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(54) Title: A TOOL FOR DIRECTION ASSISTANCE FOR FILM PRE-PRODUCTION

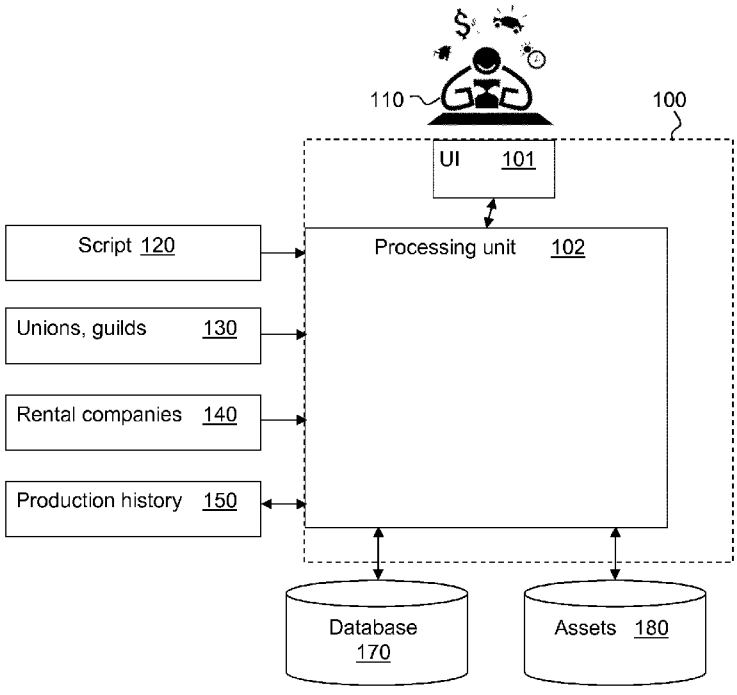

Figure 1

(57) Abstract: A cost estimation tool (100) for pre-production of a film comprising a processing unit (102) configured to obtain a script divided into a plurality of scenes, receive user input identifying at least one script element such as props and settings in the script; propose to a user at least two techniques for shooting at least one script unit such as a shot or a scene; receive user input selecting a technique for shooting at least one script unit; interact with a database (150) to obtain cost estimates for the identified script elements and the proposed techniques for shooting; calculate a cost estimate for the film based on the identified script elements and the selected techniques for shooting; and output the cost estimate.

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A TOOL FOR DIRECTION ASSISTANCE FOR FILM PRE-PRODUCTION

TECHNICAL FIELD

The present invention relates generally to film-making and in particular to a pre-production tool for proposing direction choices.

BACKGROUND

This section is intended to introduce the reader to various aspects of art, which may be related to various aspects of the present invention that are described and/or claimed below. This discussion is believed to be helpful in providing the reader with background information to facilitate a better understanding of the various aspects of the present invention. Accordingly, it should be understood that these statements are to be read in this light, and not as admissions of prior art.

Up until recently, film-making was the area where film studios or other kinds of production companies essentially handled the major, if not the whole, process from idea to release. A studio could for example buy the rights to a script (or a story, perhaps from a book), rework the script, plan the production (pre-production), shoot the film, take it through post-production and then distribute it.

Among these steps, pre-production is very important since it, broadly speaking, breaks the script down into smaller elements (shots), defines how the shots are to be made (live shooting, pure CGI, mix of both) and composition of the shots, but also multiple requirements such as shooting location, accessories, crew and material. A production schedule defines in detail the resources needed for each scene. The resources may be any kind of resource from a vast list comprising for example actors, cameramen, grips, foley artists, hairdressers, animal trainers, catering, stuntmen, set security and permits (e.g. to be able to close off a street for shooting).

Naturally, a very important resource is money. Indeed, it could be said that film-making is a compromise between creative, artistic visions and budget limitations.

During the major part of the history of film-making, pre-production has been performed by the film studio, that perhaps outsourced specific parts of the process, all the while under the supervision of the producer who among other things is in charge of making sure that the budget is respected. Usually, the producer imposes some decisions; a deal may for example by done with a country or a city that wishes to be featured in the film and in return offers subsidies of various kinds.

It will be appreciated that the studios have the necessary expertise to handle the pre-production and that they have internal methods to respect. However, an interesting trend, often named collaborative film-making, has emerged over the last years. It involves often physically distant participants to contribute to making a movie via the Internet. The collaboration can cover several aspects of traditional film-making: funding by bringing in at least part of the budget, participation in script writing, proposal of shooting locations, voting during actor casting, or even post-production tasks like audio dubbing or subtitling in a specific language.

As collaborative film-making becomes more wide-spread, there will be a greater demand for tools that allow and support collaborative pre-production. For one thing, a small, independent production is likely to lack the expertise of a studio and, for another, a collaborative effort may bring in people from all over the globe in an ad hoc team. Such tools can also aid inexperienced film makers, whether they work in a collaborative manner or not.

As mentioned, the budget is an important restraint to film-making. Providing an estimate of the production cost very early in the creation process that takes into account different elements that constitute these costs has, so far, been very difficult to do: the process is highly manual and prone to errors. A main issue is that data needed for cost estimation are rarely available in digital

form, and even when they are digital they are manipulated using different tools and stored in different formats at different locations.

Moreover, the cost estimation usually requires the participation of multiple members of the production team. A production assistant starts from the script, analyzing each scene and listing all the elements required for the scene; a process known as “script breakdown”. A director splits the scenes into shots and takes direction choices (e.g.: shooting in a studio or outdoors). A director of photography chooses the equipment to be used for shooting (e.g.: high-end professional camera or more affordable one). As to the salaries of cast and crew, some are paid hourly, daily, weekly, or monthly, while others agreed to a flat fee. It can thus be seen that a good preparation is required to optimize the budget.

So far, all this information has to be gathered manually since it impacts the overall cost of the movie. In addition, if the cost of an entity depends on the time used (as opposed to a flat fee), then it is clear that the total cost can vary; for example, if shooting lasts fifteen days, then a camera must be rented for the same duration.

It is also well known that during the film-making process, more assets (shots etc.) are produced than what is used in the final release (or extended cuts) of the movie. As a consequence, for one produced movie, typically more than 50 hours of the generated video is never used. Some of these shots are of course highly specific for the movie, but plenty of shots are more generic and could be reused in another movie. This is particularly true for the so-called “establishing” shots that are inserted to provide some context. Typical examples are a flight over a city or a shot of the main hall of Grand Central Station to situate geographically the location where the action takes place. Reusing such assets may be a very cost-efficient solution when other films are made.

