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(54) **ADJUSTING GENERAL DAMAGES VALUES USING EQUALIZATION VALUES**

(76) Inventors: **Frank Scalet**, Round Rock, TX (US); **Scott Henry**, Austin, TX (US); **Clifton Watters**, Pflugerville, TX (US); **Scott Dulock**, Cedar Park, TX (US)

Correspondence Address:
MEYERTONS, HOOD, KIVLIN, KOWERT & GOETZEL, P.C.
P.O. BOX 398
AUSTIN, TX 78767-0398 (US)

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(52) **U.S. Cl.** **705/4**

(57) **ABSTRACT**

A selection is made from a defined list of one or more equalization criteria. Based on the selected equalization criteria, equalization values are derived from a set of closed claim data. During processing of open claims, bodily injury data for the open claims are entered into the system. For one or more of the open claims, precedent claims that match the open claim are identified based on characteristics of the open claim. A value for one or more of the matching precedent claims is adjusted using the previously determined equalization values. An amount for use in settling the open claim is determined based on the adjusted value.

Soft Tissue Injury

Median of precedents in data set: **$4,596**
Mean of precedents in data set: **$4,695**
Mid-zone of precedents in data set: **$4,595**

	Claimant	Medical
Claim Number	4765	Demonstrables
Date of Accident	03/30/2005	*none*
Age	19	Soft Tissue,
Gender	Female	Injuries
State	Texas	Sprain Strain of cervical spine Sprain Strain of lumbosacral spine
County	Travis	Treatment Period
Claim Type	Unlitigated	15 weeks
		15 weeks
		36 (Chiropractor) Treatment none Prognoses Dr. Chiropractor for the Treatment on 07/21/2005: resolved

This claim has closed on 06/29/2005: General Damages		$6,600
Accepted Medicals	$8,110	
Accepted Wages	$0	
Specials	$8,110	$8,110
Gross Total		**$14,710**
Claimant Liability		0.00%

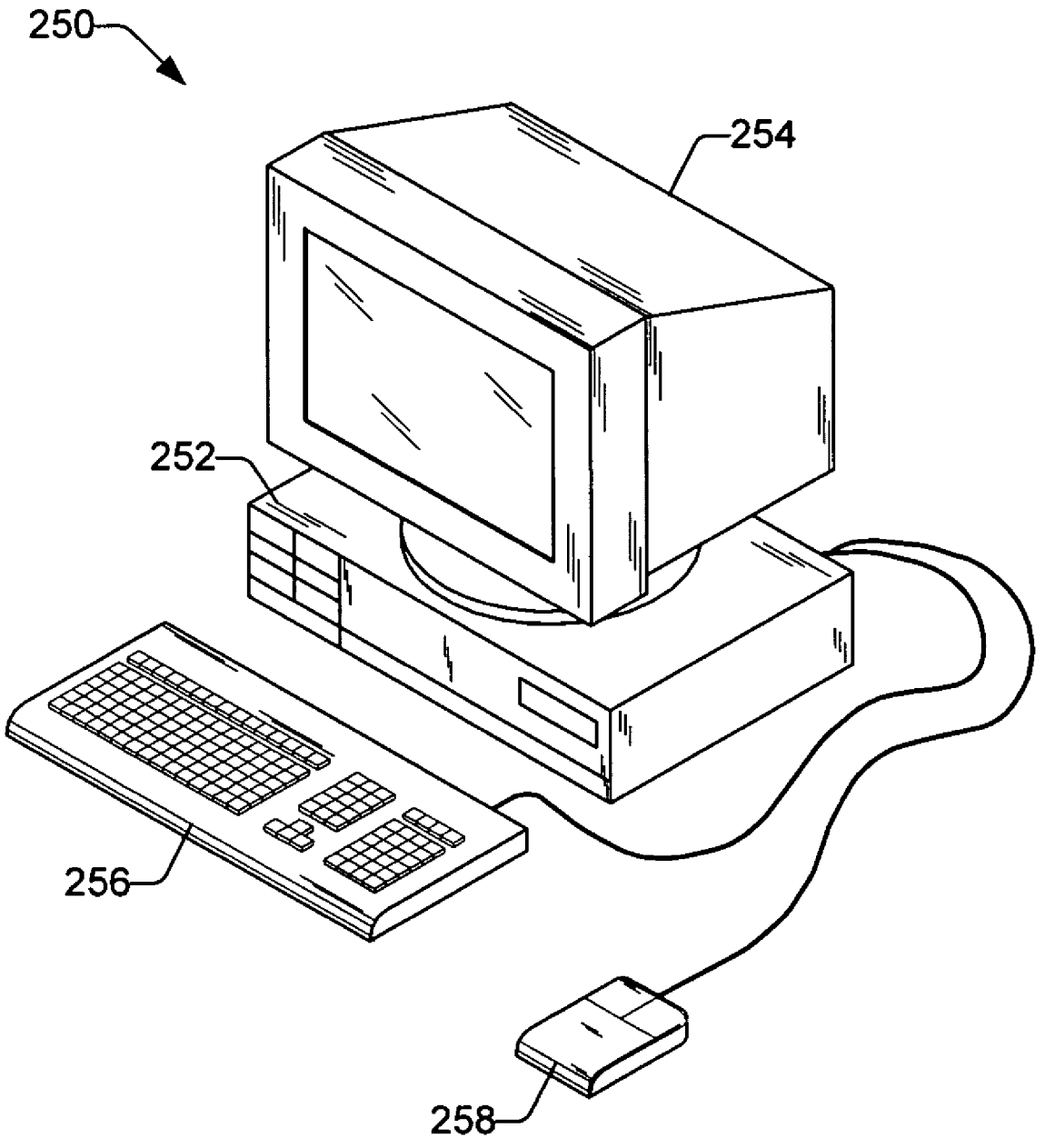

FIG. 1

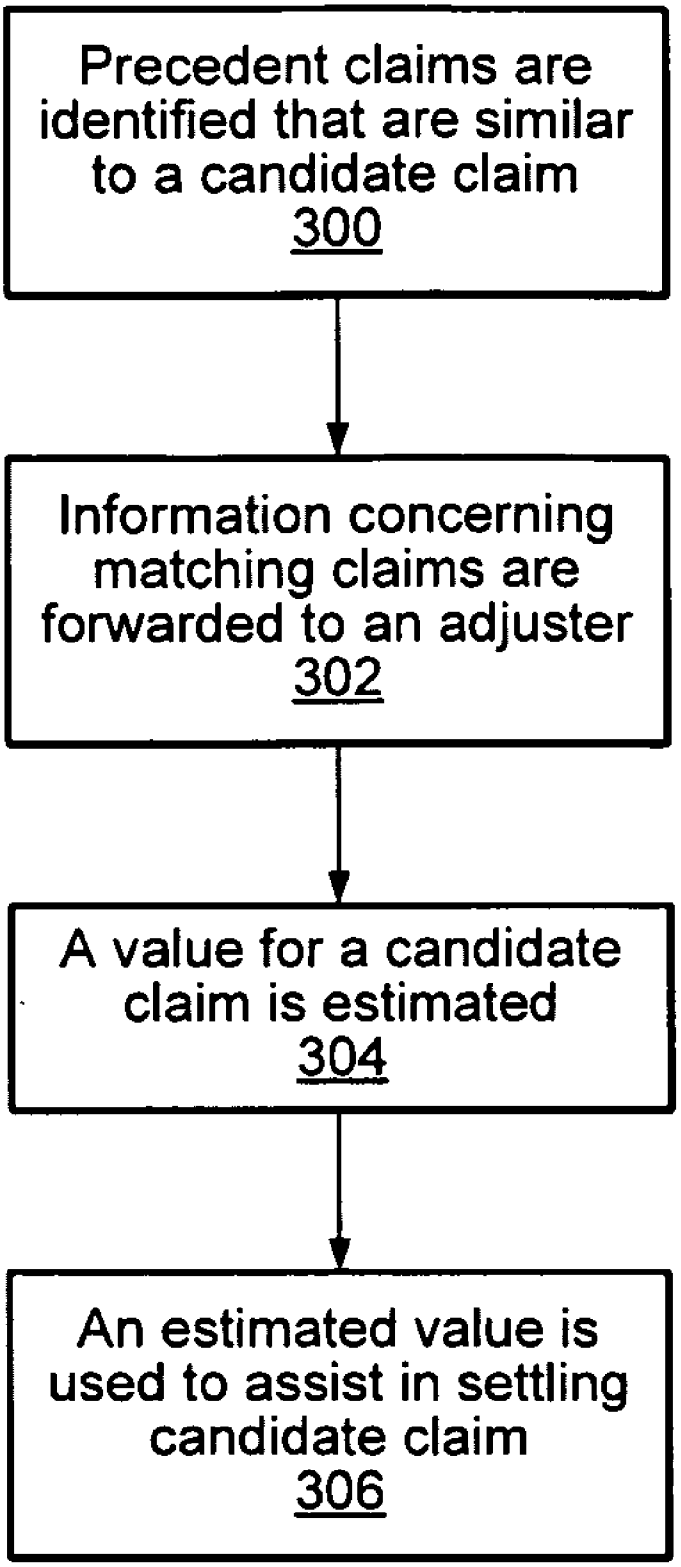
Precedent claims are identified that are similar to a candidate claim
300
Information concerning matching claims are forwarded to an adjuster
302
A value for a candidate claim is estimated
304
An estimated value is used to assist in settling candidate claim
306

FIG. 2

Soft Tissue Injury

Median of precedents in data set: **$4,596**
Mean of precedents in data set: **$4,695**
Mid-zone of precedents in data set: **$4,595**

	Claimant	Medical
Claim Number	4765	Demonstrables
Date of Accident	03/30/2005	*none*
Age	19	Soft Tissue,
Gender	Female	Injuries
State	Texas	Sprain Strain of cervical spine Sprain Strain of lumbosacral spine
County	Travis	Treatment Period
Claim Type	Unlitigated	15 weeks
		15 weeks
		36 (Chiropractor) Treatment none Prognoses Dr. Chiropractor for the Treatment on 07/21/2005: resolved

This claim has closed on 06/29/2005: General Damages		$6,600
Accepted Medicals	$8,110	
Accepted Wages	$0	
Specials	$8,110	$8,110
Gross Total		**$14,710**
Claimant Liability		0.00%

FIG. 3

Fracture Injury

Median of precedents in data set: $8,760 Mean of precedents in data set: **$9,821**
Mid-zone of precedents in data set: $8,571

	Claimant	Medical
Claim Number	4653	**Demonstrables**
Date of Accident	09/01/2004	Injuries (* denote dominant factors)
Age	44	* Open fracture of left radius (1 months - ongoing symptoms)
Gender	Male	**Treatments**
State	Nebraska	left wrist - Open reduction of fracture/left arm
County	Lincoln	left arm - Immobilization
Claim Type	Unrepresented	systemic - Prescribed medication
		Soft Tissue
		none
		Future Treatments
		none

This claim has closed on 10/01/2004: General Damages		$20,139
Claimed Wage Loss	$6,584	
Accepted Wage *Loss*	$6,584	
Medicals	$23,007	$23,007
Disfigurement		$0
Gross Total		**$50,000**
Claimant Liability		0.00%

FIG. 4

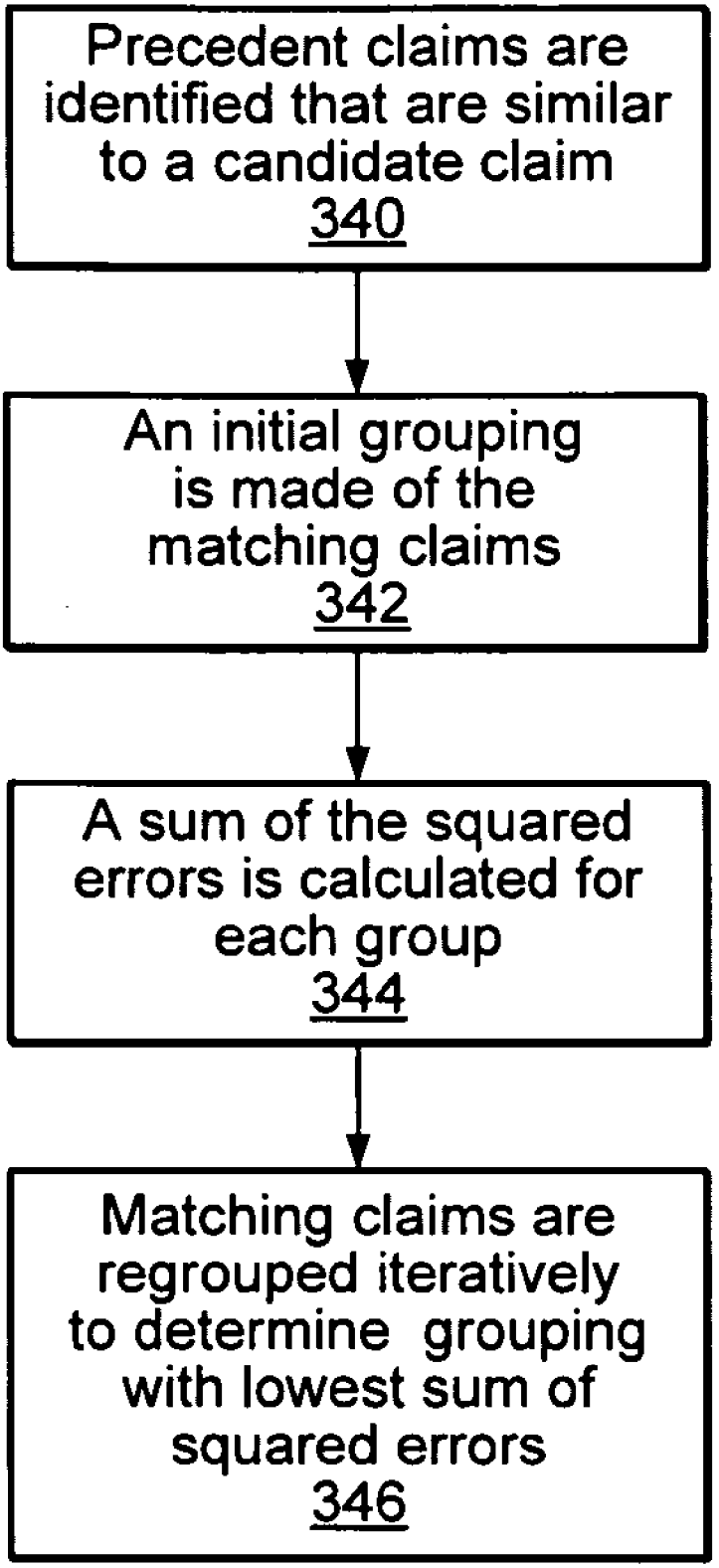
Precedent claims are identified that are similar to a candidate claim
340
An initial grouping is made of the matching claims
342
A sum of the squared errors is calculated for each group
344
Matching claims are regrouped iteratively to determine grouping with lowest sum of squared errors
346

FIG. 5

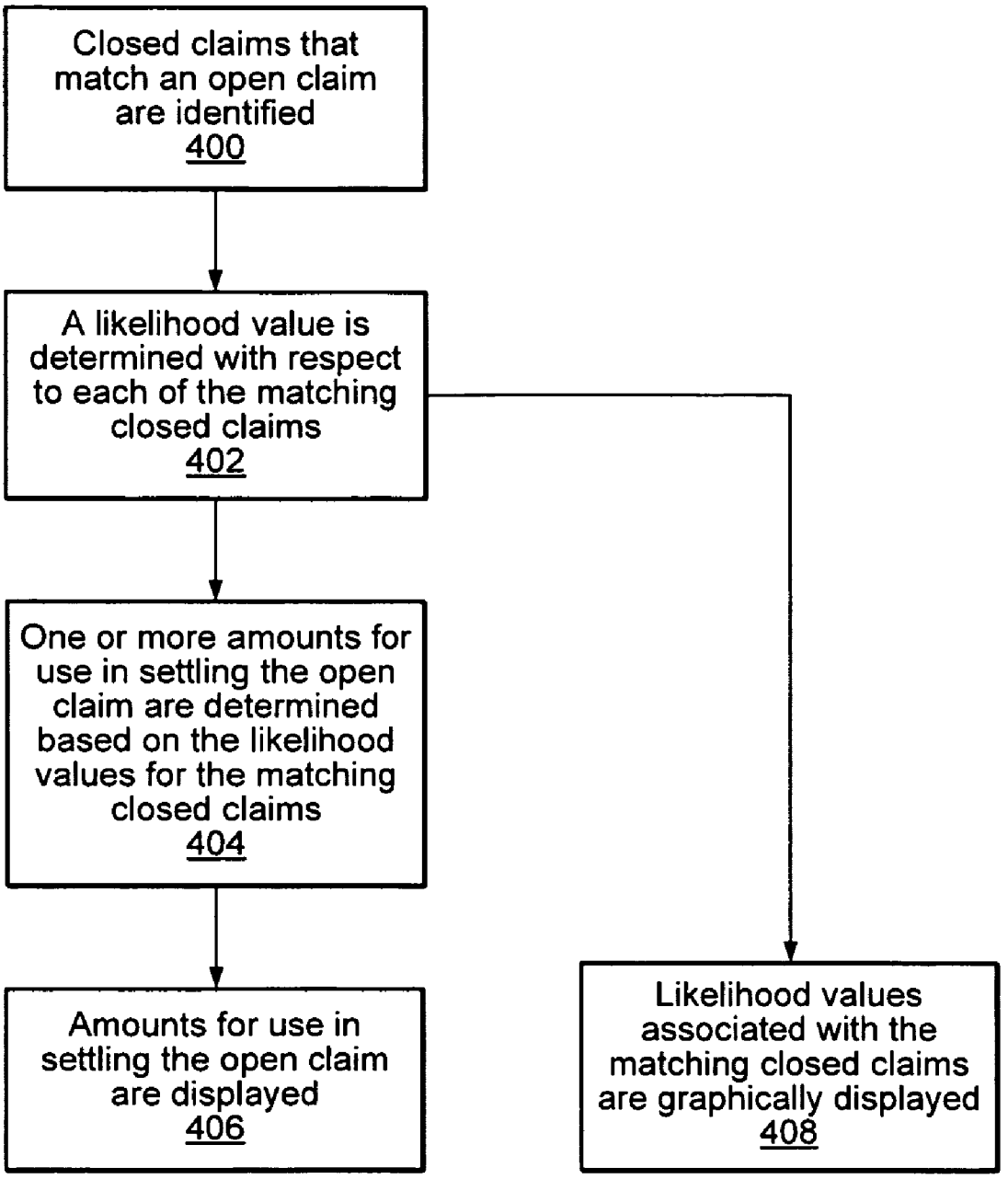
Closed claims that match an open claim are identified
400
A likelihood value is determined with respect to each of the matching closed claims
402
One or more amounts for use in settling the open claim are determined based on the likelihood values for the matching closed claims
404
Amounts for use in settling the open claim are displayed
406
Likelihood values associated with the matching closed claims are graphically displayed
408

FIG. 6

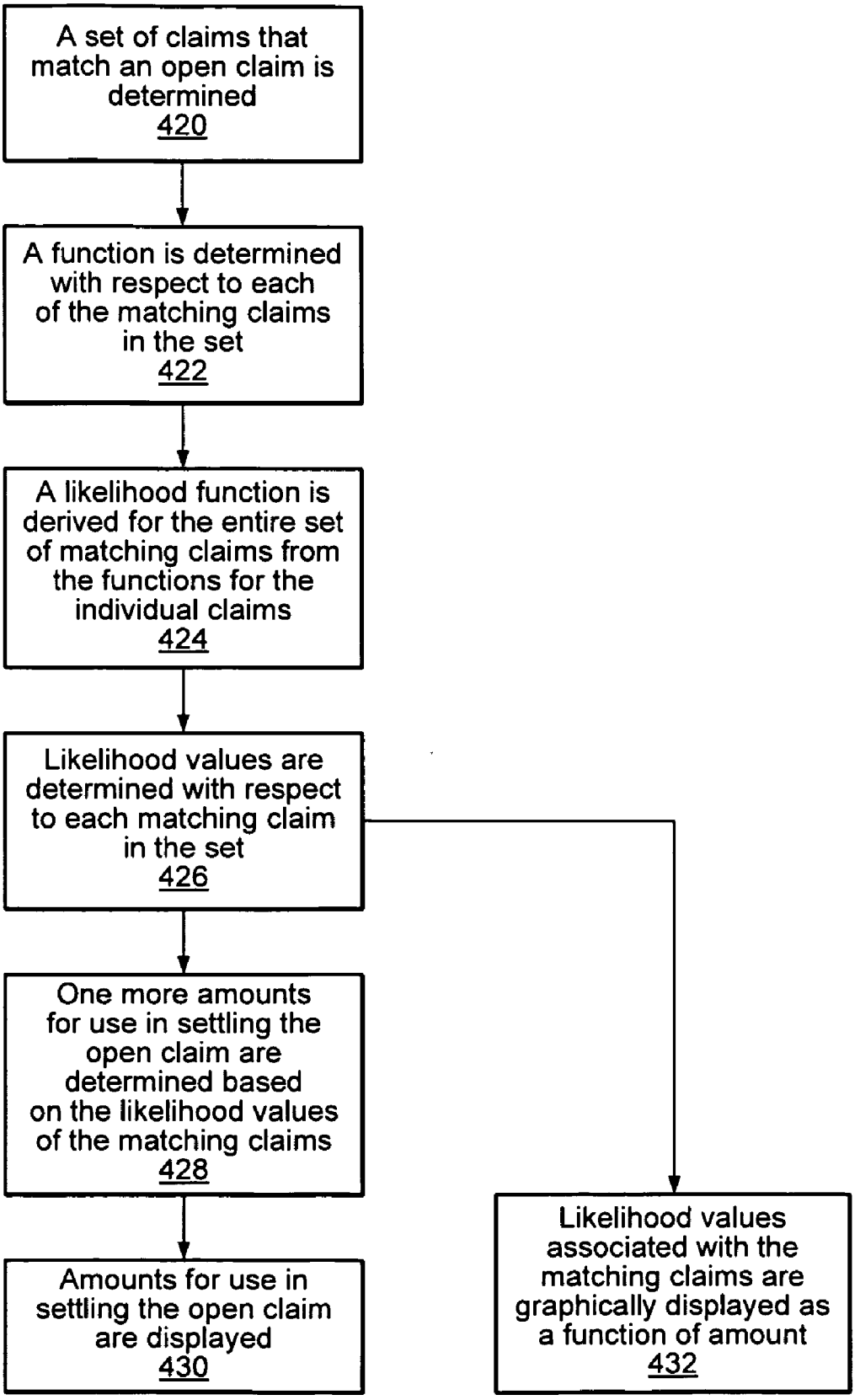
A set of claims that match an open claim is determined
420
A function is determined with respect to each of the matching claims in the set
422
A likelihood function is derived for the entire set of matching claims from the functions for the individual claims
424
Likelihood values are determined with respect to each matching claim in the set
426
One more amounts for use in settling the open claim are determined based on the likelihood values of the matching claims
428
Amounts for use in settling the open claim are displayed
430
Likelihood values associated with the matching claims are graphically displayed as a function of amount
432

