

SYSTEM AND METHOD FOR ENABLING USER COLLABORATION

[001] The invention broadly relates to a system and method for enabling user collaboration. More specifically, the invention enables supervision and project management between one or more relevant parties for an entire duration of a building construction project until its completion.

BACKGROUND OF THE INVENTION

[002] The construction industry relates to the manufacturing of buildings and their repair, renovation, and maintenance. As such, management of a construction project is a complex undertaking as it is a multifaceted process that involves multiple stages and multiple parties.

[003] In particular, within a construction project, there stages involved include initiation, planning, execution, monitoring, and closure. The execution and the monitoring stage are especially of importance as it is essential that the building is built based on the initial plan while adhering to building safety codes enforced by local governments. Hence, there is a need for project supervisors to enforce stringent supervision or monitoring means to ensure that the on-site workers and/or contracted parties execute their duties with compliance, preferably in a collaborative manner. Furthermore, monitoring of the construction execution and tracking of the entire construction project may prove difficult as there may be an involvement of one or more parties that change over time, thereby further increasing the complications in determining accountability between all involved parties.

[004] Among the disclosed prior arts that relate to a system and method for user collaboration, especially in regards to building construction, include the granted United States patent US11321791 B1, which discloses a system and method for construction management from the design stage to completion stage. The system includes various software modules for tasks such as design input conversion, project surveying, scheduling, vendor selection, cost evaluation, quality verification, and financial accounting. The system aims to automate and support communication, coordination, and management throughout the construction process between stakeholders, industry professionals, contractors, etc.

[005] Another relevant prior art is the published United States patent US20060174302 A1, which discloses a system and method for automated remote monitoring of construction projects. It utilizes remote cameras at construction sites connected to a central server via the Internet. Multiple cameras can be employed to monitor the entire site. Images/videos are transmitted to the remote server, which stores them in a remote database for long-term access. A web interface allows authorized users to view the archived media securely.

[006] However, the above-mentioned prior arts may not enable project supervisors to have comprehensive supervision or monitoring over the construction project. In particular, the prior art US11321791 B1 provides an emphasis on the financial management of the construction project. While of importance, it does not provide project supervisors with means to ensure that the on-site workers and/or contracted parties on-site execute their duties with compliance. Furthermore, the prior art US20060174302 A1 merely provides rudimentary means for real-time remote monitoring of the site of the construction project without detailed means for tracking what was monitored.

[007] Accordingly, it is desirable to have a system and method for user collaboration, preferably one configured for use in the construction industry so that a project supervisor is enabled to supervise or monitor the construction project in a comprehensive manner, and is further informed on its current and historical details to ensure that building safety codes enforced by local governments are adhered thereto.

SUMMARY OF INVENTION

[008] The main objective of the invention is to provide a system and method for user collaboration which is preferably used in the construction sector. More specifically, the invention is to enable supervision and project management between one or more relevant parties for an entire duration of a building construction project until its completion. To achieve this objective, there is provided a platform in which all parties interact therewith for posting and monitoring of the project's progress.

[009] Advantageously, the present invention enables a project supervisor to perform supervision or monitoring over an ongoing construction project.

[0010] Advantageously as well, the present invention shall allow a project supervisor to be informed on its current and historical details so as to ensure that building safety codes enforced by local governments are adhered thereto.

[0011] The present invention intends to provide a system for enabling collaboration between users, comprising at least one first device that receives content being streamed, at least one second device that receives content for being streamed to the first device, a database that stores a plurality of content, and at least one server interfaced with any one or a combination of the first device, the second device, and the database, for operating a plurality of modules to provide synchronous or asynchronous exchange of content between any one or a combination of the first device, the second device, or the database for one or more collaboration sessions, and management of content stored in the database and content streamed from the second device for its storage in the database. The server and/or the devices analyse either one or both the content stored in the server, and the content streamed from and/or received by the devices, with or without manual interaction with the user, for generation of bookmark data content for inclusion in a content documentation of the one or more collaboration sessions generated by the server.