In addition, with the continuous progress in computation power and particularly graphics processing units, more and more computer generated imagery (CGI) techniques are used in film-making in different ways: insertion of

virtual elements in live shooting, addition of visual effects (fog, fire, etc), compositing of live shooting on Green screen background with CGI generated sequences or other shooting. However, not all directors, especially beginners, are not familiar or comfortable with these techniques.

It will thus be appreciated that there is a need for a solution that can provide a different tool for efficient pre-production that facilitates the production by proposing different production alternatives with cost and delay estimations. The present invention provides such a solution.

SUMMARY OF INVENTION

In a first aspect, the invention is directed to a cost estimation tool for pre-production of a film comprising a processing unit, implemented using at least one processor configured to: obtain a script divided into a plurality of scenes; receive user input identifying at least one script element in the script; propose to a user at least two techniques for shooting at least one script unit; receive user input selecting a technique for shooting at least one script unit; interact with a database to obtain cost estimates for the identified script elements and the proposed techniques for shooting; calculate a cost estimate for the film based on the identified script elements and the selected techniques for shooting; and output the cost estimate.

In a first embodiment, a script unit is a scene or a shot.

In a second embodiment, the processor is further configured to use the script to estimate the length of at least one script unit. It is advantageous that the processor is further configured to use the length of the at least one script unit when calculating the cost estimate.

In a third embodiment, the processor is further configured to receive user input for shooting parameters for at least one script unit and to use the shooting parameters when calculating the cost estimate.

In a fourth embodiment, the processor is further configured to use identified script elements and the selected shooting technique for a script unit,

to estimate the time needed for shooting the script unit and to output the estimated time.

In a fifth embodiment, a script element is a prop or a setting.

In a sixth embodiment, the processor is further configured to receive a script element manually from a user.

In a seventh embodiment, the processor is further configured to receive the cost of script elements from a user.

In an eighth embodiment, the processor is further configured to use at least one of the identified script elements and the selected techniques for shooting and information in the database concerning such script elements and alternative techniques for shooting to calculate and output a suggestion for improvement.

BRIEF DESCRIPTION OF DRAWINGS

Preferred features of the present invention will now be described, by way of non-limiting example, with reference to the accompanying drawings, in which

Figure 1 illustrates the functional aspects of a pre-production tool according to a preferred embodiment of the present invention;

Figure 2 illustrates the features of the pre-production tool in conjunction with an exemplary use case according to a preferred embodiment of the present invention;

Figure 3 illustrates an exemplary user interface according to a preferred embodiment of the invention;

Figure 4 illustrates an exemplary screenshot of lists for cast, crew, equipment, locations and props according to a preferred embodiment of the invention;

Figure 5 illustrates an exemplary report for a film with 12 scenes according to a preferred embodiment of the invention; and

Figure 6 illustrates an exemplary screenshot in which the tool of the invention has listed the props for a scene.

DESCRIPTION OF EMBODIMENTS

For the purposes of the present invention the first input to the pre-production tool is the script 120, written by the writer. During pre-production, the script 120 may be changed, for example by removing or reordering scenes, amending dialogs or changing the setting of one or more scenes.

As is well known, a script is usually written in a standard format as a sequence of scenes. Each scene has a heading that sets the location and a scene number, after which follows a description of what happens in the scene and any dialog. An example would be:

INT. FLORA'S KITCHEN – MORNING 117

Flora walks into the kitchen and finds her son Sebastian at the table, waiting for her. He is obviously hungry.

SEBASTIAN

Mum, do we have any bangers?

During pre-production, the script 120 is broken down, which not only means taking decisions about how the scene will be made – for example, on location, in a studio or using chroma key compositing - but also communicating and documenting the decisions. The present invention provides the possibility to produce project related information digitally using the tool that advantageously is implemented online and to which access may be had through a standard web browser to enable remote use of the tool.

Figure 1 illustrates the functional aspects of the pre-production tool 100 according to a preferred embodiment of the present invention. The tool 100 comprises a user interface 101, preferably web browsers, through which a user 110 (such as a producer or a director) has access to a processing unit 102. The tool 100 further comprises, connected to the processing unit 102, a possibly external project database 170 configured to store data (such as the relations between the script elements and the assets but also the list of participants, the task schedule, etc.) for the project and a connection to an asset database 180.

The processing unit 102 is configured to analyze the script 120 for key words, usually for a specific scene, in order to recommend assets in the asset database 180. An asset may be film scenes that have been shot previously but that were never used in a film, but can also be of other kinds such as audio, photos, 3D models. If, for example, the script states that the scene takes place close to the Eiffel Tower, then the processing unit 102 is configured to search the asset database 180 for assets that are tagged “Eiffel Tower”. Further key words may be used to narrow the search, for example “night”. The director or the producer may then chose an asset for the scene in question.

The processing unit 102 can be said to be an expert system that analyses the script to come up with suggestions for the direction of the scenes. For example, for exemplary script scene 117, the module easily deduces that it is an interior scene and that there are two characters, Flora and Sebastian. It is clear that no external shooting is needed with what that entails in the way of permits, security and so on. One first direction possibility is to perform the shot in pure live shooting. For this the location, i.e. the kitchen, needs to be built (in particular if more scenes in the script take place there), a rough estimate for the cost and delay (i.e. required preparation time) may be obtained from a production history database 150. Another option would be to shoot the actors on a green-screen and composite this shooting with a CGI rendered version of the kitchen, previously modeled in 3D using dedicated tools. Here again, a cost and delay estimation may be provided for the option. Please note that here again, reusing an existing asset (e.g. a 3D model of a kitchen) might be an efficient solution. Further, still using the production history database 150, “standard” direction options may be suggested, such as filming using a team with one camera using a number of different angles (Flora coming into the kitchen, close-ups of each person for the lines...) and adding a camera to the team in order to shoot the scene in one go. In order to keep the estimates up-to-date, it is preferred to have the processing unit 102 update the production history database 150 once the direction choices, costs etc. from a current project are known. It is also preferred to receive input from, for example, unions

and guilds 130 and rental companies 140 in order to have access to the up-to-date union rules and rental costs.

