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(72) Inventors; and

(71) Applicants: SINGH, Awadhesh Pratap [IN/IN]; Flat no. 3D, Block no. 24, Rail Vihar, Sector 56, Opp. CNG Fill-

ing Station, Gurgaon 122011 (IN). VAID, Sumit [IN/IN]; B1-502 Beryl Apartment, Kharadi, Pune 411014 (IN). AGARWAL, Nitin [IN/IN]; Flat I-301, Bestech Park View Spa, Sector 47. Next to State Vigilance Bureau, Gururgram 122001 (IN). MALHOTRA, Shubham [IN/IN]; 4/267 Malviya Nagar, Jaipur 302017 (IN). SINGH, Yatendra [IN/IN]; Flat No 4/A13, Comfortzone balewadi baner road, Pune 411045 (IN). AGRAWAL, Manish Kumar [IN/IN]; G902, Park Turquoise, Park Street, Wakad, Pune 411057 (IN). VASANI, Nisarg [IN/IN]; A1 504, Mantra Majestica, Kale padal road Hadapsar, Pune 411028 (IN). CHAVAN, Krishna [IN/IN]; #17 Cinderella Society, Yogi Park, Baner, Pune 411045 (IN). MATHUR, Mayank [IN/IN]; 2D, 804, Akme Harmony, Bellandur, Outer Ring Road, Bangalore 560103 (IN). GUPTA, Gaurav [IN/IN]; B-203, Vallonia, Near Maratha Mandir, Bavdhan, Pune 411021 (IN). GARG, Amit [IN/IN]; 202 Mont Vert Avion, Sus Road, Pashan, Pune 411021 (IN). CHANDRAKAR, Amit

(54) Title: SYSTEM AND METHOD FOR DETECTING A FINANCIAL FRAUD

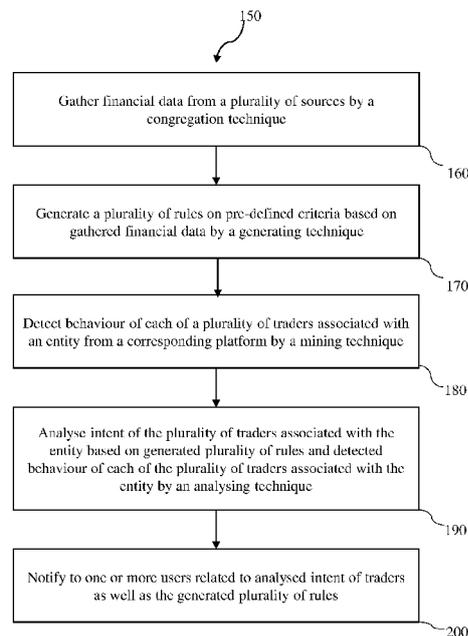


FIG. 4

(57) Abstract: A system for detecting a financial fraud is disclosed to provide real time trading information support. The system includes a processing subsystem. The processing subsystem includes a data gathering module, configured to gather financial data from a plurality of sources by a congregation technique. The processing subsystem includes a rule generating module, configured to generate a plurality of rules on pre-defined criteria based on gathered financial data by a generating technique. The processing subsystem includes a behaviour detection module, configured to detect behaviour of each of a plurality of traders associated with an entity from a corresponding platform by a data mining technique. The processing subsystem includes an intent analysing module, configured to analyse intent of the plurality of traders associated with the entity based on plurality of generated rules and detected behaviour of each of a plurality of traders associated with the entity by an analysing technique.



Kumar [IN/IN]; H.No 283, Samata Colony, Chattishgarh, Raipur 492001 (IN).

(74) **Agent: AGRAWAL, Dinkar**; IPexcel Services Pvt. Ltd., Indiqube Orion, 24th Main Rd, Garden Layout, Sector 2, HSR Layout, Karnataka, Bangalore 560102 (IN).

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- *as to the identity of the inventor (Rule 4.17(i))*
- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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SYSTEM AND METHOD FOR DETECTING A FINANCIAL FRAUD

This International Application claims priority from a complete patent application filed in India having Patent Application No. 201911028967, filed on July 18, 2019 and titled "SYSTEM AND METHOD FOR DETECTING A FINANCIAL FRAUD".

5 FIELD OF INVENTION

Embodiments of a present disclosure relates to financial services, and more particularly to a system for detecting a financial fraud and a method to operate the same.

BACKGROUND

10 Though robust surveillance mechanisms are present for detecting fraudulent activity, yet financial market is seeing various illegal activities on a daily basis. The currently used surveillance mechanisms are costly and complex. Another problem is that the majority of fraudulent activities related to the said field are detected after a long time. Financial fraud in relation to any entity also brings several add-on problems, such as
15 financial loss for an entity, reputational risk for the entity, client loss and the like.

In one approach, a system uses various data extraction module to extract news related to an entity. The disclosed system surely enables manual understanding of all extracted data. Relation in between all the extracted data is to be understood before undertaking any particular form of investment. More effective way would be to use an analysis
20 technique to provide a user with specific situational news about financial condition in real time. Real time alert would surely enable proper decisioning making capabilities of the said user.

Additionally, one must understand the trader's intent before undertaking service in relation to investment. An effective analysis technique to understand the intent of the
25 said trader would surely enable better real time investment decision.