FIG. 7

440

442 Claim ID	444 Matching Claim ID	446 Rating	448 Prec_Stl_Adj_Mny	450 STL_GDS_MNY	452 Prec_GD_Liklihood
CWW110001001	0000001464001	2	339.52	380	0.00029299
CWW110001001	0000002063001	4	758.21	4995	0.000417868
CWW110001001	0000017267001	1	769.29	927	0.000419192
CWW110001001	0000001234001	3	897.03	1407	0.000425344
CWW110001001	0000012582001	4	1082.54	1090	0.000406217
CWW110001001	0000005265001	2	1553.00	2000	0.000280081
CWW110001001	0000012497001	4	2189.12	3121	0.000159015
CWW110001001	0000016477001	2	3123.46	5793	0.000137601
CWW110001001	0000004399001	4	3825.83	22000	0.000121044

FIG. 8

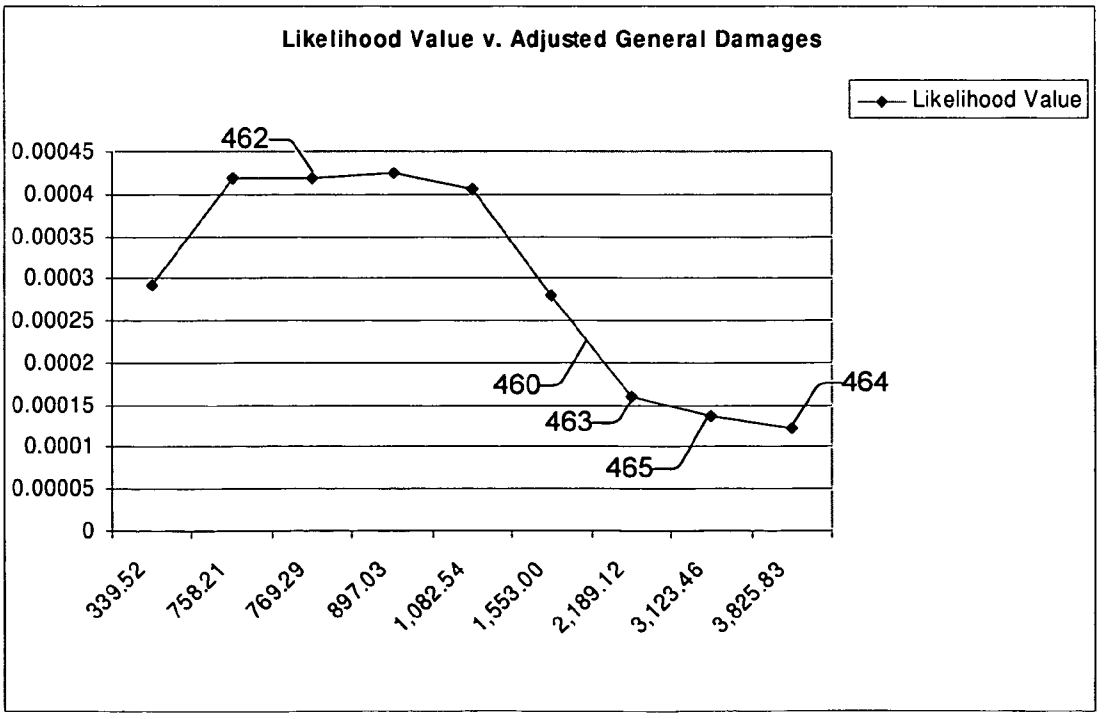

FIG. 9

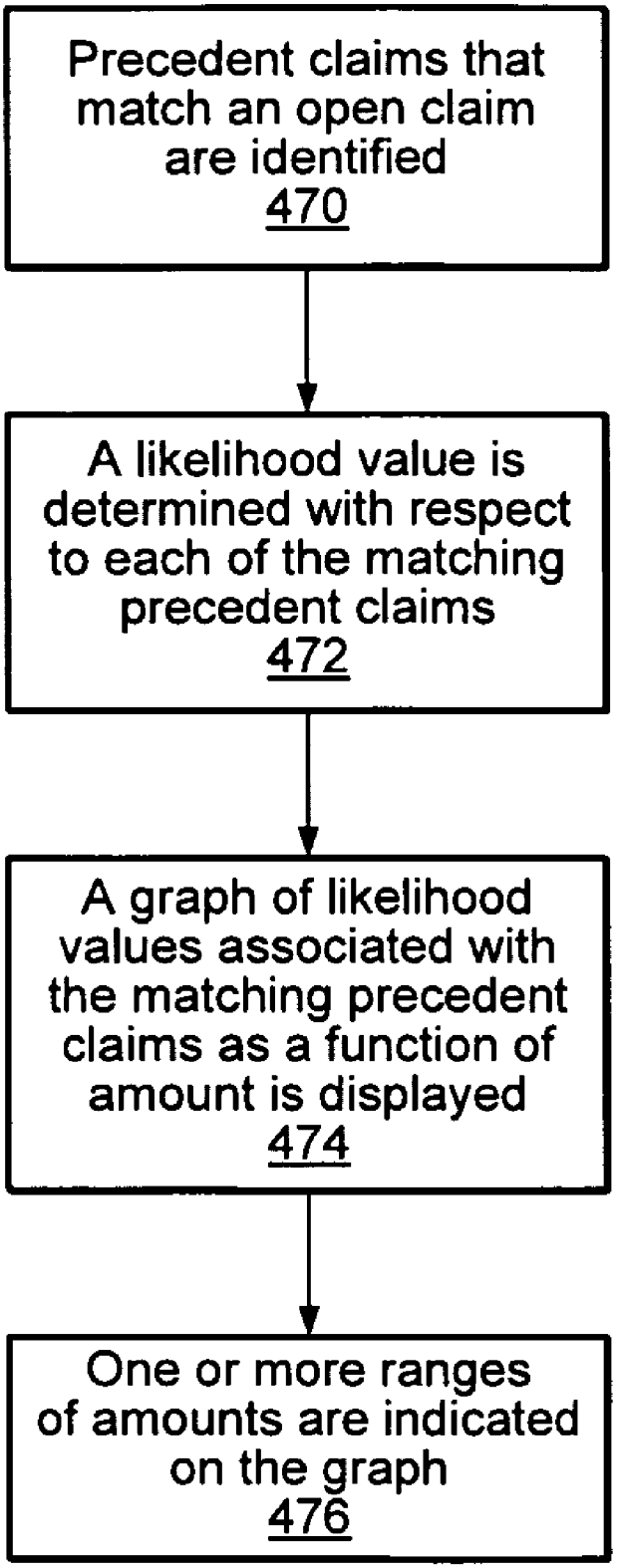
Precedent claims that match an open claim are identified
470
A likelihood value is determined with respect to each of the matching precedent claims
472
A graph of likelihood values associated with the matching precedent claims as a function of amount is displayed
474
One or more ranges of amounts are indicated on the graph
476

FIG. 10

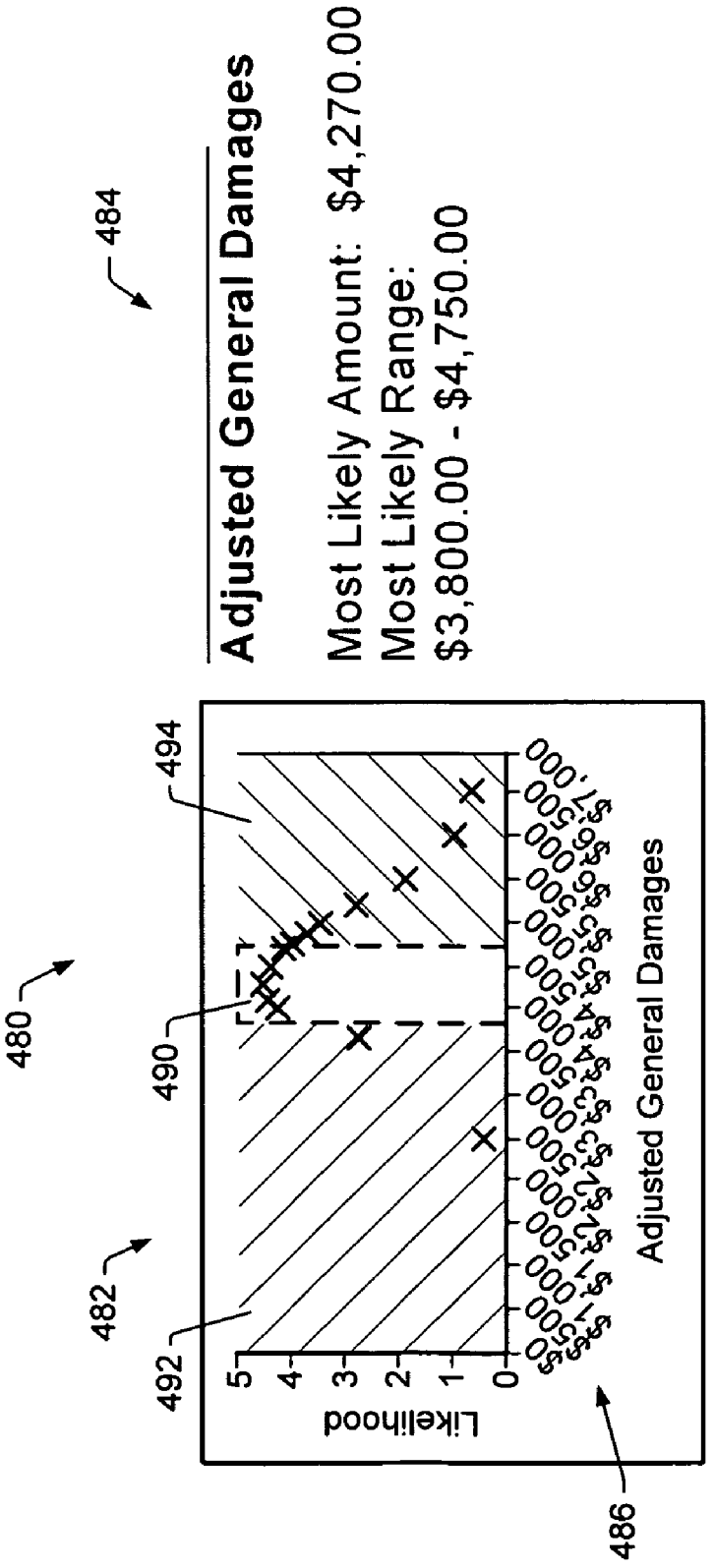
484
Adjusted General Damages
Most Likely Amount: $4,270.00
Most Likely Range:
$3,800.00 - $4,750.00
480
482
490
494
492
Likelihood
5
4
3
2
1
0
$500
$1,000
$1,500
$2,000
$2,500
$3,000
$3,500
$4,000
$4,500
$5,000
$5,500
$6,000
$6,500
$7,000
Adjusted General Damages
486

FIG. 11

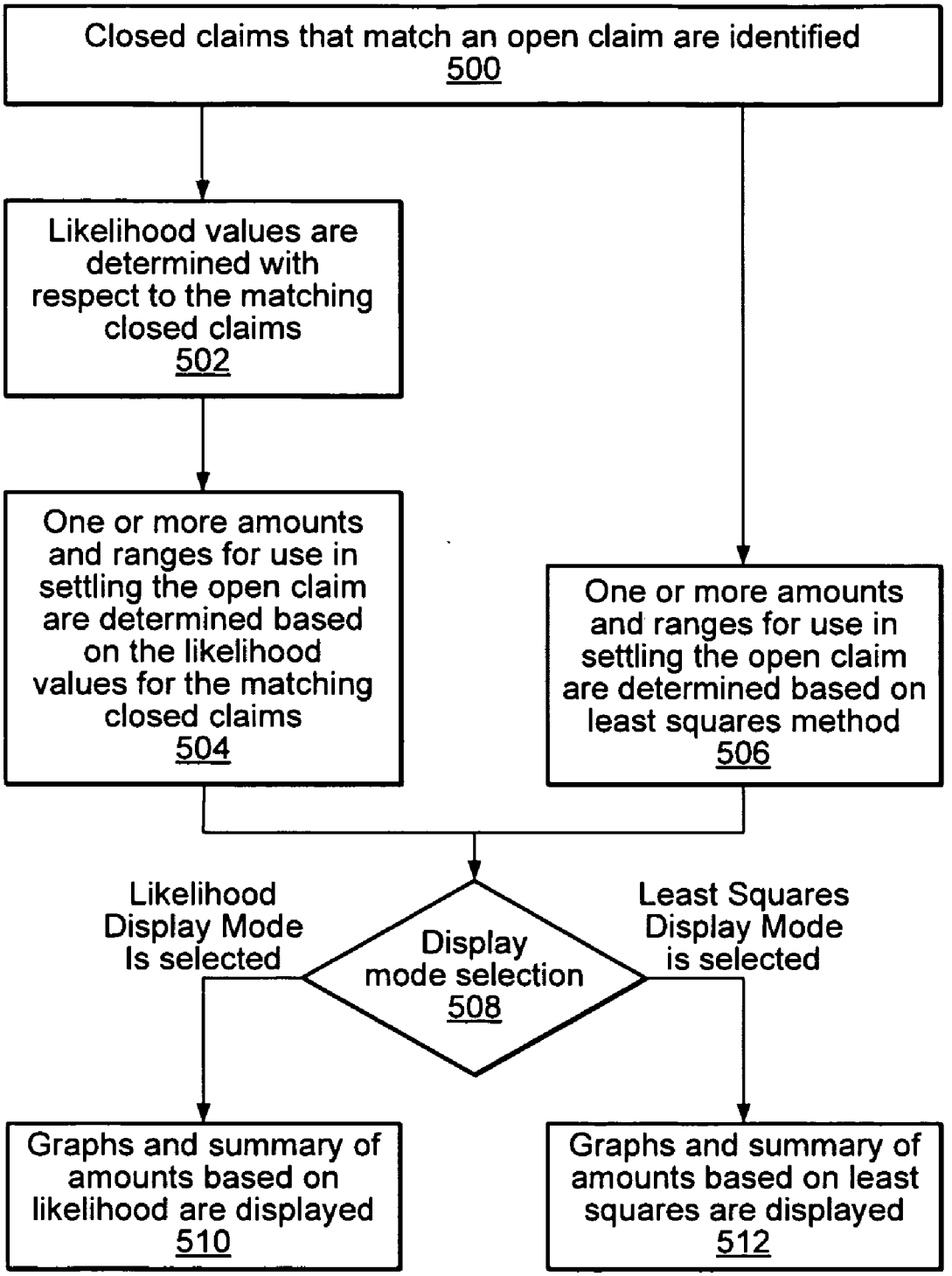
Closed claims that match an open claim are identified
500
Likelihood values are determined with respect to the matching closed claims
502
One or more amounts and ranges for use in settling the open claim are determined based on the likelihood values for the matching closed claims
504
One or more amounts and ranges for use in settling the open claim are determined based on least squares method
506
Likelihood Display Mode Is selected
Display mode selection
508
Least Squares Display Mode is selected
Graphs and summary of amounts based on likelihood are displayed
510
Graphs and summary of amounts based on least squares are displayed
512

FIG. 12

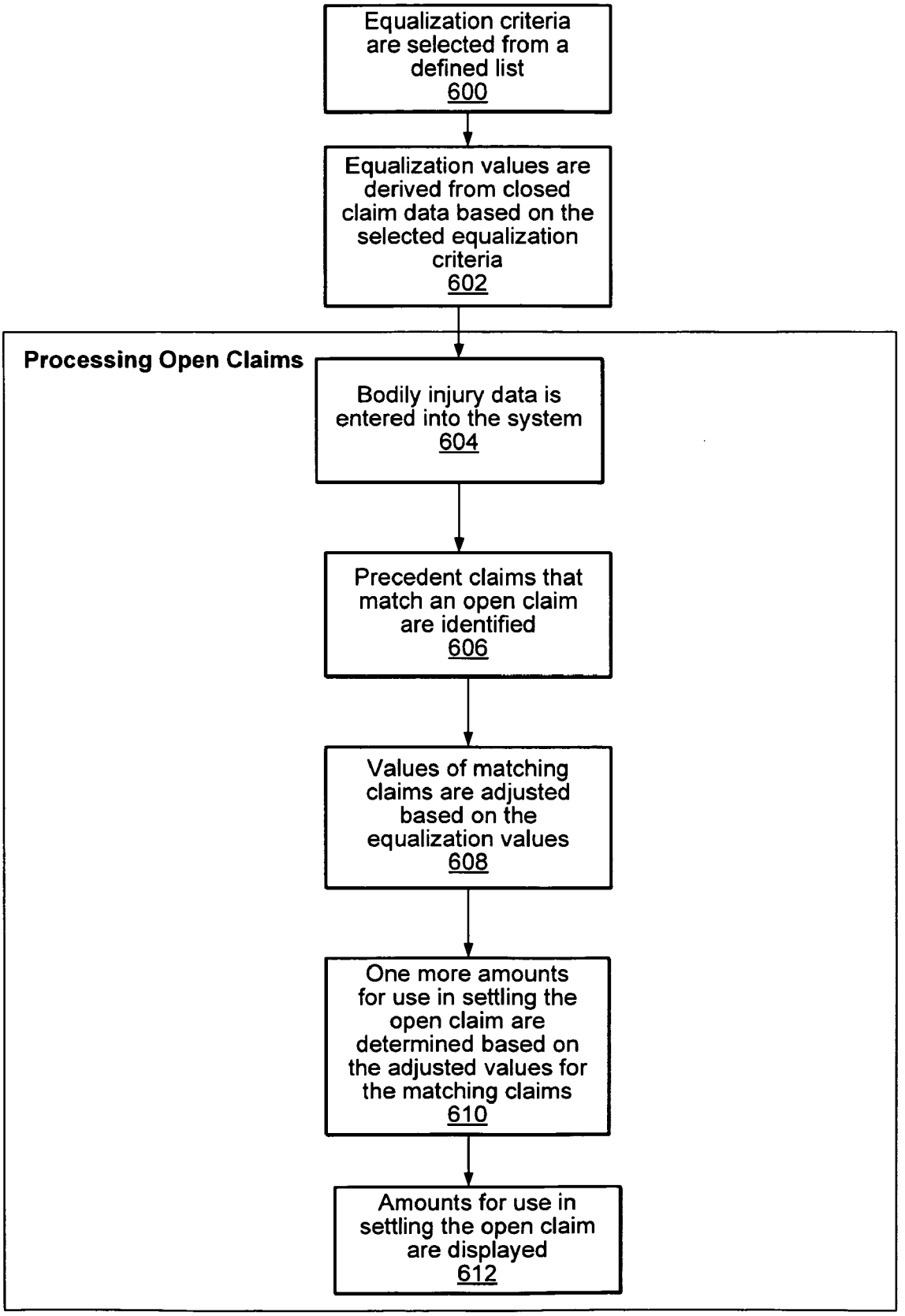
Equalization criteria are selected from a defined list
600
Equalization values are derived from closed claim data based on the selected equalization criteria
602
Processing Open Claims
Bodily injury data is entered into the system
604
Precedent claims that match an open claim are identified
606
Values of matching claims are adjusted based on the equalization values
608
One more amounts for use in settling the open claim are determined based on the adjusted values for the matching claims
610
Amounts for use in settling the open claim are displayed
612

FIG. 13

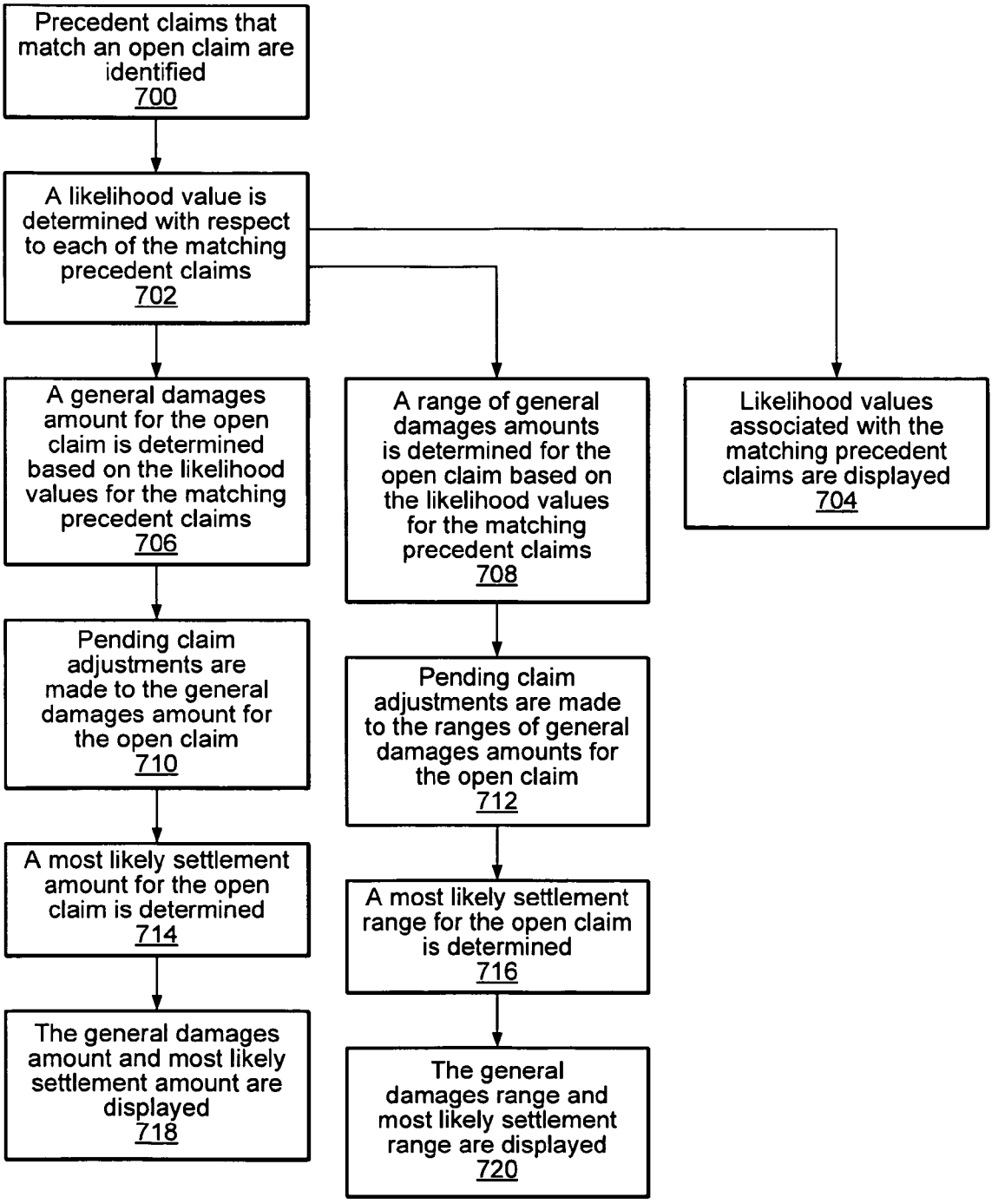
Precedent claims that match an open claim are identified
700
A likelihood value is determined with respect to each of the matching precedent claims
702
A general damages amount for the open claim is determined based on the likelihood values for the matching precedent claims
706
Pending claim adjustments are made to the general damages amount for the open claim
710
A most likely settlement amount for the open claim is determined
714
The general damages amount and most likely settlement amount are displayed
718
A range of general damages amounts is determined for the open claim based on the likelihood values for the matching precedent claims
708
Pending claim adjustments are made to the ranges of general damages amounts for the open claim
712
A most likely settlement range for the open claim is determined
716
The general damages range and most likely settlement range are displayed
720
Likelihood values associated with the matching precedent claims are displayed
704