A main idea of the present invention is thus to provide a pre-production tool 100 that provides assistance to a movie production project, particularly regarding the cost estimation. The tool uses information provided by the movie script initially provided by the writer and enhanced within the tool; the original script contains much information that usually is continuously enhanced with additional information during the pre-production stage in order to prepare both production and post-production.

The data created during this process is preferably made accessible online so that each participant to the project can access the data easily and but contribute to it by adding new data.

Several pieces of information are automatically extracted and analyzed by the pre-production tool 100, such as the list of all the elements (props, sets,...) and the list of cast and crew required for the shooting. As is well known, props are decoration elements (chair, statue, gun, etc.) to be used within a scene; depending on the costs, they can be bought, rented from dedicated shops, or fabricated from scratch. Based on this data, the pre-production tool 100 is configured to propose an early estimation to the overall production cost and to propose alternate, more cost efficient direction techniques.

The pre-production tool 100 can thus help the director and the producer to handle the creation process in an easier and safer manner, with less risks of unexpected events (e.g. missing props on shooting day) and budget costs.

As already mentioned, the initial input to the pre-production tool 100 is the movie script 120. The script 120 can be directly edited within the tool, but it is also possible that it is imported, using a text file or the output of movie script editors (e.g. Final draft, Adobe Story). Any other data (costs, production history, assets,...) is considered to be set up within the tool.

The user 110 breaks down the script 120 to establish a list of (preferably all) elements needed for the production. At this stage, some direction choices can be made, e.g. studio vs. outdoors.

In the prior art, this input data is traditionally gathered during the script breakdown phase, currently done by highlighting and marking a printed version of the script in which actors are highlighted in red, stunts in orange, make-up noted by an asterisk, and so on. The result is an annotated copy of the script, existing in only a unique printed version (unless, of course, copies are made).

According to the present invention, however, the script breakdown is performed online, by tagging elements while browsing the script from our tool. In one example of implementation, illustrated in Figure 2 (in which the user works on a remake of American Graffiti using the original script) the user selects the string “Vespa scooter”, and right-clicks to open a popup menu that allows him to tag the string with the appropriate category, i.e. “Vehicle” in the example. Wardrobe, make-up, stunt, animal, special effects are other examples of categories. If at least one element is already tagged in this category, then a list of elements is proposed. This allows the user to choose an element in this list, which prevents typing errors. The operation is then repeated for each significant element of the usually around hundred pages of the script, resulting in a potentially huge number of elements. After this, most, if not all, elements needed for the production phase are identified, except for shooting logistics such as equipment (cameras, microphones,...), catering, and so on. The identified elements take one of two forms: physical or virtual. In the first case, the element has to be available physically during the shooting. For this, they may be built, bought, or rented, which needs to be organized and has an impact on the overall cost. In the second case, the element must be constructed as a virtual object, thus requiring work such as 3D modelling, texturing animation, and other traditional steps required for the creation of a virtual object or character.

For each scene, the user can choose its technical solution. This includes decisions such as how to shoot the scene (outdoors, against a Green

screen,...), the number of cameras required, and whether the rain in the script will be done on stage with real water or added later during post-production. All these decisions impact the direction cost of the scene and also has implications on the logistics: crew to be hired, material to be rented, as well as transportation, lodging, insurance and catering.

It will be appreciated that it is common to divide a scene into shots, which represent the smallest element of a story and that each shot of a scene can have different requirements. For the sake of simplicity, throughout this specification, the expression “script unit” comprises both scenes and shots.

Different techniques can be used to shoot a script unit:

- Full live shooting on location. Problems comprise authorizations needed for the shooting, securing the place and blocking the location when it is public, “rental” costs and scheduling. For example, cities like Paris are overwhelmed by requests and one day of shooting in a metro in Paris costs approximately 15k€. In addition, the weather cannot be controlled, which can be critical if some specific weather is required. Some weather situations can be simulated (e.g. rain in a close-up shot) but an unexpected sand storm can block days of shooting in the desert. In some cases, physical features of the shooting location have to be removed either physically on set (e.g. traffic signs) or digitally in post-production (e.g. stunt cables).
- Studio shooting on Green screen and video (or still picture) compositing: the shooting is done in a studio and the actors perform in front of a Green screen (i.e. a green background, which may have another color; this is also known as chroma key compositing). A compositing stage is later needed to replace this green background by a picture or video that mimics the background described by the script. In some case, this can be a good technique compared to live shooting, particularly when the actors are shot in close-up and the background is blurred. This technique can also be used for some elements of the set like mirrors, painting, “flying objects”, etc. Main advantages are that the environment can be

controlled and that there are plenty of local studios for shooting at reasonable prices. A low-cost production can choose simple double-layered images for compositing while a blockbuster production will favor complex, multilayered compositing, increasing post-production work and cost.

- Compositing shooting with CGI elements. This technique allows the creation of any kind of environment, potentially unrealistic. However, specific skills and infrastructure are needed. It applies both to studio shooting and shooting on location.

Figure 3 illustrates an exemplary user interface through which a user can input these choices. In addition, the user can provide additional data for each shot. The complexity of shot can be vary from simple, straight-forward shots to more complex shots requiring lengthy setup and/or include many interactions that can go wrong and therefore are likely to require multiple takes to be done. To this end, the user may specify absolute values such as the setup time needed before shooting, the number of takes that are planned, and the duration of each shot. The setup time itself can be decomposed in time for the technical setup of the cameras and lighting, the decors, the hair dressing, makeup of actors and so on.

It will be appreciated that additional input is usually needed to operate the tool properly. Examples of the input are:

- Wages of the cast, which is particularly true for prominent actors that have huge impact on the overall cost, while wages of secondary actors and extras can be based on references established by unions and guilds. Similarly, wages of crew members are also regulated. For tasks accomplished by non-regulated workers (e.g. post-production), the tool is configured to process data in the production history database 150 to obtain estimations based on data from similar projects allowing to provide average or typical values.
- Transport costs. The cost of getting actors, crew, props etc. on location.

- Equipment costs. In particular for small-scale productions, most of the equipment is generally rented. Many specialized rental companies publicly provide the pricing for such items. As already mentioned, data from rental companies 140 is input to the tool, but it can be essential to use pricing of local companies rather than distant ones.
- Shooting parameters. The user can specify the intended shooting parameters such as format, color gamut and use of compression, all of which have an impact on the cost.

As already mentioned, when a project enters the production stage, all costs are preferably recorded into the production history database 150 so that the tool can base further estimations on the real costs of previous projects.