[0012] Preferably, the server operates a bookmarking module that comprises a recognition sub-module for generating recognition data as part of bookmark data content based on any one or both the content stored in the server, and the content streamed during the collaboration sessions.

[0013] Preferably, the recognition data recognised by the recognition module include any one or a combination of object patterns within the streamed content or content being streamed, and audio patterns within the streamed content or content being streamed.

[0014] Preferably, the bookmarking module further comprises an annotation module for providing annotations onto the recognition data as part of bookmark data content.

[0015] Preferably, the server further operates a content delivery and receipt module for establishing communication between the first device and the second device for the collaboration sessions.

[0016] Preferably, the database stores content that includes any one or a combination user-related content, project-related content, and media-related content that comprises image files, audio files, video files, audio-video files, text files, user data files, and mixed-media files.

[0017] Preferably, the server further operates a content management module for management of content stored in the database, content streamed from the devices for its storage in the database, and the recognition data.

[0018] Preferably, the server further operates a project management module for scheduling, modifying, or removing the one or more project groups or task slots, and/or their associated content, and/or linking the one or more collaboration sessions and their associated content into the project groups or task slots.

[0019] Preferably, the server further operates a content compiler module that is interfaced with the database for generation of the content documentation relating to the one or more collaboration sessions.

[0020] Preferably, the content delivery and receipt module further enable text communication between the first device and the second device during the collaboration sessions.

[0021] Preferably, content delivery and receipt module further enable the first device to perform any one or a combination of viewing of content streamed from the second device, interaction with content stored within the database or the content streamed from the second device, and input of annotation data based on the content stored within the database or the content streamed from the devices.

[0022] Preferably, the first device further streams content therefrom that is to be received by the second device.

[0023] The present invention further intends to provide a method for enabling collaboration between users, comprising the steps of operating a server that is interfaced with any one or a combination of a first device, a second device, and a database, allowing synchronous or asynchronous exchange of content between any one or a combination of the first device, the second device, or the database for one or more collaboration sessions, by the server, receiving content being streamed, by the first device, receiving content for being streamed to the first device, by the second device, and performing management of content stored in the database and content streamed from the second device for its storage in the database, by the server. The server and/or the devices analyse either one or both the content stored in the server, and the content streamed from and/or received by the devices, for generation of bookmark data content for inclusion in a content documentation of the one or more collaboration sessions generated by the server.

[0024] Preferably, the method further comprises the step of generating recognition data as part of bookmark data content based on any one or both the content stored in the server, and the content streamed during the collaboration sessions, by a recognition sub-module of a bookmarking module.

[0025] Preferably, within the method, the recognition data recognised by the recognition module includes any one or a combination of object patterns within the streamed content or content being streamed, audio patterns within the streamed content or content being streamed.

[0026] Preferably, the method further comprises the step of providing annotation data onto the recognition data as part of bookmark data content, by an annotation module of the bookmarking module.

[0027] Preferably, the method further comprises the step of establishing communication between the first device and the second device for the collaboration sessions, by a content delivery and receipt module.

[0028] Preferably, within the method, the database stores content that includes any one or a combination of user-related content, project-related content, and media-related content that

comprises image files, audio files, video files, audio-video files, text files, user data files, and mixed-media files.

[0029] Preferably, the method further comprises the step of generating the content documentation, which relates to the one or more collaboration sessions, by a content compiler module.

[0030] Preferably, the method further comprises the steps of viewing content streamed from the second device, through the first device, interacting with content stored within the database or the content streamed from the devices, through the devices, and inputting annotation data based on the content stored within the database or the content streamed from the devices, through the devices.