FIG. 14

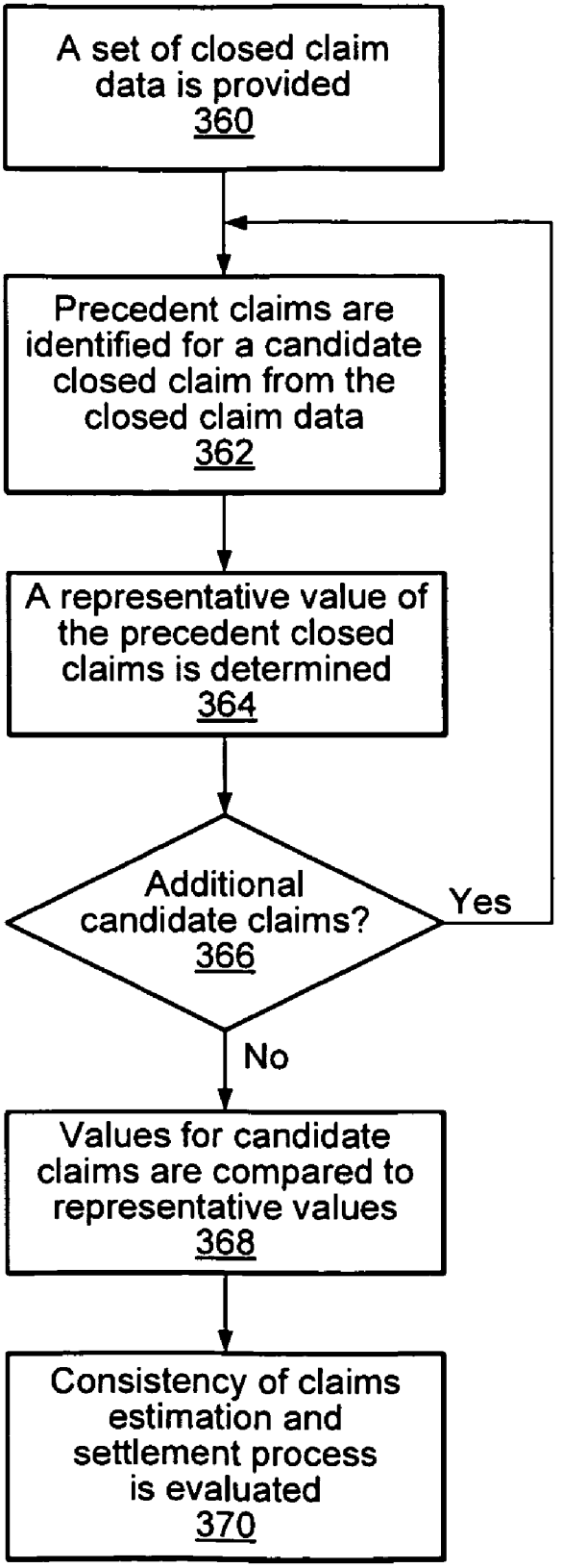
A set of closed claim data is provided
360
Precedent claims are identified for a candidate closed claim from the closed claim data
362
A representative value of the precedent closed claims is determined
364
Additional candidate claims?
366
Yes
No
Values for candidate claims are compared to representative values
368
Consistency of claims estimation and settlement process is evaluated
370

FIG. 15

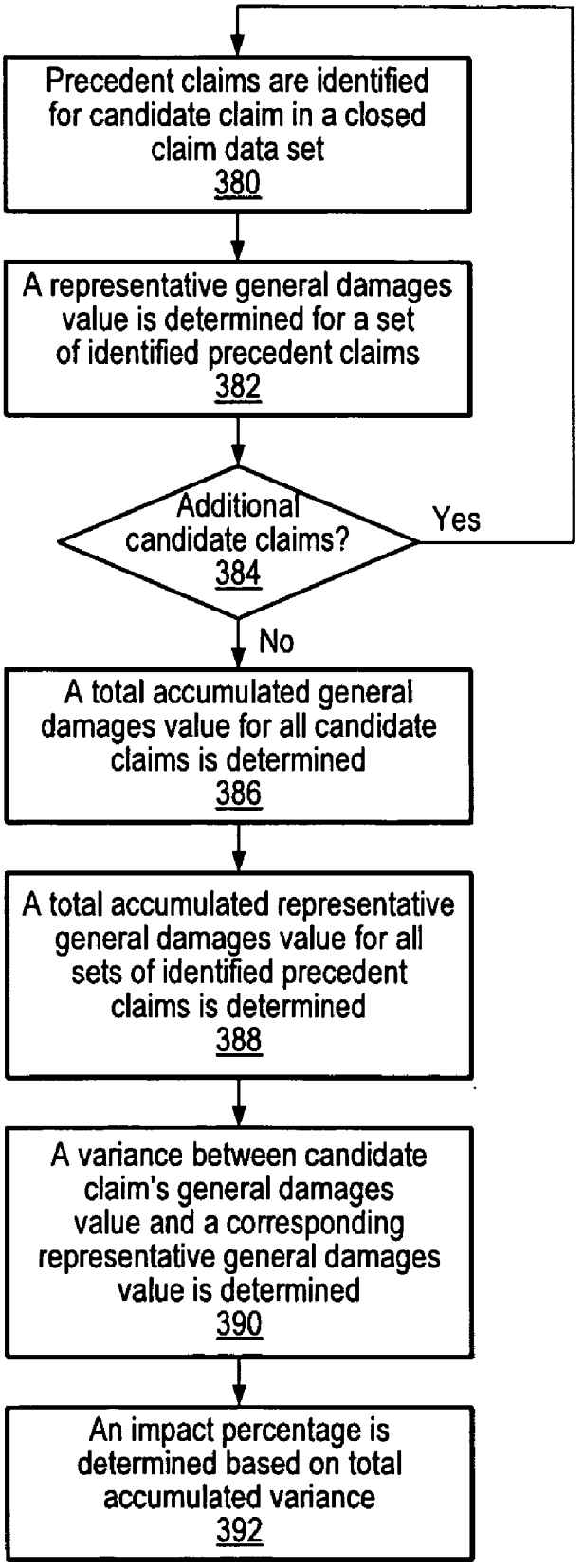
Precedent claims are identified for candidate claim in a closed claim data set
380
A representative general damages value is determined for a set of identified precedent claims
382
Additional candidate claims?
384
Yes
No
A total accumulated general damages value for all candidate claims is determined
386
A total accumulated representative general damages value for all sets of identified precedent claims is determined
388
A variance between candidate claim's general damages value and a corresponding representative general damages value is determined
390
An impact percentage is determined based on total accumulated variance
392

FIG. 16

Candidate Closed Claim					Matching Closed Claims								
ID	Type	Juris	Dom	Value	Zone	ID	Value($)	Mean		Median		Mid-Zone Average	
1	U	TX	ST	5,115.00	Low	M	2,000.00	5,162.50		5,150.00		5,125.00	
					Low	N	2,200.00						
					Mid	O	4,900.00						
					Mid	P	5,100.00						
					Mid	Q	5,200.00						
					Mid	R	5,300.00						
					High	S	7,600.00						
					High	T	9,000.00						
2	D	MA	D	15,500.00	Low	V	10,000.00	17,100.00		14,000.00		14,500.00	
					Mid	W	13,500.00						
					Mid	X	14,000.00						
					Mid	Y	16,000.00						
					High	Z	32,000.00						
								Mean	Difference	Median	Difference	Mid-Zone Average	Difference
Total Value - Candidates				20,615.00			Total Representative Values	22,262.50	1,647.50	19,150.00	1,465.00	19,625.00	990.00
							Potential Impact		7.99%		7.11%		4.80%

FIG. 17

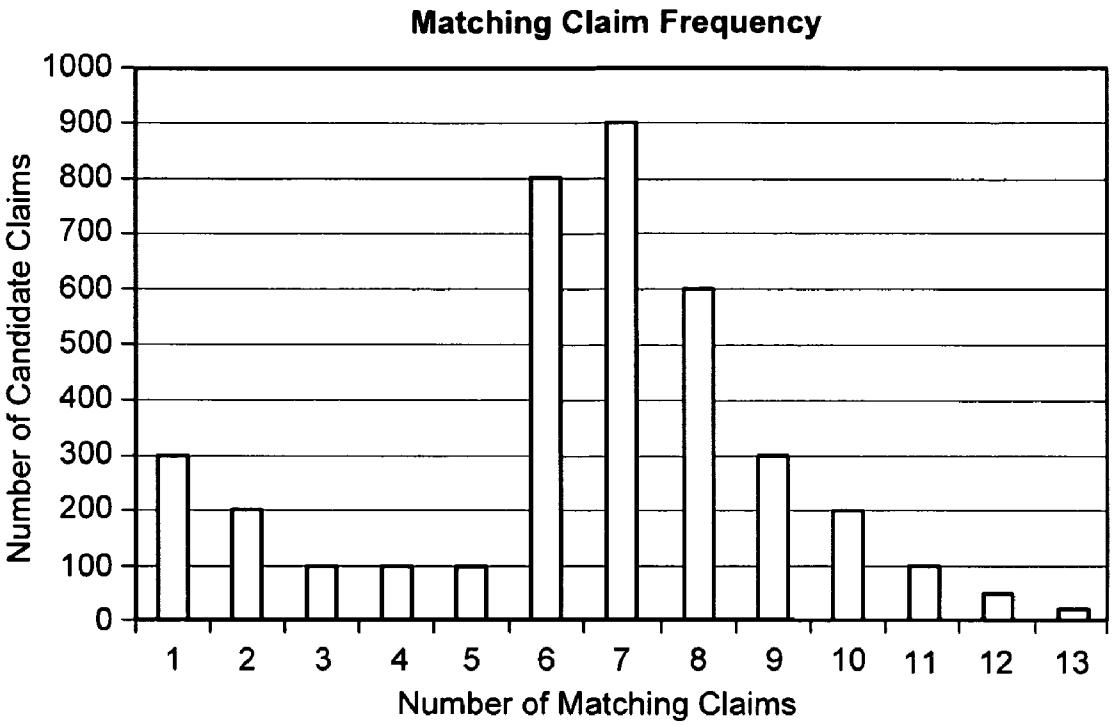
Matching Claim Frequency
Number of Candidate Claims
1000
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
9
10
11
12
13
Number of Matching Claims

FIG. 18

ADJUSTING GENERAL DAMAGES VALUES USING EQUALIZATION VALUES

PRIORITY CLAIM

[0001] This application claims priority to U.S. Provisional Patent Application Ser. No. 61/022,140 filed on Jan. 18, 2008 entitled: "SYSTEM AND METHOD FOR EVALUATING EFFECTIVENESS OF INSURANCE CLAIMS ASSESSMENT AND NEGOTIATION" and U.S. Provisional Patent Application Ser. No. 61/053,556 filed on May 15, 2008, entitled "SYSTEM AND METHOD FOR DETERMINING AMOUNTS FOR SETTLING INSURANCE CLAIMS", the disclosures of which is hereby incorporated by reference as if fully set forth herein.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention generally relates to methods of assessment and negotiation of insurance claims. Certain embodiments relate to systems and methods of evaluating the effectiveness and consistency of computer processes and systems used in insurance assessment and negotiation.

[0004] 2. Description of the Related Art

[0005] Insurance companies have been processing and settling claims associated with bodily injury for a long time. The task of evaluating, analyzing or estimating the amount of damage associated with one or more types of bodily injuries, especially trauma-induced bodily injuries, can be very complex. Complexity in the evaluation process often arises out of the fact that concurrent expertise in legal, medical and insurance fields is often required to arrive at a particular decision involving a bodily injury claim.

[0006] Several factors can affect the estimated amount of the claim associated with a bodily injury. Every accident is different and every injury is unique. Arriving at a customized evaluation of a bodily injury claim, which is unique for a specific accident, injury, etc. is desirable. Applying across-the-board standards may tend to result in an inequitable solution for one or more parties involved. External environmental factors, such as the experience level of a claims adjuster, record of accomplishment of the legal professionals, post-injury quality of life for the injured party, etc., all may affect the valuation of a claim.

[0007] Many insurance companies have been using computer-based and knowledge-based claim-processing systems to process, evaluate, analyze and estimate thousands or even millions of claims in what is intended to be a fair and consistent manner. A knowledge-based claim-processing system may include an expert system which utilizes and builds a knowledge base to assist the user in decision making. Such a system may allow the insurance companies to define new business rules and/or use previously defined rules, in real-time. The business rules are generally written by industry experts to evaluate legal, medical, insurance conditions before arriving at a valuation of a claim.

[0008] The use of assessment tools can improve the fairness and equity in claim adjusting, especially the equity between claimants with similar claims. However, there is often significant variation in the values of similar claims. In many instances, these variations may be warranted by the individual nuances of a particular claim. However, there are also a number of claims with widely disparate values that likely have no real material differences to warrant these disparate values. For any given insurer, there may be a number of precedent claims in the insurer's closed claim database that embody the best practices for a particular candidate claim; however, finding and presenting these claims to the insurer's claim team as a basis for closing the candidate claim may not be possible due to the sheer size of the database and the difficulty in matching the essential features of a claim with the available tools or methods.

[0009] Even where assessment tools for claims adjustment and negotiation are being used (or considered for use) by an organization, it may be difficult to assess how useful or consistent the values (e.g., dollar amounts) being generated using the system are.

SUMMARY

[0010] Various embodiments of determining and displaying amounts for use in settling insurance claims are disclosed. In an embodiment, closed claims that match an open claim are identified based on one or more characteristics of the open claim. A likelihood value associated with at least one of the matching closed claims is determined. An amount for use by an adjuster in settling the open claim (e.g., a general damages amount or a recommended payout amount) is determined based on the likelihood value for at least one of the matching claims. A most likely amount and most likely range associated with the open claim may be determined based on the likelihood values. In certain embodiments, likelihood values are determined using kernel density estimation.

[0011] In an embodiment, likelihood values are determined for one or more closed claims that match an open claim. A graph is displayed of the likelihood values as a function of an amount (e.g., general damages amount). The graph may be an x-y graph in which the x-axis is amount and the y-axis is likelihood value. The graph may include a likelihood curve. In certain embodiments, a band to corresponding a most likely range of amounts is shown on the graph. The band may include, for example, all the claims within a specified percentage of a most likely value for an open claim. The band may provide a visual aid to an adjuster in choosing an amount for settling the open claim.

[0012] In an embodiment, a selection is made from a defined list of one or more equalization criteria. Based on the selected equalization criteria, equalization values are derived from a set of closed claim data. The selection of the equalization criteria and the derivation of equalization values may be accomplished during installation of a claims-matching program onto a computer system. During use of the claims-matching program to process open claims, bodily injury data for the open claims are entered into the system. For one or more of the open claims, precedent claims that match the open claim are identified based on characteristics of the open claim. A value for one or more of the matching precedent claims (e.g., a general damages value) is adjusted using the previously determined equalization values. An amount for use in settling the open claim (e.g., a recommended settlement amount) is determined based on the adjusted value.

[0013] In an embodiment, precedent claims that match a pending claim are identified. A general damages amount is determined based on the likelihood value for at least one of the matching precedent claims. A general damages amount is derived from the likelihood value for at least one of the matching precedent claims. Pending claim adjustments are calculated based on amounts associated with the pending claim. Pending claim adjustments are applied to (e.g., added

to or subtracted from) the general damages amount to determine a recommended settlement amount. In certain embodiments, pending claim adjustments are applied to an adjusted general damages range derived from the precedent claims to determine a recommended settlement range.

[0014] Various embodiments of evaluating processes for insurance claim estimation and settlement are disclosed. In an embodiment, data is provided for closed claims that have been previously settled using an estimation and settlement process. Each closed claim in the data is treated as a candidate claim. For each candidate closed claim, a set of closed claims similar to the candidate closed claim is identified based on characteristics of the candidate closed claim. For each set of similar claims so identified, a representative value for the set of similar claims, such as an arithmetic mean, is determined. The settlement values for the candidate closed claims are compared to the representative values for the sets of similar closed claims. The consistency of the claims estimation and settlement process is evaluated based on the comparison. In certain embodiments, a potential benefit of changing or improving the estimation and settlement process is projected based on the comparison. The projection may be used in benefit studies, quality assessments, or the like.

[0015] In an embodiment, a method of evaluating an insurance claim estimation and settlement process includes providing candidate claims, each having an associated general damages value. For each candidate claim, a set of claims that are similar to a candidate claim is identified based on characteristics of the candidate claim and the similar claims. A representative general damages value for the set of similar claims is determined. A total general damages value is calculated for all the candidate claims. A total representative general damages value is determined for the sets of similar claims associated with the candidate claims. A difference between the total general damages value for the candidate claims and total representative general damages value for the sets of similar claims is calculated.

[0016] In some embodiments, claims in a set of similar claims are grouped into two or more zones based on the values of the claims. A representative value for the set of similar claims may be based on values determined for claims in one or more of the zones, (such as an average value for the claims in a mid-zone). The representative value for the set of similar claims may be compared to the value for a candidate claim.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] A better understanding of the present invention may be obtained when the following detailed description of preferred embodiments is considered in conjunction with the following drawings, in which:

[0018] FIG. **1** illustrates a computer system suitable for implementing various embodiments.

[0019] FIG. **2** illustrates matching of candidate claims to precedent claims according to one embodiment.

[0020] FIG. **3** illustrates a summary report for a set of precedent claims for a soft tissue injury according to one embodiment.

[0021] FIG. **4** illustrates a summary report for a set of precedent claims for a fracture injury according to one embodiment.

[0022] FIG. **5** illustrates grouping of a claim set into zones according to one embodiment.

[0023] FIG. **6** illustrates determining an amount for use in settling an open claim using likelihood estimation according to one embodiment.

[0024] FIG. **7** illustrates determining amounts for settling open claims using a likelihood function according to one embodiment.

[0025] FIG. **8** shows a set of matches for an open claim.

[0026] FIG. **9** is a graph of likelihood values for a data set for an open claim.

[0027] FIG. **10** illustrates displaying likelihood values for a set of precedent claims matching an open claim according to one embodiment.

[0028] FIG. **11** illustrates a display of likelihood values for a set of claims matching an open claim according to one embodiment.

[0029] FIG. **12** illustrates displaying summary amounts to a user based on a display mode selected by the user.

[0030] FIG. **13** illustrates determining equalization values based on defined equalization criteria for a system and processing open claims using the determined equalization values.

[0031] FIG. **14** illustrates determining recommended settlement amounts and ranges with adjustments to adjusted general damages values for matching precedent claims.

[0032] FIG. **15** illustrates determining an effectiveness of a process using a closed claim-to-closed claim comparison according to one embodiment.

[0033] FIG. **16** illustrates evaluation of a claim estimation and settlement process in which evaluation includes determining differences between values for candidate closed claims and representative values for similar closed claims, according to one embodiment.

[0034] FIG. **17** illustrates an example of results from a closed claim mathematical analysis.

[0035] FIG. **18** illustrates a column chart reporting the matching frequency for a claim set according to one embodiment.

[0036] While the invention is susceptible to various modifications and alternative forms, specific embodiments thereof are shown by way of example in the drawings and will herein be described in detail. It should be understood, however, that the drawings and detailed description thereto are not intended to limit the invention to the particular form disclosed, but on the contrary, the intention is to cover all modifications, equivalents and alternatives falling within the spirit and scope of the present invention as defined by the appended requests. Note, the headings are for organizational purposes only and are not meant to be used to limit or interpret the description or claims. Furthermore, note that the word "may" is used throughout this application in a permissive sense (i.e., having the potential to, being able to), not a mandatory sense (i.e., must). The term "include", and derivations thereof, mean "including, but not limited to". The term "coupled" means "directly or indirectly connected".

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0037] FIG. **1** illustrates an embodiment of computer system **250** that may be suitable for implementing various embodiments of a system and method for processing claims. Each computer system **250** typically includes components such as CPU **252** with an associated memory medium such as disks **260**. The memory medium may store program instructions for computer programs. The program instructions may

be executable by CPU **252**. Computer system **250** may further include a display device such as monitor **254**, an alphanumeric input device such as keyboard **256**, and a directional input device such as mouse **258**. Computer system **250** may be operable to execute the computer programs to implement computer-implemented systems and methods for processing claims.

[0038] Computer system **250** may include a memory medium on which computer programs according to various embodiments may be stored. The term "memory medium" is intended to include an installation medium, e.g., a CD-ROM, a computer system memory such as DRAM, SRAM, EDO RAM, Rambus RAM, etc., or a non-volatile memory such as a magnetic media, e.g., a hard drive or optical storage. The memory medium may also include other types of memory or combinations thereof. In addition, the memory medium may be located in a first computer, which executes the programs or may be located in a second different computer, which connects to the first computer over a network. In the latter instance, the second computer may provide the program instructions to the first computer for execution. Computer system **250** may take various forms such as a personal computer system, mainframe computer system, workstation, network appliance, Internet appliance, personal digital assistant ("PDA"), television system or other device. In general, the term "computer system" may refer to any device having a processor that executes instructions from a memory medium.