The present tool can assist the user in a number of ways to plan the work and estimate the costs.

The tool can provide an estimation of the length of each shot. For this, the tool first computes the duration of the dialog, either by sending the text to a text-to-speech engine and measuring its duration or by using some heuristics based on the length of the text. To this, the duration of action sequences and other shots are added, but this can be less accurate. For example, when the script states "The sun rises over the mountains", depending on the director's intention, the scene may last from a couple of seconds to a minute-long sequence. For this reason, the tool can only approximate the duration of such sequences by, for example, arbitrarily fix the duration to 1 second per 3 words, 1 second per word, or 10 seconds per line. This value can be tuned by the user, but it is also, as already mentioned, possible for the user to enter the length of each shot.

The shooting parameters specified by the director have a direct impact on the bit rate generated during shooting and the amount of storage that will be required. It is important to anticipate the needs in term of hard disk drive, tapes and possibly cloud storage. During the production, the tool monitors the storage space needed so that the director can take decisions if there is not enough free

space or the storage cost is getting too high. The latter example can occur in case of longer than expected delays in the production or post-production stage that lead to longer storage, which can be an issue in the case of cloud storage of huge quantities of data. The monitoring is preferably done at scene level so that the system can make recommendations to optimize the costs. For example, when for a given scene, the post-production work has been completed, the system can recommend to delete the unused raw footage from the cloud storage, allowing cost savings knowing that backups are always available on tape.

Estimating the time needed for the shooting of a single shot can help to provide an overall estimate of the schedule and the related costs. This estimate takes into account all the parameters entered previously: the time needed to setup everything, the number of takes scheduled and the recording time itself although it is generally much smaller than the other values. In addition, owing to the data entered during the script breakdown, it is possible to get the list of elements needed to shoot a given scene. This list allows a verification that everything is okay and the elements are (or will) be available, thus making it possible to anticipate problems before arriving on stage. The estimate and the list are useful if, for example, a certain piece of equipment that is rented per day, depending on the time that is needed for the shots, has to be rented one more day.

Figure 4 illustrates an exemplary screenshot of lists for cast, crew, equipment, locations and props. The user can preferably modify the status of each element, advantageously using a 3-level status: green for OK, orange when work has started, and red for elements that still need to be tackled. Summarizing the number of lights for each color can provide a quick overview of the level of preparation: 80% green, 16% orange, 4% red is clearly better than 5% green, 20% orange and 75% red. A report may be extracted gathering all this information. Another potential representation, less precise, could be based on smileys showing that one element is completed (☺), on-going (😐) or not started (☹). Figure 5 illustrates an exemplary report for a film with 12

scenes. Figure 6 illustrates an exemplary screenshot in which the tool has listed, for a scene, the props enhanced by their price and the mode used to get them (rental, purchase, borrow, build). When summed up over all the scenes, this provides a cost estimation of the props.

The generation of the global cost estimate can be seen as the application of simple arithmetic – additions and multiplications – on the input data. However, contrary to prior art cost estimation, the cost elements are related to the backbone of the movie, the script, and the elements are listed automatically since they are identified in the system so that no element is forgotten while summing up the costs. Cost estimation is performed from the bottom up. First, the amount of time estimated for production are cumulated for all the scenes. According to the union rules (e.g.: maximum six hours of work per day), this amount of time is converted into a number of days and into an amount of wages. Cast and crew wages are calculated by multiplying the unitary cost by the amount of time estimated. The number of days allows the calculation of the rental cost for the material, the catering and the accommodation for the cast and crew members. The list of props is also consolidated to sum up the related costs. Location, studio rental and related costs are added.

Once a first cost estimate has been provided, the user may tweak different elements in attempts to lower the cost. The new cost estimate is available immediately, allowing the user to see whether the modification is worth it or not. In addition to such small modifications, made by the user, the tool may propose alternatives that lower the costs but may have an non-negligible impact of the production process. Such alternatives comprise:

- Shooting cost can be very high in public or well-known places, since the production team has to rent the place, secure a perimeter around the shooting area, ensure the respect of the perimeter (e.g.: hiring security guards), possibly compensate for a loss of revenue of the location and its surroundings, and so on. In some cases, these costs can be avoided by shooting the scene in a studio on a green-screen background and inserting a background behind the actors,

advantageously provided by the asset recommendation, thus requiring additional post-production costs.

- Reuse of existing assets can make specific shoots superfluous. A typical example of video reuse is the "establishment" sequences used as transitions between scenes and allow locating the following scene. An example is a shot of a typical New York street intended to make the viewers understand that the apartment in the scene is located in New York. Reusing an existing video and paying its owner is very often cheaper than shooting it as it allows to avoid travel, crew and rental costs and also shortens the overall production time.
- Working longer each day may make it possible to shorten the duration of production and therefore lowers the rental, catering and accommodation costs. In some cases, paying cast and crew overtime is cheaper than an additional day of production.
- Some scenes need particular props (e.g.: a royal throne, a futuristic gun, and specific furniture). In the case the director chooses to use CGI rendering for such props, it can be verified whether building, buying or renting the physical props is cheaper. Moreover a library of available virtual props can be linked to the tool, allowing a search for and reuse of already available elements.

The tool is configured to analyze such alternatives and to propose the ones that would allow lowering the overall cost. The final choice is however done by the user, not by the tool.

The following exemplary use case illustrates the use of the tool. It will be appreciated that the user of the tool can be different persons, such as the director and the producer.

1. The director logs on to the tool 100 through a web browser, selects project "MY_FIRST_HORROR_MOVIE", and browses the script that has been previously processed by identifying keywords and associated categories. For example "Eiffel tower" is identified as a keyword and associated to a "location" category. The director decides to work on scene n° 42, (but could

also have worked with characters, locations or key words, or to display a list of these). The director looks for assets for this scene by performing asset searches related to the keywords of the scene. The director selects a set of assets and may display the asset information (e.g. format, quality, duration, price, etc.) related to the selected asset. The director then makes direction choices to define the use of the selected assets.