Hence, there is a need for an improved system to detect a financial fraud and a method to operate the same and therefore address the aforementioned issues.

BRIEF DESCRIPTION

In accordance with one embodiment of the disclosure, a system for detecting a financial fraud is provided. The system includes a processing subsystem. The processing subsystem includes a data gathering module. The data gathering module is
5 configured to gather financial data from a plurality of sources by a congregation technique.

The processing subsystem also includes a rule generating module. The rule generating module is operatively coupled to the data gathering module. The rule generating module is configured to generate a plurality of rules on pre-defined criteria based on
10 gathered financial data by a generating technique.

The processing subsystem also includes a behaviour detection module. The behaviour detection module is operatively coupled to the data gathering module. The behaviour detection module is configured to detect behaviour of each of a plurality of traders associated with an entity from a corresponding platform by a data mining technique.

15 The processing subsystem also includes an intent analysing module. The intent analysing module is operatively coupled to the behaviour detection module. The intent analysing module is configured to analyse intent of the plurality of traders associated with the entity based on plurality of generated rules and detected behaviour of each of a plurality of traders associated with the entity by an analysing technique.

20 A memory subsystem is operatively coupled to the processing subsystem. The memory subsystem is configured to store the plurality of generated rules and analysed intent of traders associated with the entity.

In accordance with one embodiment of the disclosure, a method for detecting a financial fraud is provided. The method includes gathering financial data from a
25 plurality of sources by a congregation technique. The method also includes generating a plurality of rules on pre-defined criteria based on gathered financial data by a generating technique.

The method also includes detecting behaviour of each of a plurality of traders associated with an entity from a corresponding platform by a mining technique. The

method also includes analysing intent of each of the plurality of traders associated with the entity based on plurality of generated rules and detected behaviour of each of the plurality of traders associated with the entity by an analysing technique. The method also includes notifying to one or more users related to analysed intent of traders as well as the plurality of generated rules.

To further clarify the advantages and features of the present disclosure, a more particular description of the disclosure will follow by reference to specific embodiments thereof, which are illustrated in the appended figures. It is to be appreciated that these figures depict only typical embodiments of the disclosure and are therefore not to be considered limiting in scope. The disclosure will be described and explained with additional specificity and detail with the appended figures.

BRIEF DESCRIPTION OF THE DRAWINGS

The disclosure will be described and explained with additional specificity and detail with the accompanying figures in which:

FIG. 1 is a block diagram representation of a system for detecting a financial fraud in accordance with an embodiment of the present disclosure;

FIG. 2 is a schematic representation of an embodiment representing the system for detecting a financial fraud of FIG. 1 in accordance of an embodiment of the present disclosure;

FIG. 3 is a block diagram of a computer or a server in accordance with an embodiment of the present disclosure; and

FIG. 4 is a flowchart representing the steps of a method for detecting a financial fraud in accordance with an embodiment of the present disclosure.

Further, those skilled in the art will appreciate that elements in the figures are illustrated for simplicity and may not have necessarily been drawn to scale. Furthermore, in terms of the construction of the device, one or more components of the device may have been represented in the figures by conventional symbols, and the figures may show only those specific details that are pertinent to understanding the embodiments of the present disclosure so as not to obscure the figures with details that

will be readily apparent to those skilled in the art having the benefit of the description herein.

DETAILED DESCRIPTION

For the purpose of promoting an understanding of the principles of the disclosure, reference will now be made to the embodiment illustrated in the figures and specific language will be used to describe them. It will nevertheless be understood that no
5 limitation of the scope of the disclosure is thereby intended. Such alterations and further modifications in the illustrated online platform, and such further applications of the principles of the disclosure as would normally occur to those skilled in the art are to be construed as being within the scope of the present disclosure.

The terms "comprises", "comprising", or any other variations thereof, are intended to
10 cover a non-exclusive inclusion, such that a process or method that comprises a list of steps does not include only those steps but may include other steps not expressly listed or inherent to such a process or method. Similarly, one or more devices or subsystems or elements or structures or components preceded by "comprises... a" does not, without
15 more constraints, preclude the existence of other devices, subsystems, elements, structures, components, additional devices, additional subsystems, additional elements, additional structures or additional components. Appearances of the phrase "in an embodiment", "in another embodiment" and similar language throughout this specification may, but not necessarily do, all refer to the same embodiment.

Unless otherwise defined, all technical and scientific terms used herein have the same
20 meaning as commonly understood by those skilled in the art to which this disclosure belongs. The system, methods, and examples provided herein are only illustrative and not intended to be limiting.

In the following specification and the claims, reference will be made to a number of terms, which shall be defined to have the following meanings. The singular forms "a",
25 "an", and "the" include plural references unless the context clearly dictates otherwise.

Embodiments of the present disclosure relate to a system for detecting a financial fraud. The system includes a processing subsystem. The processing subsystem includes a data gathering module. The data gathering module is configured to gather financial data from a plurality of sources by a congregation technique.

The processing subsystem also includes a rule generating module. The rule generating module is operatively coupled to the data gathering module. The rule generating module is configured to generate a plurality of rules on pre-defined criteria based on gathered financial data by a generating technique.