[0039] The memory medium may store a software program or programs operable to implement a method for processing insurance claims. The software program(s) may be implemented in various ways, including, but not limited to, procedure-based techniques, component-based techniques, and/or object-oriented techniques, among others. For example, the software programs may be implemented using C#, ASP.NET, HTML, JavaScript, Java, ActiveX controls, C++ objects, JavaBeans, Microsoft Foundation Classes ("MFC"), browser-based applications (e.g., Java applets), traditional programs, or other technologies or methodologies, as desired. A CPU such as host CPU **252** executing code and data from the memory medium may include a means for creating and executing the software program or programs according to the embodiments described herein.

[0040] Various embodiments may use a service-oriented architecture. In a system using service-oriented architecture, functions may be defined using a description language. Interfaces may be invoked to perform business processes. The interfaces may be independent of the platform on which the systems operate. Therefore, the services may be used regardless of the device, operating system, or communication protocol.

[0041] In some embodiments, a system includes a rule and calculation engine. The rule and calculation engine may also allow a user to configure the system to meet particular business needs.

[0042] In some embodiments, a system includes a thin-client common front end. The common front end may provide a single claims view for all types of claims. Views can be tailored to specific types of users, such as call center representatives, who handle notification and status calls, and back-office claims processors and adjudicators.

[0043] In some embodiments, a back office system may be provided. Back office users may handle more complex business processes and processes that remain active over a longer period of time. The back office may include access to management reports. Through the back office, managers may have access to all functions within their business unit in order to provide advice and to handle issues. In one embodiment, the back office may be provided as a thin client.

[0044] As used herein, "FSO" means financial services organization. An FSO may be an organization such as an insurance carrier or a bank. FSO also includes any company, organization, or other entity that covers risk and assesses claims, including entities that self-insure.

[0045] As used herein, "general damages" generally refers to general damages relating to an injury or accident. General damages may include damages relating to pain and suffering, permanent impairment, disability, loss of enjoyment of life, and disfigurement.

[0046] As used herein, a "closed" claim means a claim that has been settled.

[0047] As used herein, an "open" means to a claim that has yet to be settled.

[0048] As used herein, "precedents" generally refer to acts or instances that may be used as an example in dealing with subsequent similar instances. Applying this interpretation to bodily injury claims, precedent finding includes the act of comparing the facts of a bodily injury claim to bodily injury claims that have occurred previously, to find similar claims and to compare the "outcome" of these claims with each other. For this purpose, the "outcome" of a bodily injury claim can be the monetary settlement, or award in respect of general damages assessed or awarded for injuries suffered.

[0049] As used herein, a "candidate claim" includes a claim that being considered for adjustment, evaluation, estimation, assessment, or comparison. The candidate claim may be, for example, an open claim for which a process of estimation, negotiation, and settlement needs to be carried out by an insurer.

[0050] As used herein, a "match" includes a claim that is identified for a candidate claim based on one or more similarities to the candidate claim. For example, a closed claim relating to a broken radius bone may be found to match a candidate claim relating to a broken ulna bone. A match need not require that the characteristics of a claim be identical to the candidate claim. The degree of similarity that a system uses to produce a match may be controlled to produce a set of matching claims that are relevant to a claims negotiation process.

[0051] As used herein, "monetary amount" means an amount of money. A monetary amount may be expressed in any terms that indicate or correspond to financial value. In some embodiments, a monetary amount may be expressed in the form of a currency, such as dollars, euros, or yen.

[0052] As used herein, "likelihood value" generally refers to a value corresponding to or representing the likelihood of a condition or event. For example, a likelihood value may provide a measure of the likelihood that the monetary value associated with a particular closed claim matching an open claim represents an appropriate value for use in settling the open claim.

[0053] As used herein, "most likely value" generally refers to a value derived from a set of two or more values that, based on an established set of criteria, is most likely to represent a good value for settlement of a claim. A "most likely range" generally refers to a range of values derived from a set of two or more values that, based on an established set of criteria, is most likely to represent a good range for settlement of a claim.

[0054] As used herein, an "adjusted value" generally refers to a value that is adjusted (increased or decreased) from an original value based on one or more criteria. In some embodiments, an adjustment may be made for one or more differences between a candidate claim and a matching claim.

[0055] As used herein, "equalization" generally refers to a process of finding and/or accounting for relativities between settlement general damages amounts with different characteristics (e.g., for different jurisdictions or for different litigation types). For example, when a system is installed, a set of equalization values (e.g., coefficient values) may be derived from a set of closed claims data and stored in a database. During use of the system to process open claims, the equalization values may be retrieved from the database and used to adjust the values of matching precedent claims to account for differences between the characteristics of the open claim and the characteristics of the matching precedent claims. As used herein, equalization does not require that the value of any one claim be made equal to that of any other claim.

Claims Matching and Analysis

[0056] In an embodiment, a system allows an adjuster to compare each open and its relevant factors to other similar closed claims to determine common attributes so that the adjuster can better assess the value of each claim. The value of a claim may be, for example, a general damages value for a bodily injury claim. The system may include a database that covers all the closed claims data of a particular FSO. Details of such claims may be accessed by the adjuster to assist the adjuster in assessing values for new claims with the same or similar factors. Similar claims that significantly vary in value can be reviewed by the adjuster to understand what unique factors may have been present in the prior claim to determine whether that prior claim may have relevance to the current claim.

[0057] FIG. **2** illustrates matching of candidate claims to precedent claims according to one embodiment. At **300**, one or more claims are identified that are similar to a candidate claim based on one or more characteristics of the candidate claim. The identification of similar claims may be carried out automatically using a computer system. In one embodiment, a claims matching process may be performed using PRECEDENT ID™, available from Computer Sciences Corporation (CSC).

[0058] At **302**, information concerning the matching claims may be presented to an adjuster. The information may include information on individual claims, as well as information concerning the set of claims as a whole. For example, statistical information concerning the matching claims may be presented to the adjuster.

[0059] At **304**, a value for the candidate claim is estimated. The value may be based on the value of one or more of the matching claims. In some embodiments, the estimated value for the candidate claim may be the same as a particular matching claim. In other embodiments, the estimated value may be based on statistical information (e.g., an average) for one or more of the matching claims.

[0060] At **306**, the value of the candidate claim may be used in a process for settling the claim. In some cases, the negotiation process for a particular open claim may include more than one matching procedure. For example, an initial offer may be made to a claimant based on one matching procedure. After a counter-offer is received, a second matching process may be carried out to support an analysis of whether to accept the counter-offer or to formulate a response to the counter-offer.

[0061] FIG. **3** illustrates an example summary for a set of precedent claims for a soft tissue injury according to one embodiment. FIG. **4** illustrates an example summary for a set of precedent claims for fracture injury according to one embodiment.

[0062] Various characteristics of a candidate claim and/or precedent claims may be used in determining a matching set of claims. For a bodily injury claim, examples of characteristics that may be considered include the nature of any injuries, the treatment modalities, the injury stabilization period, the nature of any complications, the medical outcome and prognoses, and the degree of any residual permanent impairment. In certain embodiments, additional data including mitigating factors, attorney name, vehicle impact, and/or driving while under the influence, may be considered.

[0063] In some embodiments, a system or program for automatically identifying similar cases may be used in combination with a general assessment tool. In one embodiment, an adjuster may use COLOSSUS®, available from Computer Sciences Corporation, as a general assessment tool. Thus, an adjuster may have a general assessment program and a catalog of precedent cases to assist the adjuster in determining an appropriate value for the claim and to aid in the negotiation process.

[0064] If one looks for a precedent for a claim with a broken leg then one might look at claims that involved a fractured femur, patella, tibia or fibula. These however are not similar injuries. The femur and tibia are the two major weight bearing bones of the lower extremity and are considered much more serious injuries than fractures of the fibula and patella, and this would be reflected in the settlement or verdict amount. Furthermore, even if the broken leg were in fact a fractured femur, not all previous cases of fractured femur would necessarily be similar cases. In assessing General Damages for an injury, the nature and type of injury is not assessed in isolation. One also has to assess pain and suffering for the trauma of the treatment and its duration, and the complications that may arise from the injury and also the outcome—whether the injury heals or results in residual dysfunction and impairment, and the degree of such.

[0065] In some embodiments, the system collates and presents the outcome of closely similar finalized claims. An insurer's collection of finalized claims includes claims settled by negotiation, those determined by arbitration or mediation and those determined through the court process (verdicts). Finalized cases reflect the opinions and evaluations of adjusters and their peers, attorneys, injured parties, arbitrators and juries, and therefore collectively may be a fair and true reflection of the potential value of a given claim.

[0066] While many people would agree that a fracture will be worth more than a contusion, the actual monetary damages assessed for a given injury under particular circumstances can be subject to some disagreement. There can also be disagreement over the order of many injuries in regard to their relative value to each other. These disagreements may be resolved by considering the claims that have already been finalized through settlement, arbitration or verdict.

[0067] In an embodiment, relative values or severities of injuries and assessment behavior may be learned from a database of finalized claims. The relative difference between the contusion and fracture are exhibited in the finalized claims

already present. The system may use data mining technologies to learn the relative values of such injuries and many others, from the tangle of injuries present in the finalized claims. This technology is also used to determine the impact that various treatments and complications have on the value of claims, as well as other medical and non-medical attributes. These include such things as the jurisdiction, i.e., how damages for particular injuries vary from state to state and county to county, and litigation stage, i.e., whether the claim was settled with or without attorney representation and whether a suit was filed.

[0068] Once the relative values of jurisdictions, injuries, treatments and other claim attributes have been learned then finding precedent claims can be constrained by these as well as other factors. For instance, attempting to locate an existing case matching exactly the attributes of a new fractured femur claim would probably prove fruitless. Imagine the very specific medical and non-medical features of a real fractured femur claim: the actual medical treatment, the specific period under care, the prognostic expectation, the impact on lifestyle to this individual, to name only some. It is doubtful whether another claim would exist in any insurer's database which matched exactly these features. Thus the process of locating precedent claims may include consideration of what the key features of this claim are and finding other claims which share these key features—a close match rather than an exact match. The system may determine for example that if there was both a contusion and a fracture in a claim that the contusion was not a key feature of the claim. The knowledge gained from data mining the finalized claims may form the basis of determining what is important and what is not in claims, and how this varies from claim to claim.

[0069] Matching may include input of precise and comprehensive injury and claim data to successfully search for similar claims, including the nature of injuries, the treatment modalities, injury stabilization period, nature of any complication, the medical outcome and prognoses, and the degree of any residual permanent impairment or disability.

[0070] Apart from claim data, other important information to be stored in the finalized claims database includes the financial outcome of each claim. The General Damages component for all settlements, arbitration awards and verdicts may be stored for each claim along with all the other components of the settlement.

[0071] As discussed above, mathematical models may be applied to the information relating to matched claims. Statistical measures such as mean or median for the claim set may be determined and presented to the user.

[0072] In some embodiments, claims with similar adjusted general damages amounts are grouped into zones. In determining the zones, typically three are produced, but there may be fewer depending on how many claims are found as matches. The objective in determining zones can be expressed as determining where to place the dividing lines between the values in order to make three good clusters. Good clusters may be characterized by the 'closeness' of the values to each other in a cluster.

[0073] FIG. **5** illustrates grouping of a claim set into zones according to one embodiment. At **340**, claims are identified that are similar to a candidate claim. At **342**, an initial grouping of the claims is made. At **344**, the sum of the squared errors is calculated by taking the mean of the values in a cluster, finding the difference between each value and the mean, squaring the difference, and computing the sum for all of the claims. At **346**, the dividing line is iteratively moved between values to determine the group of values with the lowest sum of squared errors.

[0074] In an embodiment, the precedent claims are divided in three groups—High, Medium and Low. For each of the groups the system calculates the minimum, maximum and weighted average value (e.g., general damages value) and the number of claims. The system also needs to derive the values which separate the groups.

[0075] Typically, three bands may be calculated. However, there may be fewer bands. In this case the high band is discarded first, then the middle band.

[0076] Values may be derived to separate the groups, or bands, in order to place the claims into these bands. In this case of three bands, the task is to find the two values that represent the dividing lines between the low and medium bands, and the dividing line between the medium and high bands. These two values may be found by regression (a stepwise process of refinement of the solution). The regression process starts by dividing the claims into three groups in increasing order of value. The value may be, for example, a General Damages amount or medicals amount, depending on which are being derived at the time. Claims are initially allocated with equal numbers in each group (as far as equal numbers can be achieved, the total number may not be exactly divisible by 3, e.g. 10 claims). The values which separate the groups are then calculated as the mid-points of the claims on either side. In other words, the separator value between the low and medium groups is calculated as half way between the highest claims in the low group and the lowest claim in the medium group.

[0077] The next task is to see if the separator values can be changed in some way in order to derive more compact groups of values, or a tighter configuration of claims in the groups. To measure compactness, or tightness of values, we use the sum of the squared errors—in this case the squared errors between each claim in a group and the average value for that group. If the sum of the squared errors decreases then the claims values in a group will form a tighter cluster. An iterative task is performed, which moves the separator values in the direction of the decreasing total squared error, for all the three groups combined. In other words, it modifies the separator values until it has the tightest fit for the three bands.

[0078] To illustrate a sum of the squared errors calculation in a simple example, a set of 100 values are to fit into 2 clusters. Cluster A and cluster B may be divided into zones using the following approach:

[0079] 1. Sort the values into ascending sequence,

[0080] 2. Initially set the dividing line such that it splits the values equally, 50 values on each side of the line—therefore 50 values for cluster A and **50** for B.

[0081] 3. Calculate the sum squared error for cluster A by finding the mean of the 50 values in A and then taking the square of the difference between the mean and each value in A, and summing them, and then do the same for B. The total squared error is the sum of the squared errors for A and B.

[0082] 4. Move the dividing line up and down in single value increments, and redistribute the values accordingly between A and B, then recalculate the total error. Continue until the total error cannot be reduced any more. In mathematical terms, the foregoing description is a regression to find the best split by descending the squared error surface.

[0083] Table 1 is an example of a set of similar claims for which can be grouped into zones according to one embodiment. Table 2 is an example of a sequence of iterations used to group the claims in Table 1. To simplify the illustration, only two zones (Group A and Group B) are determined in the example.

TABLE 1

Claim ID	Value ($)
M	4,000.00
N	4,200.00
O	5,000.00
P	5,100.00
Q	5,200.00
R	5,300.00

TABLE 2

			Group Mean ($)	Squared Error
Iteration 1	Group A	M, N, O	4,400.00	560,000.00
	Group B	P, Q, R	5,200.00	20,000.00
			Sum Squared Error	580,000.00
Iteration 2	Group A	M, N, O, P	4,575.00	652,400.00
	Group B	Q, R	5,250.00	5,000.00
			Sum Squared Error	657,400.00
Iteration 3	Group A	M, N	4,100.00	20,000.00
	Group B	O, P, Q, R	5,150.00	50,000.00
			Sum Squared Error	70,000.00
Iteration 4	Group A	M	4,000.00	0.00
	Group B	N, O, P, Q, R	4,960.00	772,000.00
			Sum Squared Error	772,000.00

Referring to Table 2, a first iteration is performed with the claims evenly divided—claims M, N, and O in Group A, and claims P, Q, and R in Group B. The sum squared error is calculated for Iteration 1. Subsequent iterations may be carried out until the grouping with the lowest sum squared error is found. In this case, Iteration 3, in which Group A includes claims M ($4,000) and N ($4,200) and Group B includes claims O ($5,000), P ($5,100), Q ($5,200), and R ($5,300), is associated with the lowest sum squared error (70,000) of all the iterations. This grouping may be used in mathematical models support claim assessment, process evaluation, or other purposes.

[0084] In some embodiments, once the zones for a set of claims are established, an average for each zone is calculated using a weighted average calculation that considers the similarity (i.e., more similar attributes) of the precedent claims to the candidate claim.

[0085] In order to derive a weighted average, a weight is calculated for each claim, based on its similarity to the candidate claim, For example, an age of the claimant and the impairment as attributes to measure for claim similarity. For whiplash claims, duration of treatment, general practitioner visits, specialist visits, physical therapy, and chiropractic visits as attributes may be used to measure for claim similarity,

[0086] A ratio is first developed which is calculated as the absolute difference between the candidate claim's attribute value and the precedent claim's attribute value, divided by the size of the zone used in the search for this attribute. For instance, if the candidate claim had a claimant age of 40 and the search used an age range of 30-50 (this range is purely hypothetical and will be influenced by search filters and algorithms) then the age band is 20. If the precedent claim had a claimant age of 45 then the age attribute ratio would be (45-40)/20 or 0.25. Ratios are calculated for all the relevant claim attributes. Then an average ratio is derived from all the relevant attribute ratios that have been calculated. The weight is then 1 minus the average ratio, all squared. Therefore, if the claim is very similar to the candidate claim then the weight will be close to 1, while if it has significant dissimilarities then the weight can be close to zero (e.g., 0.0025).

[0087] The weighted average is then calculated by multiplying each precedent claim's value (e.g., adjusted General Damages) by its weight, giving its weighted value. The weighted values for all the claims in a cluster are summed and then divided by the sum of the weights for all precedent matches to the candidate claim. The result is the weighted average.

Determining Amounts for Claims Settlement Using Likelihood Values

[0088] FIG. **6** illustrates determining an amount for use in settling an open claim using likelihood estimation according to one embodiment. At **400**, an automated system may be used to identify one or more closed claims that match an open claim. Each of the closed claims may be associated with a corresponding monetary amount. In one embodiment, the monetary amounts are general damages. At **402**, a likelihood value is determined with respect to each of the closed claims.

[0089] At **404**, one or more amounts are determined for the open claim based on the likelihood values for the matching closed claims. The amounts may be monetary amounts. An adjuster may use the monetary amounts in settling the open claim. For example, the monetary amount may be used as a proposed payout amount for the open claim.

[0090] Monetary amounts may be representative of a value for any of various aspects of the claim. For example, a monetary amount may represent a general damages value, a medicals value, a settled value, or a payout value. In some embodiments, monetary amounts may be presented to an adjuster as a Most Likely Amount or Most Likely Range.

[0091] At **406**, one or more of the amounts are displayed. In some embodiments, likelihood values for the matching claims are displayed as a function of amount (e.g., in an x-y graph). At **408**, likelihood values associated with the matching claims are graphically displayed. The amounts and likelihood values may be displayed simultaneously or on separate screens.

[0092] In some embodiments, likelihood values are determined using kernel density estimation. Kernel density estimations methods suitable for embodiments described herein may be found in "Very fast optimal bandwidth selection for univariate kernel density estimation" by Vikas Chandrakant Raykar and Ramani Duraiswami (Dec. 20, 2005, CS-TR-4774/UMIACS-TR-2005-73), which is incorporated herein by reference as if fully set forth herein. In certain embodiments, likelihood values for matching claims are determined using maximum likelihood estimation.

[0093] FIG. **7** illustrates determining amounts for settling open claims using a likelihood function according to one embodiment. At **420**, a set of claims (e.g., closed claims) that match an open claim is determined. At **422**, a function is determined with respect to each of the matching claims in the set. In one embodiment, a Gaussian function is derived for each claim in the set of claims. In one embodiment, a Gaussian curve has a mean of 0 and a variance of 1. A suitable bandwidth is determined for the function. One method for determining bandwidth may be that given in the Raykar paper.

[0094] At **424**, a likelihood function is derived for the entire set of matching claims from the functions for the individual claims. In some embodiments, the likelihood function is the sum of the functions for the individual claims.

[0095] In some embodiments, kernel density estimation is accomplished using a fast density derivative estimation. In other embodiments, kernel density estimation is accomplished using a solve-the-equation plug-in method. In one embodiment, a fast density derivative method is used for relatively large sets (e.g., 20 or more points), and a solve-the-equation plug-in method is used for smaller sets.

[0096] At **426**, likelihood values are determined with respect to each matching claim in the set. At **428**, amounts for settling the open claim are determined based on the likelihood values of the matching claims. In some embodiments, an amount for settling is the amount associated with the closed claim with the highest likelihood value. In certain embodiments, a rank or rating may be assigned to each of the matching claims based on the likelihood value. One or more ranges may be determined. Each range may include all claims falling within a specified portion of the likelihood curve. In one embodiment, a range is defined to include all the claims having values within about the top quartile of the likelihood curve. In another embodiment, a range is defined to include all claims within a specified percentage of a most likely value. In one embodiment, a range is defined to include all claims within about 10% of a most likely value.

[0097] At **430**, amounts for use in settling the open claim are displayed. The amounts may include specific values and/or ranges of values. At **432**, likelihood values associated with the matching claims are displayed as a function of amount.

[0098] FIG. **8** illustrates an example of a data set for an open claim. FIG. **9** is a graph of likelihood values for the data set shown in FIG. **8**. Table **440** includes data for a set of claims that match a candidate claim. Column **442** indicates the candidate claim for which the matching claims are found. In this case, the candidate claim is identified as claim number CWW110001001. Column **444** indicates closed claims that were found to match claim CWW110001001. A unique claim number identifies each of the matching claims. Column **446** indicates a rating for each closed claim. Column **448** indicates an adjusted dollar value for each of the closed claims. Column **450** indicates a general damages value before adjustment.

[0099] Column **452** indicates a likelihood value associated with each claim. The likelihood value may be based on a likelihood function determined as described above with respect to FIG. **7**. In the data set shown in FIG. **8**, the following is used for the kernel density estimate:

$$\hat{p}(x) = \frac{1}{N\sqrt{2\pi h^2}} \sum_{i=1}^{N} e^{-(x-x_i)^2/2h^2}$$

where N is the number of points, x_i is the value of a point, and h is a bandwidth. Bandwidth may be selected by estimating an asymptotic mean integrated squared error (AMISE)-optimal bandwidth. In one embodiment, the values for both matching claims that were paid at the policy limit and matching claims that were not paid at the policy limit are combined into a single list. Likelihood values may be calculated for all of the values on the combined list.