2. The producer logs in, selects the project, and uses a pre-visualization tool to see the progress, but does not agree with the choices made for scene n° 17 as it is cheaper to use a video or CGI background rather than the more expensive live shooting planned by the director – indeed, this alternative can be proposed by the tool. The producer then communicates with the director. They browse through the assets together to find a possible solution, but as no asset fits their needs they decide to use a new CGI image that should be created especially for this background. The producer modifies the scene accordingly, requesting the creation of the new asset (i.e. the CGI image) and may help in the creation thereof by for example providing a descriptive text about the asset as well as examples in the form of pictures or video. The director finally assigns the 3D modeling task to a team member with the appropriate availability and skill, to wit the CGI artist.
3. The director receives a notification that scene n° 17 has been modified and opens the direction page for the scene n° 17 directly from the notification to see the modification done by the producer.
4. The CGI artist receives the new task: creation of the CGI image for scene n° 17. The CGI artist launches the task of background modeling (possibly using a preferred tool from which the asset can be uploaded to the tool) for the scene, models the asset and, when completed, signals the task as done.
5. The director then opens the created asset and validates it.

As can be seen, the direction assistant can aid the director and the producer to make direction and budget choices. In particular, the director can be able to make the film faster and cheaper thanks to the tool that allow to compare easily the impact of alternatives direction choices on the budget, so that more focus can be put on the most important scenes and that in addition

can prove useful for beginners. Through the tool, the director can define the vision for each scene, share this with the producer and the parties in charge of making the scenes, and have a rough preview of the movie project at any stage. The producer is able to control the progress continuously and is also able to encourage the director to maximize the reuse of assets to reduce the cost and to enable an earlier release date. This could allow producer to work with less experienced – and thus cheaper and more available – directors that are assisted by the proposed tool.

Relevant parts of the functionality of the tool will now be described in greater detail:

Script browsing: The user can browse through the script in different ways, such as:

- by scene: scene by scene navigation. Previously tagged keywords can be highlighted and selected.
- by character: shows a list of all the characters. When a character is selected, additional information is displayed: type CGI/Real actor, pictures, list of scenes in which the character is involved, etc.
- by location: shows a list of all the locations. When a location is chosen, additional information is displayed: description, address, pictures, GPS position, list of all scenes where this location is used, etc.
- by keyword: shows a list of defined keywords. When a key word is chosen, a list of all the scenes, characters, locations, etc. related to the key word is returned.

The keywords entered previously in a script editor are visually differentiated and their type/category is shown. Characters and locations are specific types of keywords.

The script browser also allows the user, having the requisite access rights, to add new keywords and make modifications to the script, for example by changing a location. For example the “location” keyword “Rennes” can be replaced by “Saint Malo”. All users involved in a task where the location “Rennes” was mentioned are notified of the change.

Asset search: Using search terms such as keywords, the user can search for assets. The tool can provide possible parameter choices for the search. Apart from keywords, the search terms can include variables deduced by the tool; for example, for a very brief location shot, the tool can deduce that there is no need for much longer assets and automatically add time variable ("< 10s"). The tool can also perform other functions to deduce the variables; for example a search for location shots of "Saint Malo" may be extended to other seaside towns in Brittany, and it is also possible to deduce that if most scenes have their location in Brittany and the next scene, according to the script, has no specific associated setting, then it is probable that the setting for the scene is in Brittany as well and the variable "Brittany" may be added to the search terms.

Each asset is extended by a set of metadata. Some of them were previously associated to the asset, some are added manually and some are calculated automatically during the asset ingest. Metadata can be of various kinds. A first kind of metadata are the set of keywords related to the asset. In the example of the asset representing a video sequence of a seagull on the beach, we could have "Saint Malo" as "location", "France" as "country", but also various keywords like "seagull", "bird", "sea", "beach", "Brittany", "wind", "sun", etc. Other metadata can be extracted from the data itself. For example, duration "10 seconds", quality "HD", format "AVI", codec "H264", as well as the date of creation and the file size.

Search result: A search results in a set of matching assets, preferably displayed graphically. The user can browse through this set of assets and sort them according the different parameters (e.g.: prices sorting from cheapest to most expensive). The set of assets may also be pre-sorted into categories, e.g. 4k video, shorter than 5 seconds, at a price lower than 100€. Additional asset information and a full resolution pre-visualization are preferably available to help the user verify the quality of the asset. The user may then 'preselect' one or more assets as option, thereby forming an "asset cloud" associated with the keyword. The asset cloud, which may be organized in clusters, does not constitute the final choice for the keyword but is associated with it.

The assets may also be searched by affinity or similarity to given references. These references may themselves be external references, or assets previously identified as option for another scene. The goal is to improve the coherence of assets throughout the film.

Direction assistant: As already described, the direction assistant may provide direction suggestions based on a set of predefined direction choices. Another possibility is that once preselected assets have been selected for different elements of a given scene, the director may then decide how to combine them and make the final choice of asset(s). First, one or several shots are added to the scene. For each shot, the type of direction is chosen. Then the director can display the asset cloud and assign assets to elements of the shot (e.g. background image).

Many parameters can be fine-tuned to further define each shot, such as for example shot duration, camera lenses and type of shot (close-up, long shot, over the shoulder, etc.). In the general case, the different characters can be 'represented' on the screen by photos, drawings, generic dummies... In the case of CGI assets, the position and scale may be modified.

Some assets may need further work, for example color correction, cropping, blurring, etc. In other cases, no asset is satisfying so a new asset has to be created. This can be specified at this stage by creating and assigning new tasks related to existing assets or assets to be created.

For each shot, a cost and delay estimation are provided, based on all data provided for the shot and the information in the database mentioned hereinbefore.

It will be appreciated that it is advantageous to allow copy-paste, as scenes and shots may have many features in common.

Pre-visualization: This features provides the possibility to pre-visualize the project, as previously described. For the pre-visualization, the tool automatically assembles the assets chosen for each element of the movie, as they have been defined in the direction choice phase. Each scene can be played back one after the other. When a scene is not defined, the corresponding script, which is the simplest version of the movie, can be shown, but it is also possible to render the

dialogs through a Text-to-speech engine and simple graphical representations of the participating characters can be overlaid.

It will be understood that variants and extensions of the tool described are possible. For example, the director may select an asset that needs to be "tuned" as it includes an undesired element, such as a modern car in a landscape shot that is intended for a costume drama. The director can then create a new task for digitally removing the car from the asset, and assign the task to a suitable project member, much as the director did assigning a task to the CGI artist in the exemplary use case.