- 5 The processing subsystem also includes a behaviour detection module. The behaviour detection module is operatively coupled to the data gathering module. The behaviour detection module is configured to detect behaviour of each of a plurality of traders associated with an entity from a corresponding platform by a data mining technique.

10 The processing subsystem also includes an intent analysing module. The intent analysing module is operatively coupled to the behaviour detection module. The intent analysing module is configured to analyse intent of the plurality of traders associated with the entity based on plurality of generated rules and detected behaviour of each of a plurality of traders associated with the entity by an analysing technique.

15 A memory subsystem is operatively coupled to the processing subsystem. The memory subsystem is configured to store the plurality of generated rules and analysed intent of traders associated with the entity.

FIG. 1 is a block diagram representation of a system for detecting a financial fraud (10) in accordance with an embodiment of the present disclosure. As used herein, the term “financial fraud” refers to an intentional act of deception involving financial transactions for purpose of personal gain.

25 Furthermore, in one embodiment, here financial fraud mainly refers to securities fraud, whereby fraud subject matter primarily involves misrepresenting information investors use to make decisions. In such embodiment, the person committing fraud comprises of an individual, such as a stockbroker, or an organization, such as a brokerage firm, corporation, or investment bank.

The system (10) includes a processing subsystem (20). The processing subsystem (20) includes a data gathering module (40). The data gathering module (40) is configured to gather financial data from a plurality of sources by a congregation technique.

In one embodiment, the financial data refers to data in correspondence from financial news. In such embodiment, the financial news comprises news from all financial sectors provided in real time.

Furthermore, in one embodiment, the plurality of sources comprises of internal data and external data. In such embodiment, the internal data includes information of
5 financial data from within the organisations. In another such embodiment, the external data includes information from economic, political and legal, demographic, social, competitive, global, and technological sectors. Here, in one specific embodiment, the external data may be from BLOOMBERG, RETEURS and the like.

10 Additionally, in one embodiment, the congregation technique comprises at least one of machine learning techniques and artificial intelligence. As used herein, “artificial intelligence” refers to sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans
15 and other animals, such as visual perception, speech recognition, decision-making, and translation between languages. As used herein, “machine learning” refers to an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.

In one exemplary embodiment, a company X is in bankrupt position and a specific
20 newspaper publishes it in real time. A web crawler may be used to detect the specific news. Providing one or more users with the news of bankruptcy in real time, will surely enable security to the one or more user’s investment.

The processing subsystem (20) also includes a rule generating module (50). The rule generating module (50) is operatively coupled to the data gathering module (40). The
25 rule generating module (50) is configured to generate a plurality of rules on pre-defined criteria based on gathered financial data by a generating technique.

In one embodiment, the pre-defined criteria comprise of the situational criteria’s that the one or more users should know before investment or during investment process. For example, during bankruptcy, the criteria are to follow the situational criteria
30 regarding the “bankruptcy” situation.

Here, in another embodiment, plurality of generated rules refers to rules that are being developed according to the situation. In continuation with above stated exemplary embodiment, the news of bankruptcy about the company X should be interpreted according to generated rules. Here, the generated rules may lead to alert notification
5 to the one or more users. Such notification is presented by a notification module.

The processing subsystem (20) also includes a behaviour detection module (60). The behaviour detection module (60) is operatively coupled to the data gathering module (40). The behaviour detection module (60) is configured to detect behaviour of each of a plurality of traders associated with an entity from a corresponding platform by a
10 data mining technique.

As used herein, the term “trader” refers to an individual who engages in the buying and selling of financial assets in any financial market, either for himself or on behalf of another person or institution. In one embodiment, entity comprises of any corporate firm or an individual that enables investment through a said trader.

15 Subsequently, in one embodiment, the trader’s behaviour is detected from a platform comprising of any social platform. In such embodiment, for example the trader’s social media posts are monitored to understand whether any fraud activity is really happening or not.

In continuation with above stated exemplary embodiment, a trader Y social behaviour
20 with respect to the company X bankruptcy is understood. In such exemplary embodiment, any untoward behaviour details of the trader Y are mined through the data mining technique.

As used herein, the term “data mining technique” refers to discovering unsuspected or previously unknown relationships amongst the data. In such embodiment, at first data
25 is collected, consequently collected data is understood, prepared, transformed, modelled and lastly evaluated.

The processing subsystem (20) also includes an intent analysing module (70). The intent analysing module (70) is operatively coupled to the behaviour detection module (60). The intent analysing module (70) is configured to analyse intent of the plurality
30 of traders associated with the entity based on plurality of generated rules and detected

behaviour of each of a plurality of traders associated with the entity by an analysing technique.

In one embodiment, the analysing technique comprises at least one of machine learning techniques and artificial intelligence. In continuation with above stated
5 exemplary embodiment, the social behaviour of the trader Y as well as the plurality of generated rules in relation with the company X news, is analysed for understanding intent of the trader Y.

Subsequently, in one embodiment, the intent analysing module (70) uses reinforcement learning technique for undertaking suitable actions in particular
10 situations. In such embodiment, the suitable actions may be determined with respect to reward system. Here, if the action taken is correct, the system rewards itself; otherwise modifies the action strategy for that particular situations.