[0100] The rating shown in column **446** may provide an indicator of how useful the value for a claim might be in settling the open claim. The rating may reflect how close a match the candidate claim is to the matched claim in regards to data on the claim. In this example, claim number 0000017267001 has a rating of 1. Point **462** shown in FIG. **9**, which is associated with claim number 0000017267001, is near the middle of the upper range of the likelihood curve. As another example, claim number 0000004399001 has a rating of 4. Point **464** shown in FIG. **9**, which is associated with claim number 0000004399001, is on the lower fringe of the likelihood curve.

[0101] In some embodiments, a rating associated with a claim value may be based on the claim's position within a cluster of points. For example, points **463**, **464**, and **465** may be considered to form a cluster. The claim associated with point **465** may be given a relatively high rating because point **465** is in the middle of the cluster. In some embodiments, a value (e.g., dollar amount) associated with the highest rated point in a cluster may be used as a representative value. For example, $3,123.46, which is the amount associated with point **465**, may be used as a representative value.

Displaying Likelihood Values for Use in Settlement

[0102] FIG. **10** illustrates displaying likelihood values for a set of precedent claims matching an open claim according to one embodiment. At **470**, precedent claims that match an open claim are identified. At **472**, a likelihood value is determined with respect to each of the matching precedent claims. At **474**, a graph of likelihood values associated with the matching precedent claims as a function of amount is displayed. At **476**, one or more ranges of amounts are indicated on the graph.

[0103] FIG. **11** illustrates a display of likelihood values for a set of claims matching an open claim according to one embodiment. Display **480** includes graph portion **482** and summary portion **484**.

[0104] Graph portion **482** of display **480** includes general damages graph **486**. General damages graph **486** includes a curve showing likelihood values as a function of general damages. In the embodiment illustrated in FIG. **11**, the curves are represented by specific discrete points (X's). The curves may, however, be represented by a continuous curve or any other discrete or continuous symbology. General damages graph **486** and medicals graph **488** may provide a user with a visual representation of values for the matching claims. General damages graph **482** may allow an adjuster to identify a cluster of a values and select a value from the cluster, rather than for example, just picking a value from a textual list.

[0105] General damages graph **486** includes mid band **490**, lower range **492**, and upper range **494**. Mid band **490** corresponds to a most likely range for general damages. Mid band **490** and ranges **492** and **494** may serve as visual aids to assist an adjuster in choosing amounts for settling an open claim. In some embodiments, mid band **490** may be shaded, hatched, highlighted, or colored, or the like. Such indicators may provide an additional visual cue to an adjuster for focusing on a most likely amount or range. In certain embodiments, a display may include only those values within a particular band. For example, an x-y graph may display only the portion of a curve associated with a mid-band, and not display any values associated with points in the lower or upper ranges.

[0106] Summary portion **484** of display **480** includes numerical values of most likely amount and most likely range for general damages.

[0107] Although in the display shown in FIG. **10**, graph portion **482** and summary portion **484** relate to general damages, graphs may be directed to other amounts. In certain embodiments, a display may include a graph and summary for medicals instead of, or in addition, the graph and summary for general damages.

[0108] In certain embodiments, graphs and summary information are each displayed on a separate screen. Switching between screens may be accomplished by selecting a tab or by toggling between a graph screen and a summary screen. In certain embodiments, a display may include other information associated with a matching claim set. For example, a History Dialog Window may include the following columns:

[0109] Date Run, Matched Cases, Lkly GD Amnt, Lkly GD High, Lkly GD Low, Lkly Med Amt, Lkly Med Low, Lkly Med High

The 'Lkly High/Low' amounts may correspond to the Most Likely Low and High amounts. These amounts may appear on Summary, Graphs, Compare With and/or Report screens.

[0110] In general damages graph **486** shown in FIG. **11**, the likelihood (y-axis) includes scale of values 0 through 5. In other embodiments, values may be shown without any specific numerical values. Thus, likelihood values may be depicted graphically, relative to other likelihood values, rather than as an absolute value of likelihood.

[0111] In certain embodiments, an adjuster may be provided with amounts for matching precedent claims that are derived using two or more different methods. For example, an adjuster may consider a recommended settlement amount based on both a kernel density estimate for the matching claims and a least squares analysis of the matching claims. FIG. **12** illustrates displaying summary amounts to a user based on a display mode selected by the user. At **500**, closed claims are identified that match an open claim. At **502**, likelihood values are determined with respect to the matching precedent claims. At **504**, amounts and ranges for use in settling the open claim are determined based on the likelihood values for the matching precedent claims. At **506**, one or more amounts and ranges are determined for settling the open claim based on least squares method. Amounts and ranges may be determined, for example, as described above with respect to FIG. **5**. In one embodiment, a display based on least squares method may include a mid-zone amount and a mid-zone range.

[0112] At **508**, a user may be prompted to select a display mode. If the user selects the likelihood display mode, summary amounts based on likelihood are displayed at **510**. If the user selects the least squares display mode, summary amounts based on least squares are displayed at **512**. The selection of a display mode may be by toggle, tab, or other user input. In some embodiments, a default display mode may be established upon installation of a claims-matching program onto a computer system.

[0113] In certain embodiments, a user may simultaneously view amounts and graphs based on more than one method. For example, a user may simultaneously view amounts and graphs based on a maximum likelihood method and amounts and graphs based on a least squares method.

[0114] In the embodiment shown in FIG. **12**, amounts are automatically computed for an open claim based on both likelihood and least squares methods regardless of the mode selected by the user. In other embodiments, a system may compute amounts only when the user selects a particular mode. For example, if the system default is to display likelihood values, the system might not calculate least squares values unless and until the user selects a least squares display mode.

Adjusting General Damages Values Using Equalization Values

[0115] In some embodiments, general damages values for precedent claims are adjusted using predetermined equalization values to account for one or more differences between an open claim and matching precedent claims. The equalization values may be derived from a set of closed claim data and stored in a database when a system is first installed or configured for use process open claims. During processing of an open claim, the equalization values are retrieved from the database and used to adjust the general damages values of matching claims. An adjuster may use the adjusted general damages values for the matching precedent claims as basis for settling the open claim.

[0116] FIG. **13** illustrates determining equalization values based on defined equalization criteria for a system and processing open claims using the determined equalization values. Equalization criteria may be configured or selected globally for all claims to be settled by an adjuster, group of adjusters, or an FSO. In one embodiment, equalization criteria are selected or configured when a claims-matching program is installed on an FSO computer system. Equalization criteria are then applied to all claims to be settled (or, alternately, to all claims that match predetermined criteria). At **600**, equalization criteria are selected from a defined list. The defined list may be presented, for example, to an installer of a claims matching program when the program is installed. Equalization criteria may relate to various characteristics of a claim including locality, injury type, personal characteristics of a claimant, dominant injury, and claimant type. Equalization criteria may be based on a single characteristic or a combination of two or more characteristics. Equalization criteria may be selected using drop-down menus, check boxes, or similar methods.

[0117] At **602**, equalization values are determined based on the selected equalization criteria. The equalization values may be coefficients derived from a set of closed claim data. In alternate embodiments, the equalization values may be expressed as factors or multipliers. Coefficient values will vary as a function of the characteristics of the claims, such as jurisdiction, claim type, and/or secondary injury. The equalization values may be calculated in a batch process. In one embodiment, the batch process for determining the equalization values is run when a claims-matching program is first

installed. The equalization values may be recalculated (e.g., by a subsequent batch process) at various times after the initial installation of a program. For example, the equalization values may be updated on a periodic basis, such as annually or quarterly.

[0118] In some embodiments, equalization values are determined based on the particular customer's past claim data. For example, based on one customer's past data, baselined equalization values may produce an adjusted settlement amount for a claim in Louisiana that is 20% less than a similar claim in New York City, while, based on another customer's past data, baselined equalization values may produce an adjusted settlement amount for a claim in Louisiana that is 22% less than a similar claim in New York City.

[0119] Beginning at **604**, the system is placed into service to determine amounts for use in processing open claims. It will be understood that once the equalization values are determined at **602** (such as at the time the system is installed), any number of open claims may be processed without recalculating the equalization values. At **604**, bodily injury data for an open claim is entered into the system. At **606**, one or more precedent claims that match the open claim are identified by the system based on one or more characteristics of the open claim. At **608**, a value of one or more of the matching precedent claims is adjusted based on the previously determined baselined equalization values. For example, for an open claim involving permanent impairment of a 20-year old male, the system may return an amount for a first matching closed claim settled for a 25-year old male and a second matching closed claim settled for a 30-year old male. Based on the baselined equalization values, the value for the closed claim relating to the 25-year old male may be increased by 4%, and the value for the closed claim relating to the 30-year old male may be increased by 8%. As another example, a value for a closed claim relating to a broken tibia might be adjusted upward for use in settling an open claim relating to a broken femur. At **610**, an amount for use in settling the open claim is determined based on the adjusted values for the closed claims. At **612**, the amounts for settling the claim are displayed.

[0120] In one embodiment, equalization criteria includes jurisdiction, claim type, and secondary injury (or a subset of one or more of these criteria). Other equalization criteria can be used, however. For example, in certain embodiments, equalization criteria include personal characteristics of the claimants. Examples of personal characteristics to be used as equalization criteria include gender, age, or type or nature of the injury to the claimant, or type or nature of the impairment to the claimant.

[0121] In one embodiment, equalization criteria include whether a claimant's injury is a combination injury or not. For example, one claim may relate to both a demonstrable and a soft tissue injury, while another claim may relate to only a soft tissue injury. A general damages value relating to the soft tissue-only claim may be adjusted using baselined equalization values to increase or decrease the value relative to a combination injury claim.

[0122] In an embodiment, equalization criteria include what a dominant injury of a claim is. For example, if a claim arises from a case where the dominant injury is demonstrable, the general damages value may be adjusted using equalization values to increase or decrease the value relative to a claim arising from a case where the dominant injury is a soft-tissue injury.

[0123] In an embodiment, equalization criteria includes settlement characteristics for the claims. Examples of settlement characteristics that may form the basis for equalization include claim type (e.g., whether a lawsuit has been filed), whether a claimant is represented by an attorney, or the identity of an attorney representing the claimant. In an embodiment, equalization criteria may include whether there is a particular type of evidence available with respect to the accident. For example, equalization values may be based on whether data for the accident is available from an electronic data recorder (EDR). In one embodiment, equalization criteria may include whether EDR data for the accident indicates that an injury was a low-impact injury. In certain embodiments, claims for which EDR data suggests fraud (e.g., false whiplash claims) may be adjusted or filtered out of the results.

[0124] In an embodiment, equalization criteria includes the locality of the claim. A locality may be a country, state, or a region thereof. In certain embodiments, a locality may be a sub-state locality (a portion of a state), such as a county, city, or zip code. For example, a general damages value for a matching claim in Orange County, California may be adjusted for use in settling an open claim in Los Angeles County, California, or Dade County, Florida based on past data from a California insurer.

Determining Recommended Settlement Amounts by Adjusting Values Derived from Matching Precedent Claims

[0125] In an embodiment, a recommended settlement amount is determined by combining a value derived from precedent claims with one or more adjustments for the pending claim. As used herein, a "pending claim adjustment" generally refers to an addition or subtraction based on one or more amounts associated with the pending claim. Pending claim adjustments can include any adjustment for the actual claim being settled. Examples of pending claim adjustments include specials, disfigurement, offsets, medical expenses (e.g., incurred expenses or expected expenses), wages (e.g., actual lost wages or expected lost wages), or a combination thereof. Thus, a recommended settlement may be calculated as follows:

> Adjusted General Damages Amount precedents+Adjustments pending claim=Adjusted Recommended Settlement Amount

In some embodiments, recommended settlement ranges may be determined in a similar manner as the recommended settlement amounts.

[0126] FIG. **14** illustrates determining recommended settlement amounts and ranges with adjustments to adjusted general damages values derived from matching precedent claims. At **700**, precedent claims that match an open claim are identified. At **702**, a likelihood value is determined with respect to each of the matching precedent claims. At **704**, likelihood values associated with matching precedent claims are displayed.

[0127] At **706**, an adjusted general damages amount for the open claim is determined based on the likelihood values for the matching precedent claims. At **708**, a range of adjusted general damages amounts is determined for the open claim based on the likelihood values for the matching precedent claims. At **710** and **712**, pending claim adjustments are made to an adjusted general damages amount and general damages range for the open claim, respectively. The pending claim adjustments may be made automatically, for example, by an FSO computer system. At **714** and **716**, a most likely settle-

ment amount and most likely settlement range for the open claim are determined. At **718** and **720**, computed amounts and ranges are displayed to a user.

[0128] In the embodiment shown in FIG. **14**, the general damages amounts and ranges are determined based on likelihood values for the matching closed claims (see **702**, **706**, and **708**). In other embodiments the general damages amounts and ranges may be determined from other methods, such as from a mid-zone calculation based on a least squares method.

[0129] In one embodiment, an "Adjusted Recommended Payout" amounts are calculated after the matching process has been completed and displayed on the Summary tab of the screen. The recommended payout amounts may be a combination of the adjusted general damages amounts of catalog claims (e.g., similar past claims) brought back in the matching process and the specials, offsets, adjustments, and disfigurement of the pending claim (i.e. the claim currently being entered into the system and adjusted). An example determination is as follows:

Adjusted Settled *GD* amount of catalog claim + Disfigurement + Medicals Incurred + Medicals Expected − Medical Offset + Wages Incurred + Wages Expected − Wages Offset − Comparative Negligence (multiplied as a percentage of the subtotal amount and then subtracted) − Contribution Percent Amount (multiplied as a percentage of the subtotal amount and then subtracted) *OR* Contribution Dollars − Other Offsets = Recommended Settlement Amount

As used in the preceding equation, "Adjusted Settled GD amount of catalog claim" may exclude specials and disfigurement, but include other offsets. The above formula may be applied to settlement values and ranges. For example, the above formula may be applied to a most likely settlement amount and a most likely settlement range.

Least Squares Display

[0130] For a least squares display, the formula described above for Recommended Settlement Amount may be applied to the final high, average, and low amounts that are displayed in the Adjusted Generals column based on a least squares method. After the Recommended Settlement amounts have been calculated for the claims catalog, those amounts may be displayed in the Recommended Settlement column. The amounts can be calculated each time the user navigates to the screen if the specials, offsets, or disfigurement have been updated since the previous re-run. Any amounts that are calculated to be less than zero may be displayed as a '$0' in this column (i.e. negative amounts are not displayed). The following is an example display of values based on a least squares method:

Adjusted General Damages:	Recommended Settlement:
High: $5,500	High: $7,500
Average: $3,500	Average: $5,500
Low: $2,000	Low: $4,000

The following is an example display of adjustments for a pending claim:

Specials/Offsets and Disfigurement for the Current Claim	
Disfigurement:	$5,000
Net Medicals	$2,000
Net Wages	$1,400
Negligence Percent:	60%
Contribution Percent:	40%
Contribution Dollars:	
Other Offsets:	$1,000
Total:	

Likelihood Display

[0131] For a likelihood display, the display may contain fields named "Most Likely Settlement Amount" and "Most Likely Settlement Range" and appear in the corresponding locations as the current amount fields located in the Adjusted Generals section. The amounts can be calculated and stored each time the user navigates to the screen if the specials, offsets, or disfigurement have been updated since the previous re-run. Any amounts that are calculated to be less than zero may be displayed as a '$0' in this column (i.e. we will not display negative amounts). The following is an example display of values based on maximum likelihood:

Adjusted Generals	
Most Likely Amount:	$4,290
Most Likely Range:	$4,000-4,700
Recommended Settlement	
Most Likely Settlement Amount:	$7,290
Most Likely Settlement Range:	$7,000-7,700

Evaluating Effectiveness of Claims Evaluation, Assessment, and Settlement Processes

[0132] In the discussion above with respect to FIGS. **2**, **6**, and **7**, a system is used for settling outstanding claims (a "production" environment). Each candidate claim is an open claim for which an estimate of value is desired for purposes of settling the claim. In support of this process, the system provides an adjuster with access to data on closed claims that match the open claim. In another embodiment, a claims-matching process is used to evaluate a claim estimation, negotiation and resolution process that has already been used by a company (i.e., a post "production" environment). In this embodiment, each closed claim may be treated as a candidate claim and compared with other closed claims. Mathematical models may be used to determine the effectiveness of the process that has been used. For example, the system may be used to quantify how consistent a claim estimation and settlement process was. Such determinations may be used to guide process improvements and/or provide benefit studies on proposed or anticipated process changes.

[0133] In an embodiment, an evaluation of a claims settlement process is performed using cross comparisons of an insurer's closed claim data for bodily injury claims. The data may reflect hundreds or thousands of closed claims. FIG. **15** illustrates determining an effectiveness of a process using a

closed claim-to-closed claim comparison according to one embodiment. At **360**, a set of closed claim data is provided. In certain embodiments, an insurer's closed claim data may be initially scrubbed to remove data that might skew the results, such as claims that have invalid or missing information. The closed claim data may be for a defined period (e.g., the preceding 3 years). The closed claim data may be limited by other attributes, such a jurisdiction, claim type, or dominant injury.

[0134] At **362**, precedent claims are identified for a closed claim in a defined set of claims. Each closed claim in the data set is considered a candidate claim when it is used as the claim at issue. The claim data for each candidate claim is used when searching for precedents (e.g., matches) of that candidate claim. In some embodiments, a claims matching process is performed as described above with respect to FIG. **2**, except that each candidate claim is a closed claim instead of an open claim.

[0135] In certain embodiments, the system automatically excludes precedent claims from the set of matches if they exceed a defined amount of variation from some attribute of the set of precedent claims. For example, the system may automatically exclude precedent claims from the set of matches if they are greater than two standard deviations above or below the mean of the set of matches. Approximately 95 percent of all matching claims are within two standard deviations of the mean of all such matches to the candidate claim.

[0136] At **364**, a representative value is determined for the precedent claims associated with the candidate claim. The representative value may be based on a statistical value such as mean, median, or mid-zone value of the precedent claims.

[0137] At **366**, if there are additional candidate claims, the system repeats the sequence of precedent claim identification (**362**) and determination of a representative value (**364**) for each of the candidate claims.

[0138] At **368**, one or more representative values of the precedent closed claims are compared with one or more values of the candidate closed claims. For example, the comparison may include computing a difference between the representative value (e.g., mean, median, or mid-zone value) of the precedent claims and the value of the candidate closed claims.

[0139] At **370**, consistency of the claims estimation and settlement process is evaluated. The evaluation may be based on a comparison of the values of the candidate closed claims with representative values of the similar claims. For example, a small aggregate deviation between the values of the candidate claims and the representative values of the associated sets of precedent claims may indicate that the process used to arrive at the values of the candidate claims produces consistent results. Conversely, a large aggregate deviation between the values of the candidate claims and the representative values of the associated sets of precedent claims may indicate that the process used to arrive at the values of the candidate claims produces inconsistent results.

[0140] Various methods and approaches may be used to determine representative value of similar claims. The mathematical models used may rely, in some cases, on assumptions about how adjusters are influenced by a resulting list of matches. For example, human tendency may result in adjusters actually looking at clusters, mid-points, and averages similar to the models described herein. In addition, adjuster decisions may be shaped based on a particular company's policies and procedures. In one embodiment, determining a representative value may include kernel density estimation. In another embodiment, determining a representative value may include maximum likelihood estimation.

[0141] FIG. **16** illustrates evaluation of a claim estimation and settlement process that includes determining differences between the general damages values for candidate closed claims and general damages values for similar closed claims according to one embodiment. At **380**, for each candidate claim in a closed claim data set, claims in the data set that are similar to a candidate claim are identified based on characteristics of the candidate claim. Although the entire data set might include thousands of claims, the mathematical modeling is performed on each claim separately, treating each claim as the candidate claim. Each candidate claim will have a subset of precedent matches from the other claims. Therefore, the relevant data set size is represented by the number of precedent claims matched to the candidate claim. Each data set could be one precedent claim or many precedent claims.

[0142] At **382**, a representative general damages value is determined for the set of precedent claims associated with each of the candidate claims. The representative general damages value may be based on a statistical value for the entire set, or for a subset, of the similar claims. In some embodiments, the mathematical analysis is successively performed using models and methods of increased complexity and sophistication. Initially, simple measures, such as median and mean, which do not require assumptions about the underlying set of matched general damages, may be used. The median is the number that splits the ordered set of precedent claims essentially in half. By using the median, effects of outliers are minimized without having to exclude any claims from the calculation. The mean is the average of all precedent matches. The median and mean are calculated using the set of precedent matches for each closed candidate claim. Once the median and mean are calculated, they are compared to the actual total general damages for the candidate closed claim.

[0143] At **384**, if there are additional candidate claims, the system repeats the step of precedent claim identification (**380**) and calculation of a representative value (**382**) for each of the candidate claims.

[0144] At **386**, a total accumulated general damages value for the candidate claims is determined. The total accumulated general damages value may be the sum of the general damages values for all the candidate claims.

[0145] At **388**, a total accumulated representative general damages value for the sets of similar claims associated with the candidate claims is determined. The total representative general damages value may be the sum of the representative general damages value determined for the sets of precedent claims.

[0146] At **390**, for the complete data set of matches, the total accumulated difference (variance) between each candidate claim's general damages value and its corresponding representative general damages value (e.g., mean, median, or mid-zone) is determined for all candidate closed claims. The total accumulated difference may be the difference between the sum of all the general damages values of the candidate claims and the sum of the representative general damages value for the associated sets of precedent claims. In an alternate embodiment, a difference is first computed between the value for each candidate claim and the representative value for the precedent claims, and then the accumulated difference is determined by taking the sum of these differences.

[0147] At **392**, an impact percentage is calculated based on the total accumulated difference. The impact percentage may

be determined by dividing the total accumulated difference by the total accumulated general damages for the candidate claims. The impact percentage may be expressed in the following formula:

$$\frac{\text{the difference between the total general damages value for the candidate claims and total representative general damages value for the sets of similar claims}}{\text{total general damages value for two or more of the candidate claims}} * 100\%$$

In some cases, the impact percentage may be used as a measure of consistency of the estimation and settlement process (with relatively larger impact percentage reflecting greater inconsistency in the estimation and settlement process). For example, an impact percentage less than 2% may indicate that the process for establishing a value of the candidate claims was relatively consistent in producing values, while an impact percentage of greater than 10% may indicate that the process was relatively inconsistent in producing values. Impact percentages may be used in benefit studies to project the impact of making a process change or improvement. For example, the impact percentages may be used to project a potential improvement to an insurer from implementing a new system and/or methodologies for evaluating and settling open claims.

[0148] FIG. **17** illustrates a simple example of results for a closed claim mathematical analysis. For the sake of simplicity for illustrative purposes, only two candidate claims are included in the set. A closed claim evaluation might, however, include any number of candidate claims, and might include hundreds or thousands of candidate claims.