Direction choices. The following list shows exemplary direction choices for the scenes/shots:

- video
  - live shooting
  - live shooting on Green screen background
    - background asset can either be image, video, static CGI or animated CGI
  - live shooting on Green screen background with foreground
    - background asset can be image, video, static CGI or animated CGI
    - foreground asset can be image, video, static CGI or animated CGI
  - multilayer composition
    - each layer can be image, video, static CGI or animated CGI, either as existing assets or as new ones (requires shooting for the video).
  - pure animation
- audio
  - onset live recording
  - mix
    - onset live recording
    - studio recording / dubbing

    - sound effects
    - music
- Necessary postproduction tasks:
    - Video or image asset editing
        - cropping / reframing or cut
        - recolorization
        - inpainting
        - rotoscoping
        - adaptation of asset length to scene duration (by repetition, mirroring, shrinking…)
        - depth map drafting for further 3D asset insertion
    - 3D asset editing
        - VFX
        - remodeling
        - recolorization
    - Motion capture asset editing
        - animation retuning
    - Adaptation of motion capture length to scene duration/real footage (e.g. footage shot for the need of the project)
        - Possibly the same as for 'video'

It will be appreciated that the tool is best implemented using the required hardware and software components, such as processors, memory, user interfaces, communication interfaces and so on. How this is done is well within the capabilities of the skilled person. As an example, the users' browsers are advantageously implemented on the users' existing computers or tablets, while the databases can be implemented on any suitable prior art database and the server on any suitable prior art server.

The skilled person will appreciate that the present invention can provide a tool for efficient collaborative pre-production.

Each feature disclosed in the description and (where appropriate) the claims and drawings may be provided independently or in any appropriate

combination. Features described as being implemented in hardware may also be implemented in software, and vice versa. Reference numerals appearing in the claims are by way of illustration only and shall have no limiting effect on the scope of the claims.

CLAIMS

1. A cost estimation tool (100) for pre-production of a film comprising a processing unit (102), implemented using at least one processor configured to:

obtain a script divided into a plurality of scenes;

receive user input identifying at least one script element in the script;

propose to a user at least two techniques for shooting at least one script unit;

receive user input selecting a technique for shooting at least one script unit;

interact with a database (150) to obtain cost estimates for the identified script elements and the proposed techniques for shooting;

calculate a cost estimate for the film based on the identified script elements and the selected techniques for shooting; and

output the cost estimate.

2. The cost estimation tool of claim 1, wherein a script unit is a scene or a shot.

3. The cost estimation tool of claim 1, wherein the processor is further configured to use the script to estimate the length of at least one script unit.

4. The cost estimation tool of claim 3, wherein the processor is further configured to use the length of the at least one script unit when calculating the cost estimate.

5. The cost estimation tool of claim 1, wherein the processor is further configured to receive user input for shooting parameters for at least one script unit and to use the shooting parameters when calculating the cost estimate.

6. The cost estimation tool of claim 1, wherein the processor is further configured to use identified script elements and the selected shooting technique

for a script unit, to estimate the time needed for shooting the script unit and to output the estimated time.

7. The cost estimation tool of claim 1, wherein a script element is a prop or a setting.

8. The cost estimation tool of claim 1, wherein the processor is further configured to receive a script element manually from a user.

9. The cost estimation tool of claim 1, wherein the processor is further configured to receive the cost of script elements from a user.

10. The cost estimation tool of claim 1, wherein the processor is further configured to use at least one of the identified script elements and the selected techniques for shooting and information in the database concerning such script elements and alternative techniques for shooting to calculate and output a suggestion for improvement.