The processing subsystem (20) further includes a feedback module. The feedback module is operatively couple to intent analysing module (70). The feedback module is
15 configured to provide alerts related to analysed intent of traders as well as the plurality of generated rules, whereby alerts are provided to one or more users.

Here, in one embodiment, the alerts may be of pop-up based alert, a text alert, a voice alert or the like. In another embodiment, the alerts may be provided by a robotic software technique. In such embodiment, robotic software techniques would
20 constantly configure, customize and alter the alerts according to situational requirement.

A memory subsystem (30) is operatively coupled to the processing subsystem (20). The memory subsystem (30) is configured to store the plurality of generated rules and analysed intent of traders associated with the entity. Here, in one embodiment, the
25 memory subsystem (30) may be a remote storage or a local storage.

FIG. 2 is a schematic representation of an embodiment representing the system for detecting a financial fraud (10) of FIG. 1 in accordance of an embodiment of the present disclosure. For example, a company M (100) after undergoing sudden financial problems, files for bankruptcy at a predefined time of the day.

Here, the news of the bankruptcy filing is gathered by a data gathering module (40) from different newspapers such a RETUERS and BLOOMBERG. The news articles are then put through rule generating module (50) for generating a set of rules. Here, one generated rule may be “do not buy shares of the company M (100)”.

5 Additionally, a behaviour detection module (60), is configured to detect behaviour of a trader Z (90) associated with the company M (100). Here, the social platform such as TWITTER and FACEBOOK are mined in real time to generate updates of trader Z (90),. The main idea of mining is to detect trader Z’s (90) behaviour with respect to company M (100).

10 Lastly, an intent analysing module (70) is used to understand the intent of the trader Z (90) in correspondence with the plurality of generated rules. Such understanding is notified to a user of the system through a notification module (80). Here, such analysing enables in real time understanding of the market.

The data gathering module (40), the rule generating module (50), the behaviour
15 detection module (60) and the intent analysing module (70) in FIG. 2 is substantially equivalent to the data gathering module (40), the rule generating module (50), the behaviour detection module (60) and the intent analysing module (70) of FIG. 1.

FIG. 3 is a block diagram of a computer or a server (110) in accordance with an
embodiment of the present disclosure. The server (110) includes processor(s) (140),
20 and memory (120) coupled to the processor(s) (140).

The processor(s) (140), as used herein, means any type of computational circuit, such
as, but not limited to, a microprocessor, a microcontroller, a complex instruction set
computing microprocessor, a reduced instruction set computing microprocessor, a
very long instruction word microprocessor, an explicitly parallel instruction
25 computing microprocessor, a digital signal processor, or any other type of processing
circuit, or a combination thereof.

The memory (120) includes a plurality of modules stored in the form of executable
program which instructs the processor (140) to perform the method steps illustrated in
Fig 1. The memory (120) has following modules: the data gathering module (40), the

rule generating module (50), the behaviour detection module (60) and the intent analysing module (70).

The data gathering module (40) is configured to gather financial data from a plurality of sources by a congregation technique. The rule generating module (50) is configured to generate a plurality of rules on pre-defined criteria based on gathered financial data by a generating technique.

The behaviour detection module (60) is configured to detect behaviour of each of a plurality of traders associated with an entity from a corresponding platform by a data mining technique. The intent analysing module (70) is configured to analyse intent of the plurality of traders associated with the entity based on plurality of generated rules and detected behaviour of each of a plurality of traders associated with the entity by an analysing technique.

Computer memory elements may include any suitable memory device(s) for storing data and executable program, such as read only memory, random access memory, erasable programmable read only memory, electrically erasable programmable read only memory, hard drive, removable media drive for handling memory cards and the like. Embodiments of the present subject matter may be implemented in conjunction with program modules, including functions, procedures, data structures, and application programs, for performing tasks, or defining abstract data types or low-level hardware contexts. Executable program stored on any of the above-mentioned storage media may be executable by the processor(s) (140).

FIG. 4 is a flowchart representing the steps of a method for detecting a financial fraud (150) in accordance with an embodiment of the present disclosure. The method (150) includes gathering financial data from a plurality of sources by a congregation technique in step 160. In one embodiment, gathering the financial data from the plurality of sources by the congregation technique includes gathering the financial data from the plurality of sources by a data gathering module. In another embodiment, gathering the financial data from the plurality of sources by the congregation technique includes gathering the financial data from a plurality of sources comprising internal data as well as external data.

Here, in such embodiment, gathering the financial data from the plurality of sources by the congregation technique includes gathering the financial data from the internal data such as information of financial data from within the organisations. In another such embodiment, gathering the financial data from the plurality of sources by the congregation technique includes gathering the financial data from the external data such as information from economic, political and legal, demographic, social, competitive, global, and technological sectors.

The method (150) also includes generating a plurality of rules on pre-defined criteria based on gathered financial data by a generating technique in step 170. In one embodiment, generating the plurality of rules on the pre-defined criteria based on the gathered financial data includes generating the plurality of rules on the pre-defined criteria based on the gathered financial data by a rule generating module.

The method (150) also includes detecting behaviour of each of a plurality of traders associated with an entity from a corresponding platform by a mining technique in step 180. In one embodiment, detecting behaviour of each of the plurality of traders associated with the entity from the corresponding platform includes detecting behaviour of each of the plurality of traders associated with the entity from the corresponding platform by a behaviour detection module.