[0031] One skilled in the art will readily appreciate that the invention is well adapted to carry out the objects and obtain the ends and advantages mentioned, as well as those inherent therein. The embodiments described herein are not intended as limitations on the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032] To facilitate an understanding of the invention, there is illustrated in the accompanying drawings the preferred embodiments from an inspection of which when considered in connection with the following description, the invention, its construction and operation and many of its advantages would be readily understood and appreciated.

[0033] **FIG. 1** illustrates a block diagram of a systemic implementation of the present invention. The system includes at least one first device, one or more second devices, and a server.

[0034] **FIG. 2** illustrates example information stored in the project data files of the project-related content.

[0035] **FIG. 3** illustrates a change of state within a task slot of the project group.

[0036] **FIGS 4 – 5** illustrate a first example flowchart describing an interaction between the server and the users via their devices, which involves creation of a project group, creation of a task slot for the project group, holding of a conference call, and generation of a report data file.

[0037] **FIG. 6** is a first example sequence diagram illustrating bookmarking operations performed within the system of the present invention.

[0038] **FIG. 7** is a second example sequence diagram illustrating bookmarking operations performed within the system of the present invention.

[0039] **FIG. 8** is a third example sequence diagram illustrating bookmarking operations performed within the system of the present invention

[0040] **FIG. 9** illustrate a second example flowchart describing first bookmarking actions performed by any one or both the project supervisor and any one of the project workers upon a recorded conference call after the said conference call between them.

[0041] **FIG. 10** illustrate a third example flowchart describing second bookmarking actions performed by the server upon a recorded conference call after the said conference call between them.

[0042] **FIG. 11** illustrate a fourth example flowchart describing generation of a report data file within the system of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0043] The present invention relates to a system and method for user collaboration, more specifically, supervision and project management between one or more relevant parties for an entire duration of a building construction project until its completion. The invention may also be presented in a number of different embodiments with common elements.

[0044] According to the concept of the invention, there is provided a platform in which multiple parties involved within a construction project may interact therewith. These parties may interact with the platform to perform any one or a combination of (i) schedule one or more collaborative sessions that include conference calls, (ii) upload, download or modify content within the server in a collaborative manner, (iii) bookmark content in a collaborative manner, and (iv) generate one or more reports pertaining to the project.

[0045] The invention will now be described in greater detail, by way of example, with reference to the figures. For ease of reference, common reference numerals or series of numerals will be used throughout the figures when referring to the same or similar features common to the figures.

[0046] **FIG. 1** illustrates a block diagram of a systemic implementation of the present invention. The system includes at least one first device **11**, one or more second devices **21a – 21c**, and a server **3**. These devices are preferably interfaced with the server **3**. The server **3** acts as a communication facilitator for facilitating synchronous or asynchronous communication with or between the first device **11** and second devices **21a – 21c**. Moreover, the server **3** further acts as a resource manager for storing a plurality of content, preferably in a digital format, which may be made accessible by any one of the first device **11** or second devices **21a – 21c**.

[0047] In particular, the first device **11** is a device to be used by at least one user of a first user group to interact with server **3**, the user being a project supervisor **1**.

[0048] In particular, the second devices **21a – 21c** are devices to be used by one or more users of a second user group to interact with server **3**, the users being on-site project workers **2a – 2c**. There may be a distinction between users of the second user group and their second

devices **21a – 21c**. More specifically, there is a primary second user, which corresponds to a foreman **2a**, who has a primary second device **21a**. Furthermore, there are one or more secondary second users **2b, 2c**, which correspond to subordinates **2b, 2c** of the foreman **2a**, each having a secondary second device **21b, 21c**.

[0049] It is to be noted that the project supervisor **1** and their first device **11** may be located at a first location, and project workers **2a – 2c** and their second devices **21a – 21c** may be located at a second location. Preferably, the second location is a construction site in which the project workers **2a – 2c** carry out their construction works. Preferably as well, the first location is remote from the second location. Furthermore, the second location may comprise one or more sites of interest.