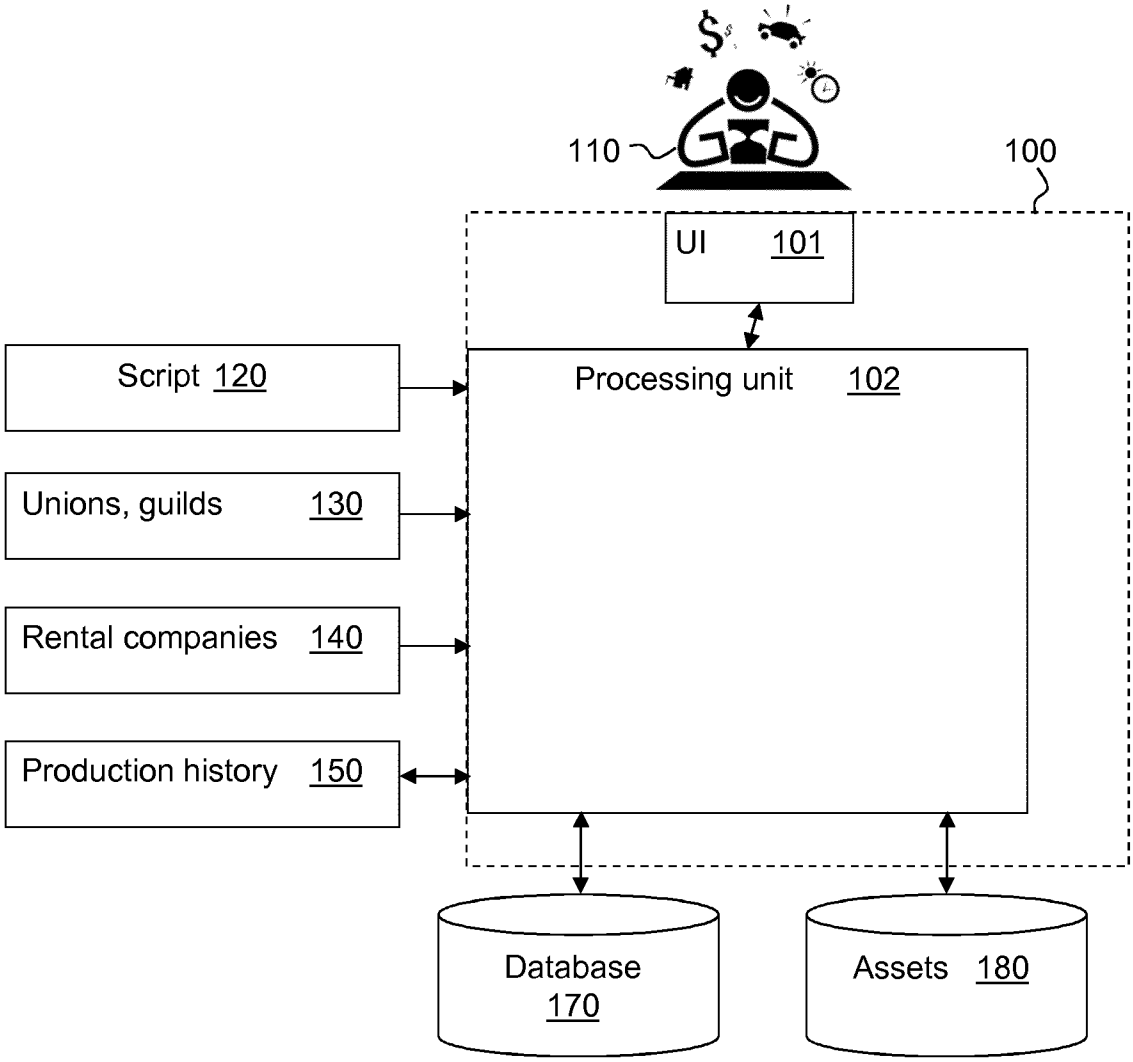

Figure 1

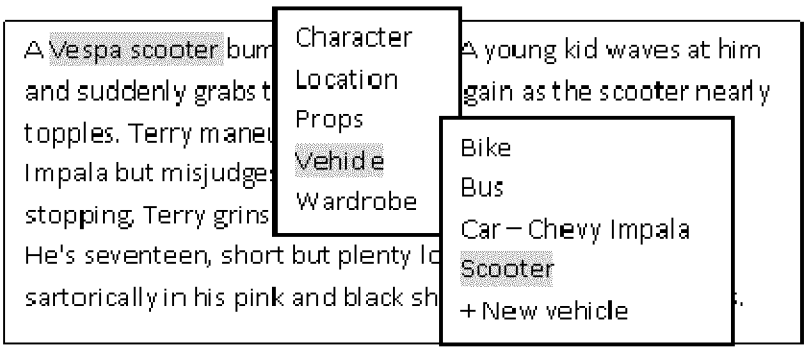

Figure 2

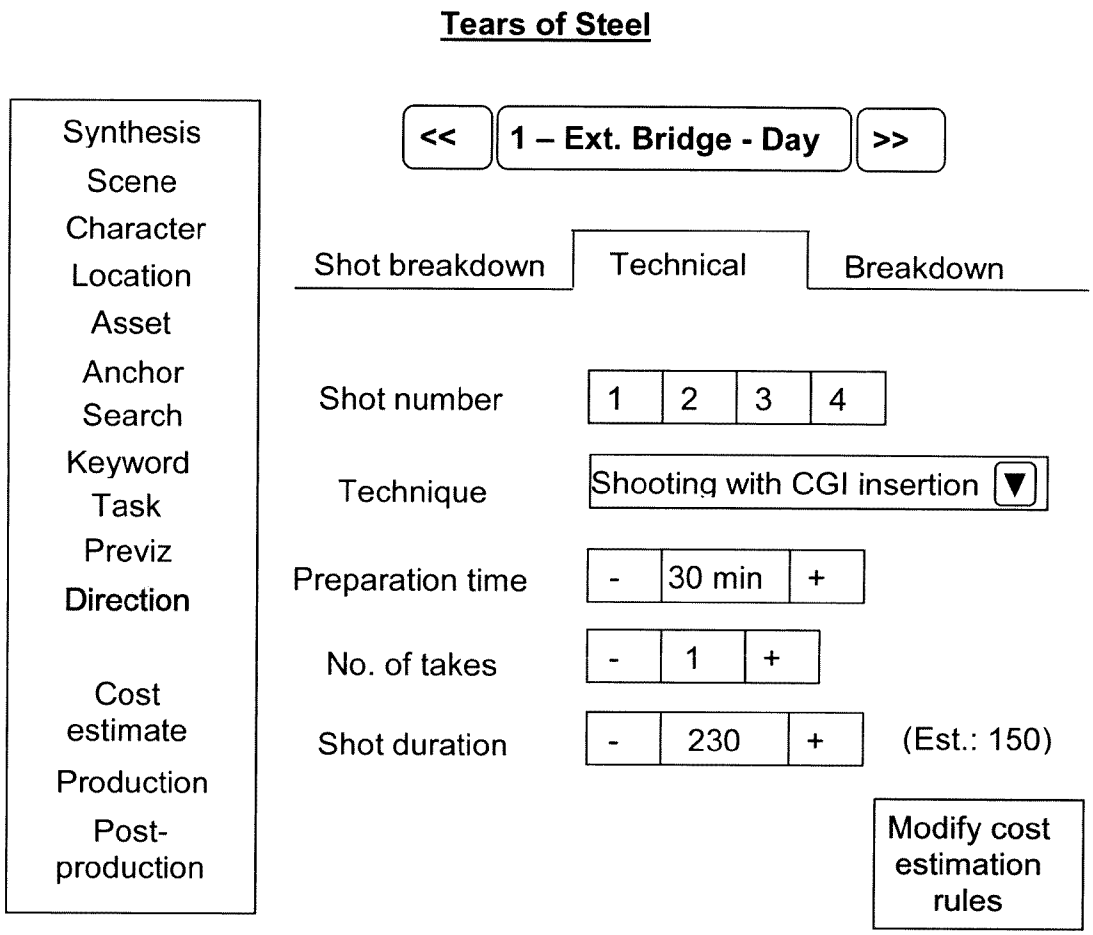
Tears of Steel
Synthesis
Scene
Character
Location
Asset
Anchor
Search
Keyword
Task
Previz
Direction
Cost estimate
Production
Post-production
<<
1 – Ext. Bridge - Day
>>
Shot breakdown
Technical
Breakdown
Shot number
1
2
3
4
Technique
Shooting with CGI insertion
Preparation time
-
30 min
+
No. of takes
-
1
+
Shot duration
-
230
+
(Est.: 150)
Modify cost estimation rules

Figure 3

CELIA	Denise Rebergen	1	Ok

Add element

Crew	Name	Note	Duration *(hours)*	Status
Camera operator	Ben		3	Unknown
Camera assistant	?		3	Unknown
Makeup and Hair	Jennifer Parker	May also handle wardrobe	3	Unknown
Camera operator	?	Good experience with F65 required	3	Unknown

Add element

Equipment	Reference	Note	Status
Camera	Alexa Red One	with 50mm and 100mm lenses	Ok
Lighting	Arri 300 light kit	Strong diffuse	Not Yet
Lighting	Homemade	Free	Ok