In another embodiment, detecting behaviour of each of the plurality of traders associated with the entity from the corresponding platform by the mining technique includes detecting the behaviour of each of the plurality of traders associated with the entity from any social platform.

The method (150) also includes analysing intent of the plurality of traders associated with the entity based on plurality of generated rules and detected behaviour of each of the plurality of traders associated with the entity by an analysing technique in step 190.

In one embodiment, analysing intent of the plurality of traders associated with the entity based on plurality of generated rules and detected behaviour of each of the plurality of traders associated with the entity includes analysing intent of the plurality of traders associated with the entity by an intent analysing module.

The method (150) also includes notifying to one or more users related to analysed intent of traders as well as the plurality of generated rules in step 200. In one embodiment, notifying to the one or more users related to analysed intent of traders as well as the plurality of generated rules includes notifying to the one or more users by
5 a notification module.

The method (150) further includes storing the plurality of generated rules and analysed intent of traders associated with the entity. In one embodiment, storing the plurality of generated rules and analysed intent of traders associated with the entity includes storing the plurality of generated rules and analysed intent of traders associated with
10 the entity by a memory subsystem.

Present disclosure for a system for detecting a financial fraud mainly provides real time trading information support for a user. Moreover, the system in analysis also includes a trader's intent before advising to a user. The real time analysis includes proper inclusion of important related news from various sources.

15 Furthermore, the automatic analysis and notification provides further advantage in corresponding to available manual systems. Lastly, the reinforcement machine learning further improves the system output with every decision made.

While specific language has been used to describe the disclosure, any limitations arising on account of the same are not intended. As would be apparent to a person
20 skilled in the art, various working modifications may be made to the method in order to implement the inventive concept as taught herein.

The figures and the foregoing description give examples of embodiments. Those skilled in the art will appreciate that one or more of the described elements may well be combined into a single functional element. Alternatively, certain elements may be
25 split into multiple functional elements. Elements from one embodiment may be added to another embodiment. For example, order of processes described herein may be changed and are not limited to the manner described herein. Moreover, the actions of any flow diagram need not be implemented in the order shown; nor do all of the acts need to be necessarily performed. Also, those acts that are not dependant on other acts
30 may be performed in parallel with the other acts. The scope of embodiments is by no means limited by these specific example

WE CLAIM:

1. A system for detecting a financial fraud (10), comprising:
 - a processing subsystem (20), comprising:
 - a data gathering module (40) configured to gather financial data
5 from a plurality of sources by a congregation technique;
 - a rule generating module (50) operatively coupled to the data gathering module (40), and configured to generate a plurality of rules on pre-defined criteria based on gathered financial data by a generating technique;
 - 10 a behaviour detection module (60) operatively coupled to the data gathering module (40), and configured to detect behaviour of each of a plurality of traders associated with an entity from a corresponding platform by a data mining technique;
 - 15 an intent analysing module (70) operatively coupled to the behaviour detection module (60), and configured to analyse intent of the plurality of traders associated with the entity based on plurality of generated rules and detected behaviour of each of a plurality of traders associated with the entity by an analysing technique;
 - 20 a memory subsystem (30) operatively coupled to the processing subsystem (20), and configured to store the plurality of generated rules and analysed intent of traders associated with the entity.
2. The system (10) as claimed in claim 1, wherein the plurality of sources comprises of internal data and external data.
3. The system (10) as claimed in claim 1, wherein the platform comprises of any
25 social platform.
4. The system (10) as claimed in claim 1, further comprising a feedback module operatively couple to intent analysing module (70), and configured to provide alerts

related to analysed intent of traders as well as the plurality of generated rules, wherein alerts are provided to one or more users.

5. A method for detecting a financial fraud (150), comprising:

5 gathering, by a data gathering module, financial data from a plurality of sources by a congregation technique (160);

generating, by a rule generating module, a plurality of rules on pre-defined criteria based on gathered financial data by a generating technique (170);

10 detecting, by a behaviour detection module, behaviour of each of a plurality of traders associated with an entity from a corresponding platform by a mining technique (180);

analysing intent, by an intent analysing module, of the plurality of traders associated with the entity based on plurality of generated rules and detected behaviour of each of the plurality of traders associated with the entity by an analysing technique (190); and

15 notifying, by a feedback module, to one or more users related to analysed intent of traders as well as the plurality of generated rules (200).

6. The method (150) as claimed in claim 5, wherein gathering, by the data gathering module, financial data from a plurality of sources comprising internal data as well as external data.

20 7. The method (150) as claimed in claim 5, wherein detecting, by the behaviour detection module, behaviour of each of the plurality of traders associated with the entity from any social platform.

8. The method (150) as claimed in claim 5, further comprising storing, by a memory subsystem, the plurality of generated rules and analysed intent of traders
25 associated with the entity.