[0149] In the example shown in FIG. **17**, information is provided for each of the candidate claims, including identification (ID), claim type, jurisdiction, dominant injury (e.g., soft tissue or demonstrable), and value. The value for each candidate claim may be a general damages value for the claim as determined by a claim adjuster during the evaluation and settlement of the claim. A set of matching closed claims is listed for each of the candidate closed claims. Each of the matching claims includes a corresponding value. For each candidate claim, the matching claims may be grouped into zones (e.g., low, mid, high). A mean, a median, and a mid-zone average are computed for each set of similar claims. In the example shown in FIG. **17**, the mid-zone average is an unweighted average of the mid-zone claims (i.e., claims O, P, Q, and R for candidate claim 1 and claims W, X, and Y for candidate 2). In other embodiments, a mid-zone average may be a weighted average. For example, each of claims O, P, Q, and R may each be given a different weight depending on their degree of similarity to candidate claim 1.

[0150] The total of each value category is accumulated to yield the total associated with all candidate claims. For each representative value, the difference between the total representative value and the total value is calculated. Based on the difference for each representative value, the impact percentage is determined.

[0151] In some embodiments, an impact is determined for a subset of an insurer's closed claim data that meets certain criteria. For example, an impact may be determined for only the claims having a certain claim type, jurisdiction, or dominant injury. In one embodiment, claim types include: unrepresented, unlitigated, and suit. "Unrepresented" are those claims without attorney representation. "Unlitigated" are those claims with attorney representation, but no suit has been filed. "Suit" are those claims in which some type of suit has been filed, but not necessarily a jury verdict outcome.

[0152] As is reflected in FIG. **17** above, a matching process may produce a different number of matches for each candidate claim. For example, candidate ID 1 has 8 matches, while candidate ID 2 has 5 matches. The frequency of the number of matching claims may be plotted for the candidate claims. The results may be presented to the user is graphical or textual format.

[0153] FIG. **18** illustrates a column chart for reporting the matching frequency for a claim set according to one embodiment. In this column chart, the x-axis represents the number of matching claims for a candidate and the y-axis represents the number of candidate claims having a given number of matching claims. Thus, the legend at the base of each column represents a number of matching claims for a candidate. The height of the column indicates the total number of candidate claims in the claim set with that number of matches. For example, there were 800 candidate claims in the set for which 6 matching claims were identified. In some embodiments, other statistical information, such as mean and standard deviation may be reported, presented and/or used in evaluating an effectiveness of a claims assessment process.

Identifying Similar Claims

[0154] Every injury has its own treatment modality. Finding similar claims may therefore take this into consideration. For example, soft tissue spinal injuries are treated therapeutically. While their treatment details can vary they are all prima facie the same injury, distinguished by their treatment, whereas demonstrable injuries are at face value not similar injuries. For example, a fractured femur and a contusion to the lower leg are completely dissimilar.

Whether a claim will use the soft tissue spine matching or the demonstrable matching component may be an important consideration.

[0155] In various embodiments, similar claims may be found using the following steps:

[0156] 1. Identify whether the major injury is predominantly a soft tissue spinal injury type or a demonstrable injury

If soft tissue spinal injury:

[0157] 1. Search the settled claim database for claims that have at least one of the soft tissue spine injuries the current claim contains

[0158] 2. Filter the claims whose medical attributes are not within certain pre-defined tolerances of the attributes of the current claim

[0159] 3. From the matches display a subset of claims which have attributes closest to the current

If demonstrable injury:

[0160] 1. Retrieve the pain and suffering severities for all the injuries, treatments and complications which are contained in the current claim

[0161] 2. Identify all the major body parts injured for the current claim

[0162] 3. Identify the most injured major body part

[0163] 4. Find the dominant medical feature (injury, treatment or complication, or combination of them)

[0164] 5. Search the settled claims database for all of the claims having the same dominant medical feature

[0165] 6. From the matches display a subset of claims which have the closest attributes to the current claim

Deciding Whether a Claim is Demonstrable or not

[0166] A claim may be defined to be predominantly demonstrable if it falls into any of the following categories:

[0167] 1. It has no soft tissue spinal injuries

[0168] 2. It contains an invasive medical procedure (diagnostic or surgical)

[0169] 3. It is one of the following injuries

[0170] a. Amputation

[0171] b. Closed Fracture

[0172] c. Open fracture

[0173] d. Dislocation

[0174] e. Fracture dislocation

[0175] f. Crush injury

[0176] g. Internal throat injuries

[0177] h. Intervertebral disc herniations or ruptures

[0178] i. Intra-abdominal injuries

[0179] j. Intra-pelvic injuries

[0180] k. Intra-thoracic injuries

[0181] l. Ligament injuries (but not a shoulder ligament injury)

[0182] 4. It has any of the following, but no soft tissue spine injuries

[0183] a. Lacerations

[0184] b. Concussion

[0185] c. Contusions

[0186] d. Superficial injuries

[0187] e. Sprain strain injuries

[0188] Shoulder ligament injuries, lacerations, concussion, contusions, superficial injuries and sprain strain injuries may not be indicators, by themselves, of whether a case is demonstrable or not. For instance, there are many whiplash claims that also include shoulder ligament injuries. In these cases the shoulder injuries are not treated, other than as part of the whiplash injury by therapeutic treatment. If the shoulder ligament injury were treated surgically then the case would be considered demonstrable, as per rule 3 above).

Deciding Whether a Claim has Only Trivial Injuries

[0189] Trivial injuries are defined as the injuries for which no matching priority rules exist. Injuries such as contusions, untreated lacerations, and superficial injuries are trivial injuries.

[0190] If a claim contains only trivial injuries then the system may find matches for the most significant of the trivial injuries, as defined by the injury hierarchy, set out under "Injury Hierarchy" in the Section explaining rule priority considerations.

[0191] If a claim contains both only trivial injuries and a soft tissue spine injury then the system may use the presence of the trivial injuries as matching criteria if the injury filter is set to "tight". This is explained in the injury section within "Filters" described below.

Matching for Soft Tissue Spine

[0192] In an embodiment, the two broad classes of claim information that will be used in the matching are treatment duration and treatment level, there being a correlation between treatment duration and treatment level. Treatment time defines injury stabilization time or the time taken for an injury to reach maximum improvement. Treatment level can involve multiple types of therapeutic treatment. For instance, this can be any combination of chiropractic, physical therapy, other therapy, GP consultation and specialist doctor consultation. Other treatment can involve various forms of spinal immobilization and prescribed medication.

[0193] Matching may involve setting some bounds around the values that are inherent in the current claim, in order to find claims that have similar, but not necessarily exactly the same values. In one embodiment, the criteria used for matching similar claims is as described in the tables below.

	Treatment Time	
Actual Treatment Days	Percentage Variation Below	Percentage Variation Above
0	100%	100%
30	25%	33%
1080	33%	50%

The table above may be based on a piecewise linear function approach. For example, a claim where the treatment time was 30 days will be addressed in the following manner. The 30 days treatment time is located in the first column, it is the second entry. The bounds then become from 30 days minus 25%, this being approximately 23 days, to 30 days plus 33%, this being approximately 37 days. Thus initially claims are looked for that had treatment times of 23 to 37 days, in this case. For treatment times which do not fall exactly on a value in the first column, which will be the case the vast majority of the time, a piecewise linear extrapolation may be used to determine the appropriate intermediate value. A worked example is contained for "Treatment Level" below. Exactly the same formula would be used.

	Treatment Level GP Treatment Consultations	
Actual GP Visits	GP Visits From	GP Visits To
0	0	1
1	1	2
2	1	3
5	4	7
10	7	14
20	15	30
50	31	70

In the table above the second and third columns define the low and high bound of GP visits that will be searched for. For example, if the current claim had 5 actual GP visits search would be searched for claims that had between 4 and 7 GP visits (these being the values from the second and third columns for the fourth row, which has the 5 GP visits in the first column).

Intermediate values for GP visits, such as 4 visits, result in piecewise linear extrapolation of the 5 second and third columns to derive the low and high bound.

Piecewise linear extrapolation may be defined as:

$$y = \frac{(x - x_1)(y_2 - y_1)}{(x_2 - x_1)} + y_1$$

where y is the extrapolated value; x is the number of GP visits; x_1 is the value from the first column which is less than x; x_2 is the value from the first column which is greater than x; y_1 is the value from either the second or third columns (depending on whether we are predicting the lower or upper bound) which corresponds to the x_1 value from the first column; and similarly y_2 corresponds with x_2.

Using 4 GP visits as the actual value results in bounds of 3 to 5.66667, which are rounded to 3 to 6.

Specialist Treatment Consultations

Actual Specialist Visits	Specialist Visits From	Specialist Visits To
0	0	0
1	0	2
2	1	3
5	4	7
10	7	14
20	15	30
50	31	70

The tables for GP and specialist are almost identical, except that if the actual specialist visits is zero then only claims with zero specialist visits will be matched. This is different from the treatment of GP visits, where if the actual visits are zero claims with zero or 1 GP visits will be matched.

Both the GP and specialist tables differ from the therapeutic treatment tables below, in that for the higher values in column 1 the corresponding bands (columns 2 and 3) are broader upwards more than downwards. For example, for 20 GP visits the band is between 15 and 30 visits, whereas for therapeutic treatment it is 15 to 25. Even for therapeutic treatment of 70 visits the band is equally distributed, being from 55 to 85—a difference of 15 either side. For the GP and specialist it is regarded that there comes a point where additional treatment no longer impresses as to the severity of the injury, and it suggestive of over-servicing. For this reason the band is larger on the high side.

In some embodiments, the above table entries can be altered to reflect a particular company's experience or as new trends emerge.

Chiropractic Treatment Visits

Actual Chiropractic Visits	Chiropractic Visits From	Chiropractic Visits To
0	0	2
2	1	4
5	3	8
10	7	14
20	15	25
40	30	50
70	55	85
100	80	120

In a similar manner to the previous table, this table defines the low and high bounds for chiropractic treatment used in matching. Physical therapy and other therapy are processed in the same manner using the respective tables below. However, each therapeutic treatment type is used distinctly in the matching process, and matched claims must satisfy all the derived bounds. For example, if the current claim had 10 chiropractic visits and 10 physical therapy visits then matched claims must have between 7 and 14 chiropractic visits and also between 7 and 14 physical therapy visits.

Physical Therapy Treatment Visits

Actual Physical Therapy Visits	Physical Therapy Visits From	Physical Therapy Visits To
0	0	2
2	1	4
5	3	8
10	7	14
20	15	25
40	30	50
70	55	85
100	80	120

Other Therapy Treatment Visits

Actual Other Therapy Visits	Other Therapy Visits From	Other Therapy Visits To
0	0	2
2	1	4
5	3	8
10	7	14
20	15	25
40	30	50
70	55	85
100	80	120

Other therapy includes treatment given by practitioners of osteopathy, naturopathy, homeopathy or other "alternative medical practices" such as acupuncture, herbal medicine, faith healing, massage or any other non-orthodox therapeutic practices.

The tables have different values associated even with the same actual observed value. In other words, if our claim has no GP visits the bounds become up to 1 GP visit. The difference between none and one GP visit may not be significant. However, the difference between a claim for which a specialist opinion was sought and one where it was not required has more significance as an indicator of severity, simply because of the fact that a specialist opinion was required. Most soft tissue injuries would not involve a specialist referral.

[0194] In a similar manner to the demonstrable injury matching process described below, a number of filters are also used to refine the match results. The use of these filters is described in the Section "Filters" below.

Matching Similarity for Demonstrable Injuries

[0195] In some embodiments, matching similar cases may include, in the first instance, matching similar injuries. Injuries as defined by the program include traumatic amputations, fracture dislocations, dislocations, fractures, intra-abdominal injuries, intra-thoracic injuries, intra-pelvic injuries, vertebral disc injuries, ligament injuries, lacerations, sprains and strains and trivial injuries such as contusions and superficial injuries.

[0196] Demonstrable injuries rarely occur in isolation or to only one body part, and often involve multiple trauma to multiple body parts. Matching similar cases in these instances may include determining what the dominant injury (or injuries) is, or in other words, what major body part was most

severely injured. Determining what major body part is injured is not based only on the type of injury suffered. The overall severity of the trauma is not just the injury suffered but can also be influenced by the treatment and often the complications that might arise from the injury.

[0197] As an example, consider a case involving a fractured skull, requiring craniotomy for an intracranial hematoma. A fractured skull is not an insignificant injury; but an intracranial hematoma is both life threatening and potentially can lead to residual brain damage; which required an invasive operative procedure to drain the hematoma (craniotomy). A fractured skull would not generally require any operative treatment. In this case the craniotomy alters the nature of the case, making it a more severe head injury. The complication of the intracranial hematoma transcends both the initial injury and the operative treatment, and becomes the dominant medical feature of this claim. Determining the most severely injured body part therefore takes into account all three of these considerations—injuries, treatments and complications, or a combination of these.

[0198] The dominant medical feature of a case can be specified by the adjuster using the system's user interface, or failing this, can be determined by the system.

Establishing the Most Injured Body Part

[0199] In some embodiments, if the user has not specified the dominant medical feature of a case then the system can perform this function. In order to do this the system:

[0200] Retrieves all the medical facts about the case, the injuries, treatments, complications and impairments

[0201] Accesses its own database tables to retrieve medical attributes corresponding to these case medical facts

[0202] Using its own algorithms it derives the overall severity of each major body part. The major body parts include the head, chest, abdomen, pelvic area, the spine, arms and legs.

[0203] Determining the dominant medical feature of the most injured body part

Retrieving Medical Codes

[0204] Each case can have any number of medical attributes associated with it. These can be a number of injuries, treatments and complications, in any combination. For each of these instances there is a corresponding character code (there is a seventh character denoting sidedness), which is constrained to be from a list of treatment, or complication codes predefined with each injury code tracked by the system.

[0205] In certain embodiments, predefined treatment and complication codes may be derived from a series of mappings within the system. Injury may be mapped to treatment, injury may be mapped to complication, and complication may be mapped to treatment. For each injury code, the system may have a list of treatments the injury may require, these are sorted as "expected" and "possible" treatments. For example if the injury were an open fracture of the tibia, the treatment list might contain:

[0206] Amputation or re-amputation
[0207] Osteotomy
[0208] Limb shortening or lengthening procedures
[0209] Arthroplasty
[0210] Arthrodesis
[0211] Open reduction of fracture
[0212] External fixation
[0213] Traction
[0214] Closed reduction of fracture
[0215] Immobilization
[0216] Removal of internal fixation device
[0217] Physical therapy
[0218] Debridement of open fracture site
[0219] Walking aids
[0220] Diagnostic studies
[0221] Prescribed medication.

In addition, the list can include treatments for potential complications which will vary depending on the type of complication that occurred. This might include such procedures as fasciotomy, osteoarthrotomy, nerve or vascular repair. Medical procedures are considered only as past and future procedures, there is no notion of initial treatment or subsequent treatment, and these are considered simply as past treatment. Similarly, for each injury code, the system can have a list of potential complications that might arise from the injury. In the case of our fractured tibia this would include:

[0222] Associated vascular
[0223] Associated nerve injury
[0224] Avascular necrosis
[0225] Osteomyelitis
[0226] Osteoarthritis
[0227] Compartment syndrome
[0228] Deep vein thrombosis
[0229] Nonunion
[0230] Malunion
[0231] Delayed union.

Complication and treatment mapping may be derived from medical references including:

[0232] 1. Apley's System of Orthopaedics and Fractures—6^{th} Edition

[0233] 2. Attorney's Textbook of Medicine: Manual of Traumatic Injuries—Volumes 1-3

[0234] 3. Attorney's Textbook of Medicine—3^{rd} Edition—Volumes 1-18

[0235] 4. Vertebral Musculoskeletal Disorders—Corrigan & Maitland

[0236] 5. Essentials of Surgery—Scientific Principles and Practice—Lippincott-Raven publication

[0237] 6. Current Surgical Diagnosis & Treatment—10^{th} Edition—Appleton & Lange publication

[0238] 7. Rehabilitation Medicine—Delisa Gans—3^{rd} Edition—Lippincott-Raven publication

[0239] 8. The Disability Advisor—3^{rd} Edition—Pressley Reed

Medical Severity Attributes of Medical Codes

[0240] After the medical codes are entered against a case, a table may be accessed which defines a number of attributes for each medical code. In some embodiments, the pain and suffering severity scale is used to derive overall medical severity for each injured body part, given the medical facts regarding the case being considered.

[0241] A pain and suffering severity scale can represent relative severity between injuries, treatments and complications respectively. The severity applied may be in isolation to the particular injury, treatment or complication it is applied to. For example the severity applied to an open fracture of the femur can be for the relative trauma of the fracture alone, and not include the treatment or any other considerations. Conversely the relative severity applied to an open reduction of the femur might not take into account the trauma for the

fracture. Also, the scale may not include severity for implied impairment. For example procedures such as amputation and arthrodesis leave permanent impairments but these may be ignored in the assigned value.

[0242] The pain and suffering severity scale may be refined through a calibration process described below.

Calculating Major Body Part Relative Pain and Suffering Severity

[0243] In an embodiment, agglomeration algorithms are used to derive a combined value for a body part when more than one medical code is present. For example, if a case consisted of a fractured humerus and a fractured scaphoid, both being to the same arm, then the agglomeration algorithm can derive an overall value for the arm in question, comprising both injuries. The system can do this for every body part described above.

[0244] The determination of the combined value may not be a simple summation of the medical codes. Doing so would result in unconstrained total values. For example, even if a case involves a fracture of the middle finger, which on average settles for $5,000, this does not mean that a case involving three fractured fingers should settle for $15,000. For example, the proximity of the fingers may obviate the combined value being three times the value of one, thus the value for the three-finger injury should be less than three times that of the one-finger injury.

[0245] As injuries become less proximal to each other then combined value may increase, towards the sum of the value of the individual injuries.

Deriving the Dominant Medical Feature

[0246] In some embodiments, a set of rules may be utilized, one set for each major body part. Each rule detects a particular medical feature. For example, one rule, within the leg detects a femur fracture with osteomyelitis, another with avascular necrosis, yet another for nonunion of the femur.

[0247] If only one body part was injured then its related rules may be run to determine the primary medical features and which cases to search for. Example rules are described below for each body part. If more than one body part was injured then the rules may be run for the most injured body part only. The "most injured" body part may be the body part with the highest combined value on the pain and suffering severity scale (described above). All the medical codes present in the case may be visible to all the rules, thus rules can reference medical codes belonging to this body part as well as ones that are systemic (affecting the whole body).

[0248] On the other hand, if the user has nominated one or more dominant medical features then the rules may be run which correspond to body parts representing the dominant medical features. For example, if the user had nominated a fractured tibia and a fractured humerus as dominant, then the rules may be run for the leg and those for the arm respectively. In running these rules the system may be restricted to seeing only the dominant medical features nominated by the user—other medical codes which may be present on the case but not made dominant will not be considered by the rules.

Cases can have a number of medical features, even for the same body part. This can result in more than one rule potentially being considered. For example, in a case where there is a fractured humerus with delayed union and an uncomplicated fractured thumb, then two different rules could be executed—one for the humeral fracture and its complication and another for the thumb. In these cases rule priority determines which will have precedence when it come to searching for matching cases. In this example it will be the fractured humerus with delayed union that will have precedence owing to the higher priority assigned to its rule. In one embodiment, the rule priorities are as defined in the section "Rule Prioritization Considerations" below.

Rule Prioritization Considerations

[0249] In prioritizing the rules a number of medical considerations may be taken into account. These include:

[0250] The hierarchy of injury

[0251] The hierarchy of complications

[0252] The hierarchy of treatments

[0253] Exceptions for some injuries

[0254] Exceptions involving multiple medical features

Injury hierarchy may be derived from medical texts and literature and a Judicial Publication. Reference sources may include:

[0255] 1. The Judicial Studies Board "Guidelines for the Assessment of General Damages in Personal Injury Cases—4th Edition—published by Blackstone Press

[0256] 2. Fractures and Dislocations—Apley's System of Orthopaedics and Fractures—6th Edition

[0257] 3. Attorney's Textbook of Medicine: Manual of Traumatic Injuries—Volumes 1-3—a Matthew Bender publication

[0258] 4. Attorneys Textbook of Medicine—3rd Edition—Volumes 1-18—Matthew Bender publication

[0259] 5. Vertebral Musculoskeletal Disorders—Corrigan & Maitland

[0260] 6. Essentials of Surgery—Scientific Principles and Practice—Lippincott-Raven publication

[0261] 7. Current Surgical Diagnosis & Treatment—10th Edition—Appleton & Lange publication

[0262] 8. American Medical Associations "Guides to the Evaluation of Permanent Impairment—5th Edition

[0263] 9. Rehabilitation Medicine—Delisa Gans—3rd Edition—Lippincott-Raven publication

In general the hierarchy of injury may be:

[0264] 1. Loss of vision

[0265] 2. Major amputations

[0266] 3. Fracture dislocations to major joints

[0267] 4. Fractures

[0268] 5. Intra-abdominal injuries

[0269] 6. Intra-pelvic injuries

[0270] 7. Intra-thoracic injuries

[0271] 8. Dislocations

[0272] 9. Ligament and tendon injuries

[0273] 10. Sprain and strain injuries

[0274] 11. Lacerations

[0275] 12. Contusions

[0276] 13. Superficial injuries

Within each of these injury groups there may also exist another hierarchy. For example, for fractures clearly a fractured femur is much more serious than fractured toe. Similarly, the removal of a kidney is much more serious than the removal of a gallbladder. Of course, a fractured toe is a trivial injury compared to any significant intra-abdominal injury. Therefore the injury hierarchy when applied to the body as a whole is not a strict one, but only a guide to the placement of different injuries in a pain and suffering medical severity scale. When applied to a body part this injury hierarchy is

more constant though still with exceptions. In the arm for example, generally amputations would precede fracture dislocations and fractures and dislocations, which would precede ligament injuries, sprains strains and contusions and superficial injuries.