[0050] It is to be further stated that the first user group may further cover project stakeholders. Alternatively, the project stakeholders may be interpreted as part of a third user group that interacts with server **3** via at least one third device, which is similar to the first device, from a third location. It is to be noted that project stakeholders may include any one or a combination of government regulators, safety regulators, project shareholders, or the like.

[0051] Regarding the first device **11** and the second devices **21a – 21c**, they each may be conventional commercially available end-user devices, which may include smartphones, desktops, personal device assistants, or any devices capable of interacting with a computer network. From hereon, the first device **11** and the second devices **21a – 21c** may be collectively referred to as “devices”, and it is to be understood that the first device **11** belongs to the project supervisor **1**, and the second devices **21a – 21c** belong to project workers **2a – 2c**. Furthermore, it is preferred that these devices have means or are capable of being coupled with means to capture or record audio and/or visual data/or information, such as image sensors, microphones, etc.

[0052] Regarding server **3**, it is preferably one or more computers configured to perform resource management provided through cloud computing. Server **3** may also be proprietarily owned by a company that employs the project supervisor **1** and the project workers **2a – 2c**, or is proprietarily owned by a company that services the project supervisor **1** and the project workers **2a – 2c** for a project.

[0053] **FIG. 1** further illustrates the server **3** with its relevant hardware and software components for performing its relevant operations. Preferably, server **3** has at least one processor **31** that runs a server-side application software **31a**, and at least one data storage device **32** interfaced with the said processor **31**. The server-side application software **31a** is to manage communication between the first device **11** and second devices **21a – 21c**, and the delivery and receipt of content for server **3**. The data storage device **32** acts as a medium that stores said content.

[0054] Processor **31** of server **3** preferably performs the scheduling and the execution of software instructions of the software modules of the server-side application software **31a** running thereon while being interfaced with the data storage device **32** as well. Preferably, it may be, but shall not be limited to, a conventional processor, application-specific integrated circuit (ASIC), a field-programmable gate array (FPGA), a graphics processing unit (GPU), or a combination thereof.

[0055] Data storage device **32** of server **3** preferably serves its database. As such, it preferably stores data therewithin in a permanent or semi-permanent manner. Preferably, the data storage device **32** may be, but shall not be limited to one or a combination of digital storage mediums such as hard-disk drives, solid-state drives, hybrid drives, or the like. In an alternative embodiment, the data storage device **32** may be separated from server **3**, whereby it may be part of a cloud database or network-attached storage. In embodiments where there are one or more digital storage mediums are present, they are preferably set up to have an increased reliability through the implementation of redundancy measures, such as a Random Array of Independent Disks (RAID) setup. From hereon, the data storage device **32** may be referred to as database **32**.

[0056] Database **32** stores content that includes user-related content **321**, project-related content **322**, and media-related content **323**. It is to be noted that the content are of a digital format that may be appropriately stored in digital storage mediums. These content may include image files, audio files, video files, audio-video files, text files, user data files, mixed-media files, three-dimensional model data files of the construction site, etc.

[0057] The user-related content **321** preferably includes user data files having relevant identification information of the project supervisor **1**, the project workers **2a – 2c** as users of the server **3**.

[0058] The project-related content **322** preferably includes project data files having relevant information on one or more projects. More specifically, shall have information related to one or more project groups, wherein the project groups each have its associated user-related content **321** and its media-related content **323** in a relationship therewith.

[0059] The media-related content **323** preferably includes media data files that that may pertain to the user-related content **321** and/or project-related content **322**. More specifically, the media-related content **323** may include audio-video content **3231** and bookmark content **3232**. The audio-video content **3231** are audio-video data files that include audio and/or video. The bookmark content **3232** are bookmark data files that pertain to bookmarked instances of interest within the audio-video data files of the audio-video content **3231**, and may include timestamp data, annotation data, and recognition data.