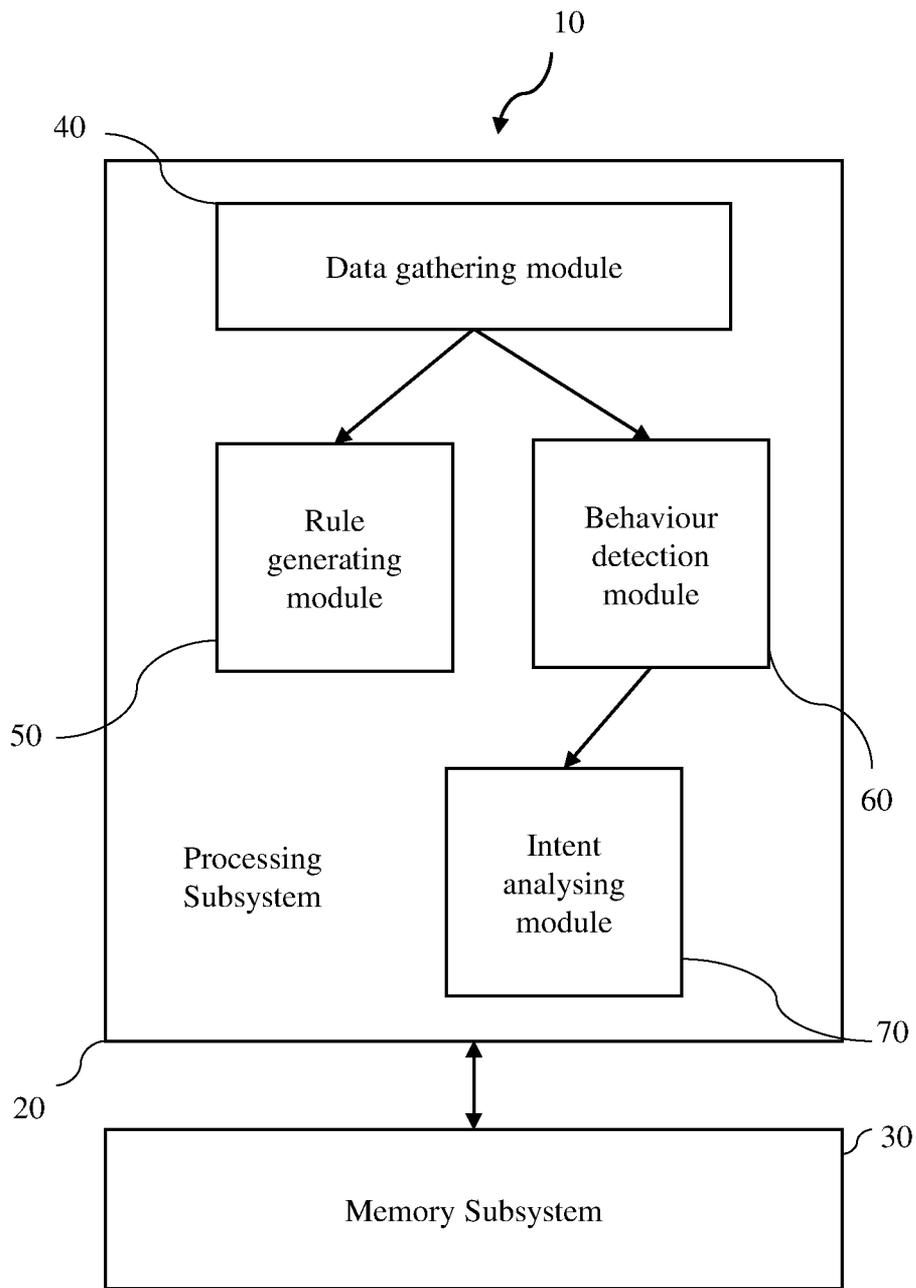


FIG. 1

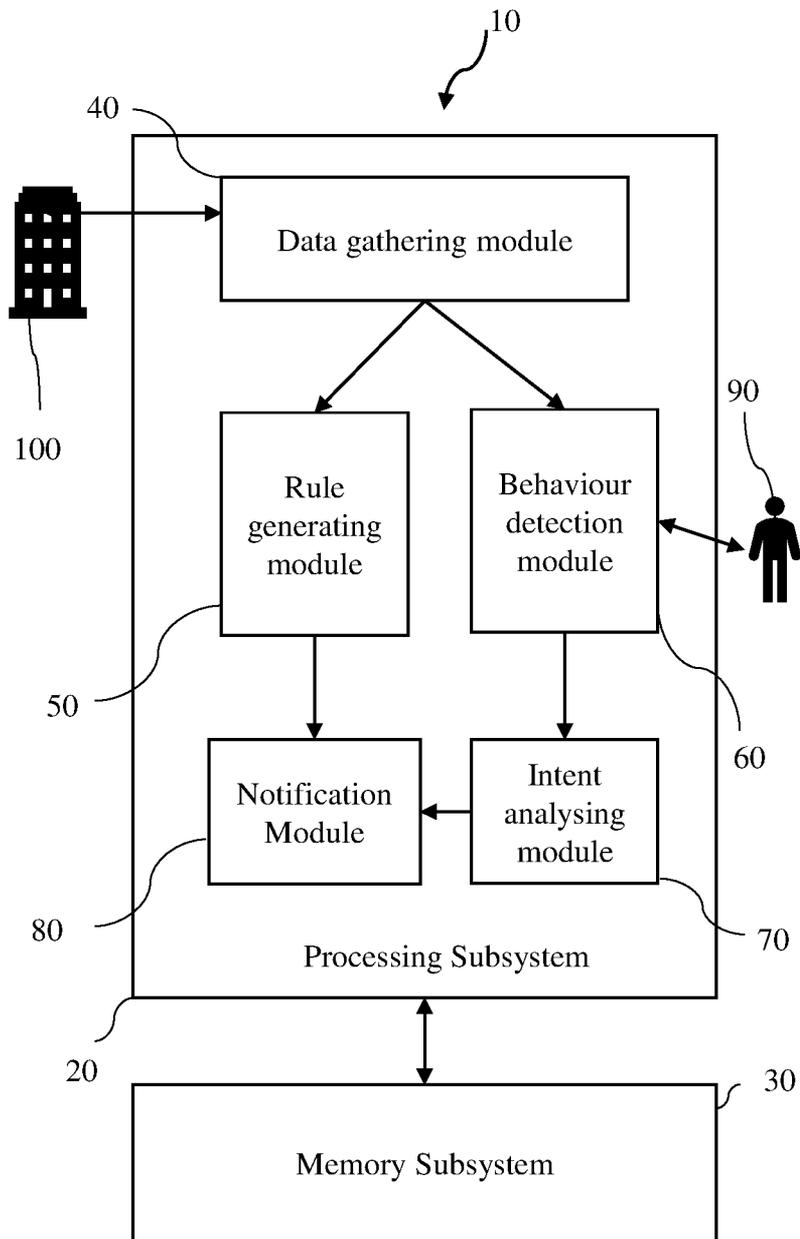


FIG. 2

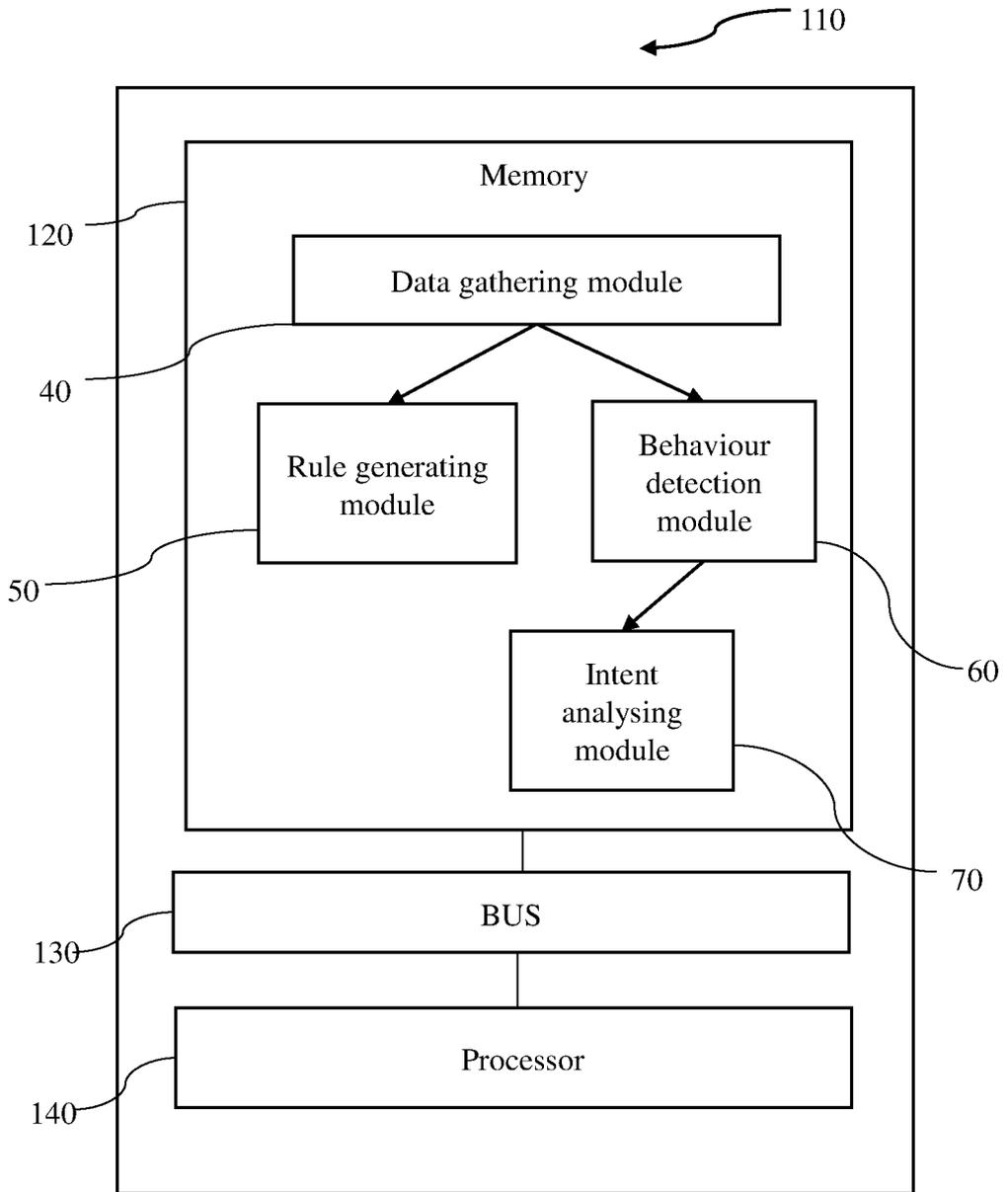


FIG. 3

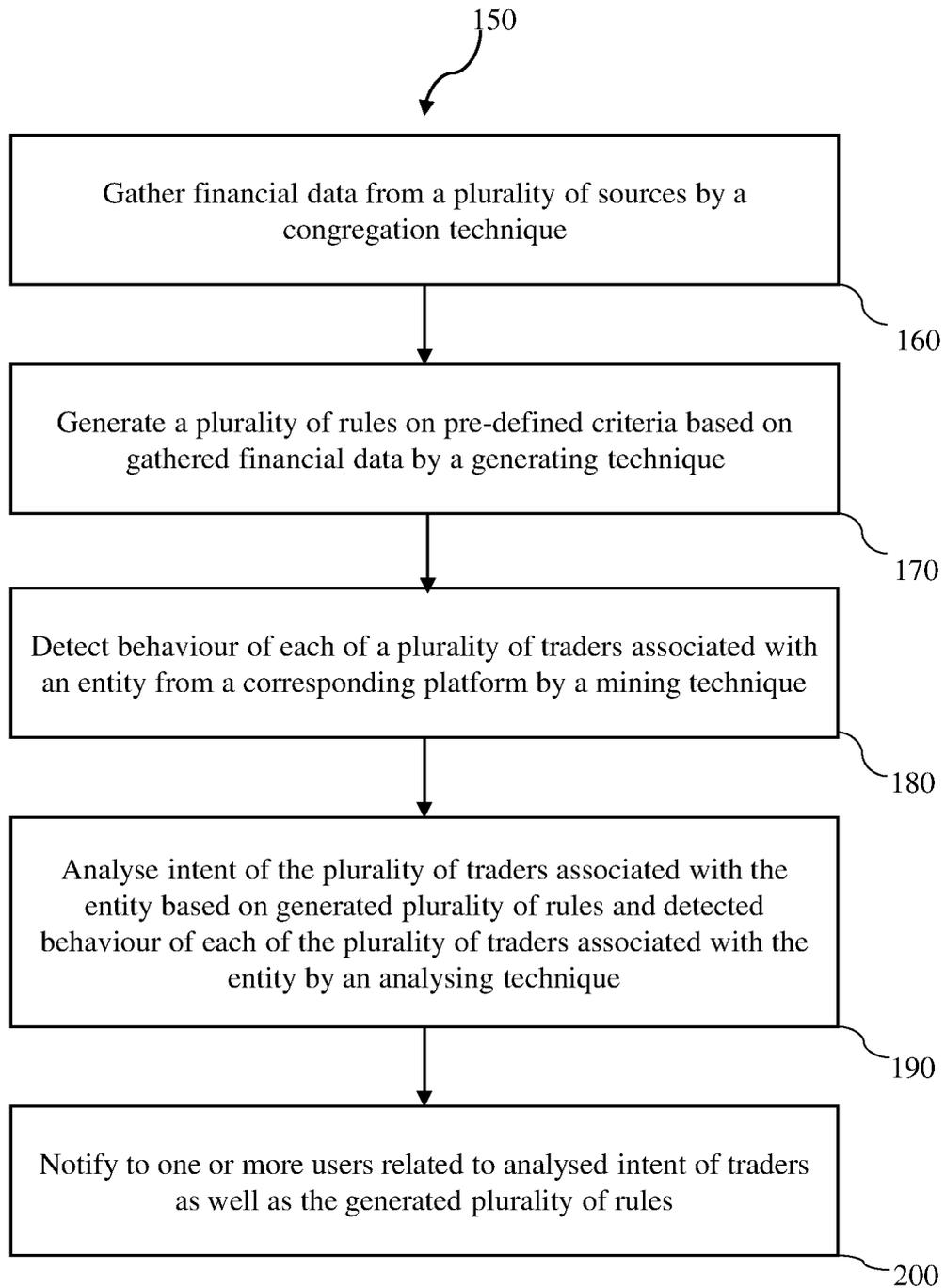


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2019/057337

| | | |
|--|---|--|
| A. CLASSIFICATION OF SUBJECT MATTER G06Q20/40, G06Q20/42, G06Q20/32, G06F15/80 Version=2019.01 According to International Patent Classification (IPC) or to both national classification and IPC | | |
| B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) G06Q, G06F Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Databases: IPO Internal, Total Patent One Keywords: Behaviour analysis, data acquisition, rule generation | | |
| C. DOCUMENTS CONSIDERED TO BE RELEVANT | | |
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| Y | CN103714479A (SICHUAN ORIENT SOFTWARE SCIENCE & TECHNOLOGY CO LTD) 09 April 2014 (09-04-2014) Whole Document | 1-8 |
| Y | US8250004B2 (LANCASTER UNIVERSITY BUSINESS ENTERPRISES LTD.) 21 August 2012 (21-08-2012) Abstract, column 6 line 40-column 7 line 47, column 20 line 58-column 25 line 57 | 1-8 |
| <input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex. | | |
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