[0277] Injury complications can be either localized or systemic, and like injury type has a hierarchy which is along the following:

[0278] 1. Life threatening, such as septicemia, peritonitis or pneumonia

[0279] 2. Brain complications such as intracranial hematoma—subdural, subarachnoid or epidural hematoma, cerebral edema or posttraumatic epilepsy

[0280] 3. Cranial nerve involvement such as vertigo, tinnitus or loss of smell and taste

[0281] 4. Vascular complications such as crush syndrome, hypovolemic shock, deep vein thrombosis, compartment syndrome or hemorrhage

[0282] 5. Thoracic complications such as pneumothorax, hemothorax, pneumothorax or pleural edema

[0283] 6. Treatment complications such as fistula or adhesions

[0284] 7. Bone complications such as osteomyelitis, avascular necrosis, bony union difficulties or limb deformities

[0285] 8. Joint complications such as osteoarthritis, synovitis, joint stiffness or joint laxity

[0286] 9. Pelvic complications such as hematuria, ureteral or urethral strictures

[0287] 10. Localized infections

Although a hierarchy exists, it may not be strictly followed in all cases. For example, osteoarthritis of the hip is not the same as osteoarthritis of the little finger.

In one embodiment, a treatment hierarchy includes, but is not limited to:

[0288] 1. Amputation

[0289] 2. Major chest surgery such as thoracotomy

[0290] 3. Removal of the eye

[0291] 4. Organ removal such as kidney or spleen

[0292] 5. Other abdominal surgery

[0293] 6. Pelvic surgery

[0294] 7. Skull procedures such as craniotomy or craniectomy

[0295] 8. Joint surgery such as spinal fusion, arthrodesis or arthroplasty

[0296] 9. Bone surgery such as fracture reductions, sequestrectomy or osteotomy

[0297] 10. Ligament and tendon repairs

[0298] 11. Vascular repair

[0299] 12. Fascia repair

The above hierarchy is a guide as to the severity of treatments. For instance the amputation of the arm at the shoulder is far more severe than the amputation of the little finger. Accordingly there will be considerable overlap between treatments in the hierarchy in terms of where medical severities could be allocated.

Some injuries can be exceptional and therefore not be close to others of their kind in the hierarchy. For instance, a true dislocation of the knee (a tibiofemoral dislocation) is an orthopedic emergency, with the loss of the limb possible unless it is treated promptly and professionally. Even then the outcome will be guarded. Within the same injury category, dislocations, will be hip dislocations for instance. These latter dislocations do not present the same orthopedic emergency nor are they likely to have the same medical outcome. So in this case, dislocations of the knee would be regarded as the most severe form of dislocation and would rate as a more severe injury in the overall hierarchy of injury than it would have otherwise.

[0300] There are also instances where a combination of medical features can have significant implications for the matching process. For instance, a laceration of the upper arm requiring nerve repair implies that a 3^{rd} degree peripheral injury is present. Such nerve injuries can lead to significant impairment of the limb. On the other hand, a laceration to the upper arm with vascular repair is also a significant injury but is unlikely to have the same pessimistic outcome or associated impairment of the limb. Thus the first combination of injury and complication could be more serious than the second.

There are no specific rules to match the medical outcome with regard to permanent impairment. Impairments are addressed in the filters section below.

Filters

[0301] In some embodiments, filters are used to constrain, refine or relax the criteria that are used in finding matching closed claims. The starting settings of the filters can be specified on a company wide basis, at a user level, or at a specific claim level (once set by the user). Example filter settings are:

[0302] Tight

[0303] Enabled

[0304] Loose

[0305] Ignore

The settings above are constraints on the range of values that will be used in the search for precedent claims. A "tight" setting for a parameter, such as age, will constrain the search only finding claims whose claimant is in a narrower age band. The "loose" setting will widen the band of claimant ages that can be returned.

The settings of "enabled" and "ignore" refer to parameters whose potential values are Boolean (constrained to the values of yes or no). Gender is an example of a Boolean values attribute—it is either enabled and only claims with the correct gender will be returned or ignored and claims involving both sexes will be returned.

Not all filter values have all the same potential settings. Example filter values are:

[0306] State and County

[0307] Age

[0308] Gender

[0309] Injuries

[0310] Impairment

[0311] Litigation stage

State and County

[0312] The state/county filter can take the values "tight", "loose" and "ignore". The "tight" setting will constrain the search to ensure that all claims returned match the county of the current claim. A "loose" setting will allow claims within the same state to be returned, using all counties within the corresponding state. An "ignore" setting will seek claims anywhere throughout the United States, including the nominated state and county.

Age

[0313] For each age (or range of ages), "tight" and "loose" may be defined. For example, a "tight" setting for a 40 year

old may be from age 30 to 45, and a "loose" setting for a 40 year old may be from 25 to 55. Example settings include:

Claimant age	Tight From age	Tight To age	Loose From age	Loose To age
0	0	5	0	5
2	0	5	0	5
5	3	8	3	8
8	5	12	4	14
10	7	14	6	16
13	10	18	9	19
18	14	25	14	30
25	18	35	17	40
40	30	45	25	55
70	55	120	45	120
80	60	120	50	120
120	100	120	90	120

In the above example, the table has entries for ages 0 and 120. Though few claimants will have these particular ages, they are included to provide lower and upper bounds of theoretical potential ages. For claimants whose age falls in between two values in the first column, such as age 9, then the values used representing the age range will be intermediate values from the other columns. For example, if the setting for age is "tight" then, since age 9 is half way between ages 8 and 10 (which appear in the claimant age column), the derived low age value will be 6 (half way between 5 and 7—which are the corresponding value for ages 8 and 10) and the high bound will be 13 (between 12 and 14 from the high column).

Gender

[0314] The gender settings are "enable" and "ignore", which correspond to matching the claimant's gender or returning claims involving both sexes respectively.

Injuries

[0315] The settings for injuries are "tight" and "loose" only

For cases whose dominant injury is demonstrable (therefore non-whiplash) the "tight" setting constrains the matching to include precedent claims whose medical attributes match all the medical attributes of the current claim, excluding any trivial injuries. These medical attributes are governed by the medical rules as specified below. A "loose" setting widens the matching to claims which have the same dominant medical feature as the current claim (the dominant medical feature is described elsewhere in this document).

For claims that are predominantly of a soft tissue spinal nature the "tight" and "loose" setting can have different effects. A "tight" setting may constrain the matching to only return claims which have at least one of the whiplash type injuries of the current claim, and which have trivial demonstrable injuries if the current claim also has them or that do not have any trivial injuries if the current claim also does not have them. For example, for a case with a cervical sprain and a chest contusion the cases returned will include any that have a cervical sprain and another trivial demonstrable injury (not necessarily a chest contusion). A "loose" setting may remove the constraint of requiring to include or exclude the trivial demonstrable injuries. For the above example, claims would be returned which had a cervical sprain, but regardless of whether they also had any trivial demonstrable injuries.

Impairment

[0316] In a similar manner to the treatment of an age filter, impairment is constrained to be between two values. Different values are used for "tight" and "loose". Example settings include:

Claimant whole person impairment	Tight Impairment from	Tight Impairment to	Loose Impairment from	Loose Impairment to
0	0	0	0	0
0.1	0.1	0.5	0.1	3
3	2	4	2	5
5	4	6	3	8
10	8	12	7	13
20	17	23	15	25
50	40	60	35	70
60	60	100	60	100

Litigation Stage

[0317] In one embodiment, potential values for litigation stage are "direct", "unlitigated" and "suit". The values for the filter are "enable" and "ignore". A setting of "enable" constrains the matching to return claims which have the same litigation stage, as the current claim. A setting of "ignore" will return claims regardless of their litigation stage.

Attorney Representation

[0318] In an embodiment, a filter may be applied depending on whether a claimant is represented by an attorney. In another embodiment, a filter may be applied depending on whether a claimant is represented by a particular attorney or a defined set of particular attorneys.

Accident Data

[0319] In an embodiment, a filter may be applied depending on whether EDR data is available for the accident that gave rise to the claim. In an embodiment, a filter may be applied depending on whether EDR data for the accident indicates that an injury was a low-impact injury.

Fallback

[0320] In some embodiments, if insufficient claims are matched the filters may be relaxed in order to expand the search.

In order of priority the filters are relaxed in the following order, assuming filters are originally set at tightest setting

[0321] 1. Injury is set to "loose"

[0322] 2. Gender is set to "ignore"

[0323] 3. Age is set to "loose"

[0324] 4. Age is set to "ignore"

[0325] 5. Jurisdiction (state and county) is set to "loose"

[0326] 6. Litigation stage is set to "ignore"

[0327] 7. Jurisdiction is set to "ignore"

For example if insufficient claims are found then the first fallback for the filters is to set the injury filter to "loose". If there are still insufficient claims then the gender filter is set to "ignore". Filters may be relaxed in the above sequence until either enough claims are found or the relaxation of the filters has been exhausted.

If, in relaxing a filter, a large number of claims are returned, other filters already relaxed may be re-tightened in order to optimize the closeness of the matched claims' attributes until it reaches close to the minimum number of claims required. For example, if during filter relaxation reached the 6^{th} stage (setting the litigation stage to "ignore"), and suddenly the number of claims matched rises to 100 then all the filters whose priority is less than 6 may be re-tightened, and then, if not enough matches are found, may be relaxed again in turn until the minimum threshold is reached. This task may be repeated several times to optimize the closeness of the matched claims.

[0328] In certain embodiments, one or more of any of the characteristics used for filters described herein may be used as equalization criteria. Such equalization criteria may be used instead of, or in addition to, the application of various filters. For example, the system might filter claims based gender and adjust values using equalization values based on age.

[0329] In one embodiment the minimum number of claims used in the filter optimization is set to 6.

Ranking the Matching Claims

[0330] In some embodiments, matching claims are ranked on a numerical scale. For example, Rank **1** matches may be the best fit, but claims of Rank **4** are still similar claims. It is the number of claim attributes and to what degree they differ between a matched claim and the current claim that determine the rating a matched claim receives. Example attributes considered when determining ranking level are:

[0331] 1. Dominant injury treatment or complication

[0332] 2. Jurisdiction

[0333] 3. Litigation stage

[0334] 4. Age

[0335] 5. Impairment

[0336] 6. Secondary injuries

For soft tissue spine additionally:

[0337] 7. Treatment time

[0338] 8. Number of GP visits

[0339] 9. Number of chiropractor visits

[0340] 10. Number of physical therapy visits

[0341] 11. Number of specialist visits

Within each rating displayed the claims are sorted by increasing General Damages.

Deriving Adjusted General Damages

[0342] There will be instances where the claims that have been returned by the matching process will not be absolute matches for the current claim. For example, the dominant medical feature may match, but secondary medical features may be different. Or if insufficient cases were found in the nominated stage and county then claims can be returned from another jurisdiction. This difference in jurisdiction can be reflected in different settlement values for similar claims. In both cases, the General Damages from the original settlement should be adjusted to reflect different jurisdiction or different secondary medical features. All returned claims may include the actual General Damages paid as well as the adjusted General Damages.

[0343] For example, if the current claim involved a fracture of the humerus only and the minimum required number of claims are found for the current claim jurisdiction, then this function would not be invoked. In some instances, however, there may not enough claims within the one jurisdiction, for this injury. The jurisdiction filter would be relaxed at some stage and claims from other states would have been returned. For the sake of example, the current claim is from Massachusetts and one of the claims being returned is from Connecticut. A trend may be found that Connecticut claims settle at higher monetary damages than Massachusetts claims, for similar cases. Thus, if the Connecticut precedent is to be used for the Massachusetts claim then an adjustment would be made to reduce its settled value to Massachusetts values.

[0344] In some embodiments, the system also adjusts for differences in litigation stage. For instance, settlements for claims already in suit are generally at higher monetary damages than for unlitigated claims, and direct claims respectively.

[0345] In order to derive the variations in settlement values from state to state settled claims from the entire database may be analyzed. Each claim may be considered in turn and matching claims found from other states. The difference between the settlement value of this claim and the average value from the matching claims is recorded, as a comparison. Once the entire database has been examined in this manner state by state relativities are calculated using the stored comparisons generated for each claim. This is performed once for claims involving demonstrable injuries and separately for soft tissue spine claims. Thus, two sets of relativities may be calculated for each state.

[0346] In a similar manner the relativities associated with the different stages of litigation may be calculated, by exhaustively examining all the claims in the database.

[0347] More commonly, instances will exist where the claims returned will be from the correct jurisdiction but they have different secondary medical features, because sufficient absolutely exact matches could be found. For example, if the current claim involved a fractured humerus and a fractured sternum and a matching humerus fracture claim involved a sprained wrist, then the current claim has a more serious secondary injury than the matched claim. Therefore, the projected value of the current claim should be higher than the settlement value of the matched claim.

Learning How to Adjust for Secondary Medical Features

[0348] In an embodiment, each medical code used by the system may be assigned a Pain and Suffering severity which represents the General Damages severity relativity. These relativities follow in general the injury, treatment and complication hierarchies described above. Each medical code may also been assigned a medical scale relativity parameter value (e.g., from 0 to 10). A higher the value may correspond to a more serious medical feature belonging to the code. F or instance, the complication of flail chest, a life threatening respiratory complication, may be assigned a medical scale of 8, while a facial wound infection is assigned 0.5. Other serious complications such as epidural, subdural or subarachnoid hematomas may be assigned a medical scale of 9. The medical scale values reflect the seriousness of a medical condition (whether this is an injury, treatment or complication) and its relationship to the General Damages settled. In the example above a flail chest would contribute more to the settlement than a facial wound infection

[0349] In certain embodiments, each medical sub body part is assigned a rank. The injuries with same ranks have the same Pain and Suffering severities. For example the radius and ulna

have the same rank and the system considers fracture ulna and fracture radius as the same injuries in terms of severity.

[0350] All closed claims in the database may be examined. For the injuries, the system may aggregate all medical codes with the same major body part, injury code and rank, to form a set of injury categories. For treatments and complications the categories are constructed by aggregation of the codes with the same medical scale. The system derives the contribution of each category of medical codes to the settlement values of the claims. Once the values of the medical codes categories have been derived then the Pain and Suffering severities assigned to every medical code are adjusted accordingly.

Prioritizing Medical Features for Each Body Part

[0351] Within each body part the medical features, being injuries, treatments and complications, may be listed in decreasing priority order. The first entry may be the highest priority—it is the most severe case and will be searched for instead of any others, if it exists.

[0352] All the rules are executed for each major body part required. This results in all matching injuries generating matching criteria.

Head

[0353] Skull fractures include open or closed fracture to the base of vault or the skull. Facial fractures also include open and closed fractures.

[0354] 1. Removal of an eye

[0355] 2. Intracranial hematoma, head vascular injury or cerebral edema

[0356] 3. Fractured skull or concussive injury with epilepsy

[0357] 4. Fractured skull or concussive injury with trigeminal neuralgia or cranial nerve injury

[0358] 5. Fractured skull or concussive injury with hearing loss

[0359] 6. Fractured skull or concussive injury with loss of smell and taste

[0360] 7. Fractured skull or concussive injury with craniotomy, craniectomy or other skull surgery

[0361] 8. Fractured skull or concussive injury with vertigo or tinnitus

[0362] 9. Open skull or facial fracture or laceration of face or scalp with osteomyelitis

[0363] 10. Skull, orbit or nose fracture with rhinorrhea or otorrhea

[0364] 11. Fractured skull without skull surgical procedures

[0365] 12. Fractured jaw (mandible or maxilla)

[0366] 13. Fractured facial bone (zygoma or orbit)

[0367] 14. Fractured nose

[0368] 15. Laceration to the eye

[0369] 16. Concussive injury

[0370] 17. Laceration to the scalp, ear, eyelid, mouth or face

Explanation

[0371] Loss of sight may be the highest level of severity, followed by head injuries with accompanying intracranial hemorrhage such as epidural, subdural and subarachnoid hemorrhage. While recovery from intracranial hemorrhage may take place, some residual cerebral dysfunction may also exist. Posttraumatic epilepsy is a serious consequence of head injury which depending on its severity may have a profound affect on an individuals ability to lead a normal life style. Head injuries with associated cranial nerve trauma may result in sensory loss (hearing, smell and taste). Injuries to the acoustic nerve may produce vertigo or tinnitus or both, again these complications depending on the severity of the symptoms can seriously affect a person's ability to lead a normal life. Skull surgery is an indication that some serious brain or vascular injury or complication was involved. Facial fractures may have both a functional and disfiguring aftermath. Jaw fractures (mandible or maxilla) can heal with dysfunction to mastication and may even be disfiguring. Zygoma and orbit fractures may heal with disfigurement, similarly nasal fractures. The main implication for lacerations to the head region is disfigurement. Eye lacerations can be simple or extremely serious.

[0372] The severity order described above is not absolute, for example, an eye laceration with visual impairment clearly would be a more serious injury than where it currently lies within this hierarchy. Debilitating epilepsy or vertigo or tinnitus would also be higher in the hierarchy than suggested above.

Chest

[0373] 1. Thoracic injuries involving open thoracic or abdominal surgery

[0374] 2. Life threatening respiratory or cardiac complications (including flail chest, hemothorax, pneumothorax, pneumohemothorax, myocardial contusion, mediastinal emphysema or pneumonia)

[0375] 3. Intercostal neuralgia

[0376] 4. Fractured ribs or sternum

- **[0377]** a. Fractures of five or more ribs Fractures to 5, 6, 7 or 8 or more rib fractures
- **[0378]** b. Fractures of 4 ribs Fractures to 3 to 6 ribs
- **[0379]** c. Fractures of 3 ribs Fractures of 2 to 5 ribs
- **[0380]** d. Fracture of 2 ribs Fractures of up to 3 ribs or the sternum
- **[0381]** e. Fracture of 1 rib Fracture of 1 or 2 rubs or the sternum
- **[0382]** f. Fracture of the sternum Fractures of the sternum or 1 or 2 ribs

[0383] 5. Lacerations or fractures to the internal throat structures

[0384] 6. Internal thoracic contusions

[0385] 7. Contusions to the internal throat structures

[0386] 8. Laceration to the external throat

[0387] 9. Laceration to the breast

[0388] 10. Laceration to the chest wall

Explanation

[0389] Chest injuries requiring open chest surgery (thoracotomy) or an abdominal approach (laparotomy) may be the most potentially serious thoracic injury. Thoracotomy for example is one of the most invasive surgical procedures that can be undertaken. Then follows thoracic trauma with life threatening respiratory complications. Intercostal neuralgia is a painful and often intractable condition so it has been placed high in the severity hierarchy. Sternum and rib fractures follow. They are sometimes associated with lung complications such as pneumothorax or hemothorax, in which case they would be considered more serious an injury than a corresponding fracture without lung complication. Internal throat lacerations may be ranked higher than contusions in the

overall chest severity hierarchy, lacerations to internal structures or organs are generally more serious than contusions.

Abdomen

[0390] 1. Internal abdominal surgical removal or reconstruction (nephrectomy, splenectomy, colostomy, ileostomy or jejunostomy)
[0391] 2. Peritonitis
[0392] 3. Fistula
[0393] 4. Pancreatitis
[0394] 5. Abscess or cyst
[0395] 6. Adhesions or incisional hernia
[0396] 7. Paralytic ileus
[0397] 8. Internal abdominal open surgery via laparotomy
[0398] 9. Internal abdominal surgery via laparoscopy
[0399] 10. Abdominal injuries without surgical intervention

Explanation

[0400] Abdominal hierarchy is generally reflected by removal or repair or reconstruction to major abdominal organs and trauma or surgical complications. Removal of a kidney (nephrectomy) would be seen as the most serious abdominal injury because of its potential to be life threatening should the remaining kidney be injured or become diseased in the future. Removal of the spleen (splenectomy) puts the individual (particularly if he or she is young) at risk of very serious infection (post-splenectomy sepsis) and requires ongoing medication to prevent against infection. Injuries to the small or large bowel requiring surgery indicate serious abdominal injuries. Peritonitis heads the severity for abdominal complications. Fistula, abscess, cyst, adhesions and incisional hernia are all suggestive of possible further surgery. Abdominal injury with repair by laparotomy is considered more invasive than repair by laparoscope.

Pelvis and Uritogenital

[0401] Pelvic fracture includes both open and closed fractures.
[0402] 1. Internal pelvic surgery or laparotomy
[0403] 2. Intra-pelvic laceration of internal organs (bladder, ureter, urethra)
[0404] 3. Pelvic fistula
[0405] 4. Urethral or ureteral stricture or associated urethral, ureter or bladder injury
[0406] 5. Osteomyelitis of the pelvis
[0407] 6. Fracture of the pelvis or dislocation of the pelvic ring
[0408] 7. Laparoscopic surgical repair of internal organs
[0409] 8. Intra-pelvic contusion of internal organs
[0410] 9. Lacerations to the testes
[0411] 10. Lacerations of the penis
[0412] 11. Lacerations to the scrotum
[0413] 12. Lacerations to the vulva
[0414] 13. Contusions of the testes

Explanation

[0415] Lacerations to the bladder, ureter or urethra requiring surgical repair or reconstruction are considered to be the most severe pelvic injuries, followed by complications such as fistula or stricture of the ureter or urethra. Pelvic fractures are serious injuries but not considered as serious as injuries to the urinary system aforementioned. Genital lacerations can be minor or serious injuries, this would be determined by any residual impairment that resulted. As with other body parts it is again pointed out this severity hierarchy is not inflexible and the order shown can change depending on factual circumstances of a claim.

Spine

[0416] Spinal fractures include open and closed fractures of the spine. Fractures, dislocations and fracture dislocations to any spinal region include such injuries to any specific level within the spinal region.
[0417] 1. Fracture dislocations or dislocations of the cervical spine
[0418] 2. Fracture dislocations or dislocations of the thoracic spine
[0419] 3. Fracture dislocations or dislocations of the lumbar spine
[0420] 4. Spinal adhesions Any spinal region
[0421] 5. Osteomyelitis of the spine Any spinal region
[0422] 6. Associated spinal nerve injury Any spinal region
[0423] 7. Traumatic spondylolisthesis Any spinal region
[0424] 8. Fractures of the cervical spine
[0425] 9. Fractures of the thoracic spine
[0426] 10. Fractures of the lumbar spine
[0427] 11. Fractures of the sacrum
[0428] 12. Fractures of the tailbone (coccyx)
[0429] 13. Disc herniations or ruptures of the cervical spine requiring surgery
[0430] 14. Disc herniations or ruptures of the thoracic spine requiring surgery
[0431] 15. Disc herniations or ruptures of the lumbar spine requiring surgery
[0432] 16. Disc herniations or ruptures of the cervical spine not requiring surgery
[0433] 17. Disc herniations or ruptures of the thoracic spine not requiring surgery
[0434] 18. Disc herniations or ruptures of the lumbar spine not requiring surgery
[0435] 19. Spondylosis Any spinal region
[0436] 20. Decubitus ulcer
[0437] 21. Bed sores

Explanation

[0438] Fracture dislocations and dislocations of the spine head the severity hierarchy, vertebral fractures although serious injuries are not considered as severe. Dislocations of the vertebral column have graver potential consequences than fractures because of the increased possibility of spinal cord damage. The cervical region is regarded as potentially a more serious region to be involved than the thoracic or lumbar regions. Spinal complications then follow, followed by fractures. Disc herniations or ruptures requiring disc surgery are ranked higher than those without though of course this may not necessarily follow. Because a disc injury isn't surgically treated does not necessarily mean it is less serious than one operated on.