Add element

Location	Note	Status
Bridge		Unknown

Add element

Props	Mode	Source	Note	Status
Floating duck	Purchase	Toy Store		Ok

Add element

Figure 4

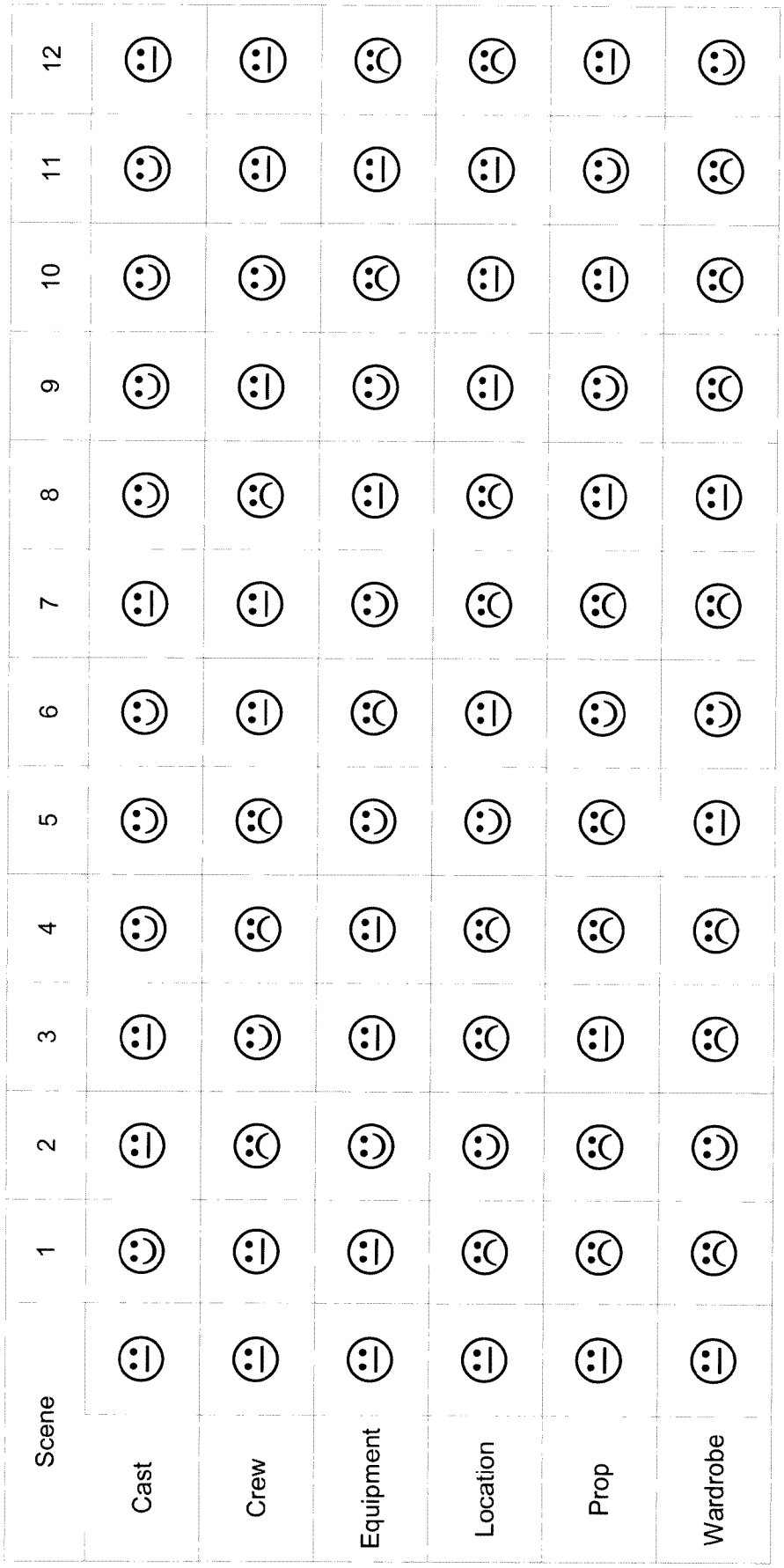
Scene
1
2
3
4
5
6
7
8
9
10
11
12
Cast
Crew
Equipment
Location
Prop
Wardrobe

Figure 5

Props	Mode	budget
Mango juice can	Purchase	$1, flat
Floating duck	Purchase	$5, flat
Desk	Purchase	$75, flat
Armchair	Purchase	$50, flat
Bicycle	Borrow	$0, flat
Add element		

Figure 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/075923

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06Q10/06 G06Q30/02
ADD.

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

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)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Wikipedia: "Celtx", INTERNET ARTICLE, 15 November 2012 (2012-11-15), XP055099957, Retrieved from the Internet: URL:https://en.wikipedia.org/w/index.php?title=Celtx&oldid=523223622 [retrieved on 2014-02-03] the whole document ----- -/--	1-10

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
6 February 2014	13/02/2014

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Krafft, Gerald

1

Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Mike Jones: "Celtx pre-production software - Part 1: A fresh approach to software, creativity and production process", INTERNET ARTICLE, 2 April 2007 (2007-04-02), XP055099960, Retrieved from the Internet: URL:http://oceania.digitalmedianet.com/articles/viewarticle.jsp?id=123283 [retrieved on 2014-02-03] the whole document	1-10
X	Mike Jones: "Part 2: Celtx pre production software - Script writing, character and plot", INTERNET ARTICLE, 2 April 2007 (2007-04-02), XP055099961, Retrieved from the Internet: URL:http://oceania.digitalmedianet.com/article/Part-2:-Celtx-pre-production-software-123336 [retrieved on 2014-02-03] the whole document	1-10
X	Joshua Givens: "Celtx Crash Course: Basic Scriptwriting and Media Preproduction Software Features", INTERNET ARTICLE, 13 July 2010 (2010-07-13), XP055099966, Retrieved from the Internet: URL:http://voices.yahoo.com/celtx-crash-course-basic-scriptwriting-6376172.html [retrieved on 2014-02-03] the whole document	1-10
X	Samuel Dean: "Celtx Offers Free Pre-production for Your Multimedia Content", INTERNET ARTICLE, 2 September 2009 (2009-09-02), XP055099968, Retrieved from the Internet: URL:http://gigaom.com/2009/09/02/celtx-offers-free-pre-production-for-your-multimedia-content/ [retrieved on 2014-02-03] the whole document	1-10