Arm

[0439] 1. Amputations at the shoulder Any above elbow amputation
[0440] 2. Amputations of the upper arm Forearm, elbow or above amputation

[0441] 3. Amputation at the elbow Elbow, forearm and upper arm amputations
[0442] 4. Amputation at the forearm Hand, wrist, elbow, forearm or upper arm amputations
[0443] 5. Amputations of the hand or wrist Hand, wrist, forearm or elbow amputations
[0444] 6. Amputations of the thumb Whole thumb or partial amputation
[0445] 7. Amputations of other finger Amputation of whole finger or partial amputation
[0446] 8. Crush injuries to the arm or hand with associated surgery (fasciotomy nerve repair vascular repair)
[0447] 9. Volkmann's contracture
[0448] 10. Reflex sympathetic dystrophy
[0449] 11. Lacerations of the shoulder or upper arm requiring nerve repair 3rd degree nerve injury to the median, axillary or ulnar nerves
[0450] 12. Lacerations of the elbow or forearm requiring nerve repair 3rd degree nerve injury to the radial or ulnar nerves
[0451] 13. Crossunion of radius Synostosis involving the radius and ulna
[0452] 14. Lacerations of the wrist or hand requiring nerve repair 3rd degree nerve injury to the radial or digital nerves
[0453] 15. Lacerations of the thumb requiring nerve repair 3rd degree digital nerve injury
[0454] 16. Amputations of the fingers
[0455] 17. Avascular necrosis of humerus, radius or ulna
[0456] 18. Avascular necrosis of the shoulder bones (scapula or clavicle)
[0457] 19. Avascular necrosis of the carpal bones (scaphoid, lunate, pisiform, hamate, capitate, triquetral, trapezoid, trapezium)
[0458] 20. Avascular necrosis of metacarpal, thumb or finger
[0459] 21. Osteomyelitis of humerus, radius or ulna
[0460] 22. Osteomyelitis of the shoulder bones (scapula or clavicle)
[0461] 23. Osteomyelitis of the carpal bones (scaphoid, lunate, pisiform, hamate, capitate, triquetral, trapezoid, trapezium)
[0462] 24. Osteomyelitis of metacarpal, thumb or finger
[0463] 25. Deep vein thrombosis of the arm
[0464] 26. Nonunion of humerus, radius or ulna
[0465] 27. Nonunion of the shoulder bones (scapula or clavicle)
[0466] 28. Nonunion of the carpal bones (scaphoid, lunate, pisiform, hamate, capitate, triquetral, trapezoid, trapezium)
[0467] 29. Nonunion of metacarpal, thumb or finger
[0468] 30. Osteoarthritis of shoulder, elbow or wrist
[0469] 31. Osteoarthritis of hand, thumb or fingers
[0470] 32. Delayed Union of humerus, radius or ulna
[0471] 33. Delayed Union of the shoulder bones (scapula or clavicle)
[0472] 34. Delayed Union of the carpal bones (scaphoid, lunate, pisiform, hamate, capitate, triquetral, trapezoid, trapezium)
[0473] 35. Delayed Union of metacarpal, thumb or finger
[0474] 36. Malunion of humerus, radius or ulna
[0475] 37. Malunion of the shoulder bones (scapula or clavicle)
[0476] 38. Malunion of the carpal bones (scaphoid, lunate, pisiform, hamate, capitate, triquetral, trapezoid, trapezium)
[0477] 39. Malunion of metacarpal, thumb or finger
[0478] 40. Fracture dislocation or dislocation of the shoulder
[0479] 41. Fracture dislocation or dislocation of the elbow
[0480] 42. Fracture dislocation or dislocation of the wrist
[0481] 43. Fracture dislocation or dislocation of the hand
[0482] 44. Fracture dislocation or dislocation of the thumb
[0483] 45. Lacerations of the hand or wrist requiring tendon repair
[0484] 46. Lacerations of the thumb requiring tendon repair
[0485] 47. Associated tendon injury of hand, thumb or fingers
[0486] 48. Lacerations of the fingers requiring tendon repair
[0487] 49. Lacerations of the shoulder or upper arm requiring tendon repair
[0488] 50. Lacerations of the elbow or forearm requiring tendon repair
[0489] 51. Associated tendon injury of shoulder, upper arm, elbow, forearm or wrist With any other injury
[0490] 52. Fracture of the humerus
[0491] 53. Fractures of the forearm bones (radius or ulna)
[0492] 54. Fractures of the shoulder bones (scapula or clavicle)
[0493] 55. Crush injury to the thumb with associated surgery (fasciotomy nerve repair vascular repair)
[0494] 56. Crush injuries to the fingers with associated surgery (fasciotomy nerve repair vascular repair)
[0495] 57. Crush injury to the thumb not requiring surgery
[0496] 58. Crush injuries to the fingers not requiring surgery
[0497] 59. Fractures of the carpal bones (scaphoid, lunate, pisiform, hamate, capitate, triquetral, trapezoid, trapezium)
[0498] 60. Fractures of the first metacarpal (of the thumb)
[0499] 61. Fractures of the second to fifth metacarpals (of the fingers)
[0500] 62. Fractures of the thumb
[0501] 63. Fracture dislocation or dislocation of the fingers
[0502] 64. Fractures of the fingers
[0503] 65. Ligament injuries to the wrist with associated surgery
[0504] 66. Ligament injuries to the hand with associated surgery
[0505] 67. Ligament injuries to the shoulder with associated surgery
[0506] 68. Ligament injuries to the elbow with associated surgery
[0507] 69. Ligament injuries to the thumb with associated surgery
[0508] 70. Ligament injuries to the fingers with associated surgery
[0509] 71. Associated vascular injury With any other injury

[0510] 72. Lacerations of the shoulder or upper arm requiring vascular repair

[0511] 73. Lacerations of the elbow or forearm requiring vascular repair

[0512] 74. Lacerations of the fingers requiring nerve repair

[0513] 75. Associated nerve injury of the arm

[0514] 76. Lacerations of the wrist or hand requiring vascular repair

[0515] 77. Lacerations of the thumb requiring vascular repair

[0516] 78. Lacerations of the fingers requiring vascular repair

[0517] 79. Sprains and strains of the shoulder with associated surgery

[0518] 80. Sprains and strains of the wrist with associated surgery

[0519] 81. Sprains and strains of the elbow with associated surgery

[0520] 82. Sprains and strains of the thumb with associated surgery

[0521] 83. Sprains and strains of the fingers with associated surgery

[0522] 84. Crush injuries to the arm or hand not requiring surgery

[0523] 85. Ligament injuries to the wrist not requiring surgery

[0524] 86. Ligament injuries to the hand not requiring surgery

[0525] 87. Ligament injuries to the shoulder not requiring surgery

[0526] 88. Ligament injuries to the elbow not requiring surgery

[0527] 89. Ligament injuries to the thumb not requiring surgery

[0528] 90. Ligament injuries to the fingers not requiring surgery

[0529] 91. Bursitis, synovitis, tendonitis or tenosynovitis of shoulder, elbow or wrist

[0530] 92. Bursitis, synovitis, tendonitis or tenosynovitis of hand, thumb or fingers

[0531] 93. Sprains and strains of the shoulder not requiring surgery

[0532] 94. Sprains and strains of the wrist not requiring surgery

[0533] 95. Sprains and strains of the elbow not requiring surgery

[0534] 96. Sprains and strains of the thumb not requiring surgery

[0535] 97. Sprains and strains of the fingers not requiring surgery

[0536] 98. Lacerations of the shoulder or upper arm not requiring surgery

[0537] 99. Lacerations of the elbow or forearm arm not requiring surgery

[0538] 100. Lacerations of the wrist or hand not requiring surgery

[0539] 101. Lacerations of the thumb not requiring surgery

[0540] 102. Lacerations of the fingers not requiring surgery

Explanation

[0541] In the above listing, traumatic amputations head the severity order i.e. the limb or part thereof was severed in the accident. Crush injury to the arm or hand follows, crush injuries might be expected to result in some vascular or peripheral nerve damage with resulting muscle and fascia dysfunction. Next in severity hierarchy is major peripheral nerve injury, minor nerve injuries are not surgically treated, those that are suggest 3rd degree nerve injuries, and some residual dysfunction might be expected to result. Fracture complications come next in the order. Osteomyelitis and avascular necrosis are serious bone complications, the former being an infection and the latter a bone vascular problem. Nonunion is considered the most significant of the bony union complications (with the exception of cross union). Fracture dislocations and dislocations of major joints are considered slightly more severe than fractures. Obviously not all fractures or fracture dislocations or dislocations are treated alike in terms of injury hierarchy.

[0542] There is considerable severity overlap between these injuries with their complications and potential treatments. What may be ranked as a moderately severe injury may in fact end up a more serious injury than some ranked higher in severity, this however can be related by the adjuster as the "dominant injury".

Leg

[0543] 1. Amputations at the hip Amputation at the hip or through the thigh

[0544] 2. Amputations though the thigh Hip, thigh, knee or lower leg amputations

[0545] 3. Amputations at the knee Amputation though thigh, knee or lower leg

[0546] 4. Amputations through the lower leg Amputations through thigh, knee, lower leg, ankle or foot

[0547] 5. Amputation at the ankle Amputations through knee, lower leg, ankle or foot

[0548] 6. Amputations through the foot Amputations through lower leg, ankle or foot

[0549] 7. Fracture dislocations or dislocations of the knee

[0550] 8. Fracture dislocations or dislocations of the hip

[0551] 9. Lacerations of the hip or thigh requiring nerve repair 3rd degree nerve injury to the femoral or sciatic nerves

[0552] 10. Lacerations of the knee or lower leg requiring nerve repair 3rd degree nerve injury to the peroneal, popliteal, tibial or other nerves

[0553] 11. Crush injuries of the leg or foot requiring surgery (fasciotomy nerve repair vascular repair)

[0554] 12. Nonunion of femur, patella, tibia or fibula

[0555] 13. Nonunion of tarsal bones (calcaneus, cuboid, navicular, talus or cuneiforms)

[0556] 14. Deep vein thrombosis of the leg

[0557] 15. Avascular necrosis of femur, patella, tibia or fibula

[0558] 16. Avascular necrosis of tarsal bones (calcaneus, cuboid, navicular, talus or cuneiforms)

[0559] 17. Avascular necrosis of metatarsals, sesamoids or toes

[0560] 18. Osteomyelitis of acetabulum, femur, patella, tibia or fibula
[0561] 19. Osteomyelitis of tarsal bones (calcaneus, cuboid, navicular, talus or cuneiforms)
[0562] 20. Osteomyelitis of metatarsals, sesamoids or toes
[0563] 21. Osteoarthritis of hip, knee or ankle
[0564] 22. Osteoarthritis of foot or toes
[0565] 23. Delayed union of acetabulum, femur, patella, tibia or fibula
[0566] 24. Fractures of the femur
[0567] 25. Fractures of the hip (acetabulum)
[0568] 26. Fractures of the tibia
[0569] 27. Amputation of the toes Any toes, whole or part
[0570] 28. Nonunion of metatarsals, sesamoids or toes
[0571] 29. Delayed union of tarsal bones (calcaneus, cuboid, navicular, talus or cuneiforms)
[0572] 30. Delayed union of metatarsals or toes
[0573] 31. Malunion of acetabulum, femur, patella, tibia or fibula
[0574] 32. Malunion of tarsal bones (calcaneus, cuboid, navicular, talus or cuneiforms)
[0575] 33. Malunion of metatarsals or toes
[0576] 34. Fracture dislocations or dislocations of the ankle
[0577] 35. Fracture dislocations or dislocations of the foot
[0578] 36. Fractures of the hind foot (talus and calcaneus)
[0579] 37. Ligament injuries of the knee requiring surgery
[0580] 38. Sprain strain injuries of the knee requiring surgery
[0581] 39. Ligament injuries of the ankle requiring surgery
[0582] 40. Sprain strain injuries of the ankle requiring surgery
[0583] 41. Ligament injuries of the hip requiring surgery
[0584] 42. Sprain strain injuries of the hip requiring surgery
[0585] 43. Sprain strain injuries of the thigh requiring surgery
[0586] 44. Ligament injuries of the foot requiring surgery
[0587] 45. Sprain strain injuries of the foot requiring surgery
[0588] 46. Fracture dislocations or dislocations of the patella
[0589] 47. Fractures of the patella
[0590] 48. Fractures of the fibula
[0591] 49. Fractures of the tarsal bones (cuboid, navicular, first, second and third cuneiforms, tibial and fibular sesamoids)
[0592] 50. Crush injuries of the toes requiring surgery (fasciotomy nerve repair vascular repair)
[0593] 51. Ligament injuries of the toes requiring surgery
[0594] 52. Fractures of the forefoot (metatarsals)
[0595] 53. Fracture dislocations or dislocations of the toes
[0596] 54. Fractures of the toes
[0597] 55. Associated vascular injury
[0598] 56. Sprain strain injuries of the toes requiring surgery
[0599] 57. Lacerations of the ankle or foot requiring tendon repair
[0600] 58. Lacerations of the toes requiring tendon repair
[0601] 59. Lacerations of the hip or thigh requiring tendon repair
[0602] 60. Lacerations of the knee or lower leg requiring tendon repair
[0603] 61. Lacerations of the hip or thigh requiring vascular repair
[0604] 62. Lacerations of the knee or lower leg requiring vascular repair
[0605] 63. Lacerations of the ankle or foot requiring nerve repair
[0606] 64. Lacerations of the toes requiring nerve repair
[0607] 65. Lacerations of the ankle or foot requiring vascular repair
[0608] 66. Lacerations of the toes requiring vascular repair
[0609] 67. Crush injuries of the leg or foot not requiring surgery
[0610] 68. Crush injuries of the toes not requiring surgery
[0611] 69. Ligament injuries of the knee not requiring surgery
[0612] 70. Ligament injuries of the ankle not requiring surgery
[0613] 71. Ligament injuries of the hip not requiring surgery
[0614] 72. Ligament injuries of the foot not requiring surgery
[0615] 73. Ligament injuries of the toes not requiring surgery
[0616] 74. Associated tendon injury of hip, upper leg, knee, lower leg or ankle
[0617] 75. Associated tendon injury of foot or toes
[0618] 76. Associated nerve injury
[0619] 77. Bursitis, synovitis, tendonitis or tenosynovitis of hip, knee or ankle
[0620] 78. Bursitis, synovitis, tendonitis or tenosynovitis of foot or toes
[0621] 79. Sprain strain injuries of the knee not requiring surgery
[0622] 80. Sprain strain injuries of the hip not requiring surgery
[0623] 81. Sprain strain injuries of the thigh not requiring surgery
[0624] 82. Sprain strain injuries of the ankle not requiring surgery
[0625] 83. Sprain strain injuries of the foot not requiring surgery
[0626] 84. Sprain strain injuries of the toes not requiring surgery
[0627] 85. Lacerations of the hip or thigh not requiring surgery
[0628] 86. Lacerations of the knee or lower leg not requiring surgery
[0629] 87. Lacerations of the ankle or foot not requiring surgery
[0630] 88. Lacerations of the toes not requiring surgery

Explanation

[0631] In the listing above, traumatic amputations head the list of severity hierarchy. The follows fracture dislocations of

the 2 largest joints in the body, the knee and the hip. Knee fracture dislocation has been given priority over the hip, knee dislocations are orthopedic emergencies and even when treated promptly and expertly are still likely to result in neurovascular impairment. Injuries with peripheral nerve complications requiring nerve repair come next, the assumption applied here is that because nerve repair is required, the nerve injury is of a third degree type. Third degree peripheral nerve injuries do not fully heal. Extensive soft tissue injury (crush injury) is next, note: it is assumed this injury involves soft tissues—fascia, muscle etc. Bony injuries are not implied as being part of crush injuries. Fracture complications come next in the hierarchy and then fractures to the major weight bearing bones. It will be noted that the fibula although a long bone is not ranked along with the other bone of the lower leg, the tibia. The fibula is not weight bearing and fractures of the fibula are not considered as serious as tibia fractures.

[0632] As with the order for the other major body parts, this list is only a broad guide for leg injury severity hierarchy. Complications, treatments, prognosis and medical outcome are all factors that can change the order in which these injuries appear in this hierarchy.

[0633] Embodiments of a subset or all (and portions or all) of the above may be implemented by program instructions stored in a memory medium or carrier medium and executed by a processor. A memory medium may include any of various types of memory devices or storage devices. The term "memory medium" is intended to include an installation medium, e.g., a Compact Disc Read Only Memory (CD-ROM), floppy disks, or tape device; a computer system memory or random access memory such as Dynamic Random Access Memory (DRAM), Double Data Rate Random Access Memory (DDR RAM), Static Random Access Memory (SRAM), Extended Data Out Random Access Memory (EDO RAM), Rambus Random Access Memory (RAM), etc.; or a non-volatile memory such as a magnetic media, e.g., a hard drive, or optical storage. The memory medium may comprise other types of memory as well, or combinations thereof.

[0634] In addition, the memory medium may be located in a first computer in which the programs are executed, or may be located in a second different computer that connects to the first computer over a network, such as the Internet. In the latter instance, the second computer may provide program instructions to the first computer for execution. The term "memory medium" may include two or more memory mediums that may reside in different locations, e.g., in different computers that are connected over a network.

[0635] In some embodiments, a computer system at a respective participant location may include a memory medium(s) on which one or more computer programs or software components according to one embodiment of the present invention may be stored. For example, the memory medium may store one or more programs that are executable to perform the methods described herein. The memory medium may also store operating system software, as well as other software for operation of the computer system.

[0636] In some embodiments, users (e.g., claims adjusters, process evaluators, FSO personnel) may access or operate elements of a computer system via a network such as a WAN or LAN. In certain embodiments, users may have web-enabled access to a system (e.g., via internet browser).

[0637] Further modifications and alternative embodiments of various aspects of the invention may be apparent to those skilled in the art in view of this description. Accordingly, this description is to be construed as illustrative only and is for the purpose of teaching those skilled in the art the general manner of carrying out the invention. It is to be understood that the forms of the invention shown and described herein are to be taken as embodiments. Elements and materials may be substituted for those illustrated and described herein, parts and processes may be reversed, and certain features of the invention may be utilized independently, all as would be apparent to one skilled in the art after having the benefit of this description of the invention. Changes may be made in the elements described herein without departing from the spirit and scope of the invention as described in the following claims.

1-72. (canceled)

73. A computer-implemented method for determining amounts for use in settling insurance claims, comprising:

receiving a selection of one or more equalization criteria from a defined list;

automatically determining on an insurance claims processing system equalization values from a set of closed claim data based on the selected equalization criteria;

for at least one open claim,

providing bodily injury data for the open claim;

identifying one or more precedent claims that match the open claim based on one or more characteristics of the open claim;

automatically adjusting on the insurance claims processing system a value for one or more of the matching precedent claims using one or more of the equalization values; and

determining an amount for the open claim based at least in part on at least one adjusted value.

74. The method of claim **73**, wherein the amount is a general damages value for the open claim.

75. The method of claim **73**, wherein the amount is a recommended settlement amount for the open claim.

76. The method of claim **73**, wherein the selection by a user of the one or more equalization criteria is made during installation of a claims-matching program.

77. The method of claim **73**, further comprising determining a likelihood value associated with at least one of the precedent claims, wherein the amount for the open claim is based at least in part on the likelihood value.

78. The method of claim **73**, wherein the amount for the open claim is determined by:

determining an adjusted general damages amount for the open claim based at least in part on at least one equalized value; and

increasing or decreasing the adjusted general damages amount based on at least one pending claim adjustment.

79. The method of claim **73**, wherein the equalization criteria comprises a locality of an accident.

80. The method of claim **73**, wherein the equalization criteria comprises a sub-state locality of an accident.

81. The method of claim **73**, wherein the equalization criteria comprises a claim type.

82. The method of claim **73**, wherein the equalization criteria comprises a county of an accident.

83. The method of claim **73**, wherein the equalization criteria comprises secondary injury type.

84. The method of claim **73**, wherein the equalization criteria comprises jurisdiction.

85. (canceled)

86. The method of claim **73**, wherein identifying the one or more precedent claims that match an open claim comprises applying at least one filter.

87. The method of claim **73**, wherein identifying the one or more precedent claims that match an open claim comprises receiving at least one selection from user specifying at least one filter and applying the at least one filter.

88. The method of claim **73**, wherein identifying the one or more precedent claims that match an open claim comprises determining whether a major injury for the open claim is predominantly a demonstrable injury or not a demonstrable injury.

89. The method of claim **73**, wherein identifying the one or more precedent claims that match an open claim comprises determining a most injured body part for the open claim.

90. The method of claim **73**, wherein identifying the one or more precedent claims that match an open claim comprises determining one or more medical codes for at least one injury to a claimant for the open claim.

91. The method of claim **73**, wherein identifying the one or more precedent claims that match an open claim comprises identifying a dominant medical feature associated with at least one injury to a claimant for the open claim.

92. A system, comprising:

a processor;

a memory coupled to the processor and configured to store program instructions executable by the processor to implement:

receiving a selection by a user of one or more equalization criteria from a defined list;

determining equalization values from a set of closed claim data based on the selected equalization criteria; and

for at least one open claim:

providing bodily injury data for the open claim;

identifying one or more precedent claims that match an open claim based on one or more characteristics of the open claim;

adjusting a value for one or more of the matching precedent claims using one or more of the equalization values; and

determining an amount for the open claim based at least in part on at least one adjusted value.

93. A tangible, computer readable medium comprising program instructions, wherein the program instructions are computer-executable to implement:

receiving a selection by a user of one or more equalization criteria from a defined list;

determining equalization values from a set of closed claim data based on the selected equalization criteria;

for at least one open claim:

providing bodily injury data for the open claim;

identifying one or more precedent claims that match an open claim based on one or more characteristics of the open claim;

adjusting a value for one or more of the matching precedent claims using one or more of the equalization values; and

determining an amount for the open claim based at least in part on at least one adjusted value.

94-168. (canceled)

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