[0060] Processor **31** of server **3** runs the server-side application software **31a** that operates one or more modules for the server **3** to at least (i) manage synchronous and/or asynchronous communication between devices, (ii) manage the receipt and delivery of content between devices, (iii) generate content based in instructions provided from the devices, and (iv) manage content stored in the in the database **32** based instructions from the devices.

[0061] These modules may include a content delivery and receipt module **311**, a database management module **312**, a project management module **313**, a bookmarking module **314**, a content compiler module **315**, and an access control module **316**. It should be noted that while the aforementioned modules may be in a software embodiment, they may also be a hardware embodiment where they are directly connected to the processor **31**, or they are their own independent computer system. While not shown, server-side application software **31a** may further include one or more ancillary software modules that support the operations of the server **3**.

[0062] Regarding the content delivery and receipt module **311**, it preferably facilitates communications between the server **3** and the devices in a synchronous and/or asynchronous manner. In particular, it shall receive content or content requests from the connected devices, and pass them to subsequent software modules for these requests to be interpreted. In particular, it shall also deliver relevant content back to the connected devices.

[0063] More specifically, the communication between the server **3** and the devices in a synchronous manner involves the content delivery and receipt module **311** enabling the server **3** to act as an intermediary between devices, so that each device that is in connection with the server **3** experiences a substantially simultaneous or real-time exchange of information. For example, content received from any one or more devices, by the server **3**, may be instantaneously provided to the other remaining devices, by the server **3**.

[0064] More specifically, the communication between the server **3** and the devices in an asynchronous manner involves the content delivery and receipt module **311** enabling the server **3** to be in sporadic connection with any one or a combination of the devices, or vice versa. For example, one device may be in connection with the server **3** to access and/or manipulate contents stored in the server **3**, which may then be further accessed and/or manipulated by the same device or other devices that connect to the server **3** afterwards.

[0065] In one example embodiment, the content delivery and receipt module **311** may be configured for a web application to be hosted on the server **3**, wherein an interactable website is provided to the users for the users to interact with the server **3** through the browsers of devices. In yet another example embodiment, the content delivery and receipt module **311** is configured to act as an application protocol interface, which may allow users to interact with server **3** through a client-end application software. The content delivery and receipt module **311** may be configured to be any one or both of these embodiments if so desired.

[0066] With this, it is to be further stated that the content delivery and receipt module **311** may comprise a telephony sub-module **3111**, which facilitates real-time communication of audio and/or video content between devices that are in connection with the server. This enables a virtual conference between multiple users to be held.

[0067] With this, it is to be further stated that the content delivery and receipt module **411** may comprise a user interface sub-module **3112**, which facilitates one or more user interfaces for the users to interact therewith when their devices are interfaced with the server **3**. The user interface sub-module **3112** may further facilitate delivery of one or more interactive web-based pages or web-based content that may be, but shall not be limited to, a login page, a dashboard page, a project management page, a content management page, a bookmark management page, or the like.

[0068] Regarding the database management module **312**, it facilitates the input and output of content between: (i) the database **32** of server **3**, and (ii) the devices that are in connection with server **3**. By way of example, the database management module **312** is a software that implements a relational database management system (RDBMS), using known domain-specific languages such as Structured Query Language (SQL), onto the content stored in the database **32**. This allows for content to be represented as one or more entries of one or more tables. These tables would have one or more primary keys and foreign keys which may be indicative of relationships between user-related content **321**, project-related content **322**, and media-related content **323**. Furthermore, the entries of these tables may have interconnected relationships between each other such as: (i) a one-to-one relationships, (ii) a one-to-many relationships, and (iii) a many-to-many relationships. These relationships may also be expressed as classes, categories, hierarchies, or the like. The database management module **312** may further support one or more users accessing the server **3** simultaneously for creating, modifying, or removing content within the database **32**.

[0069] Regarding the project management module **313**, it facilitates management of one or more project groups as project-related content. More specifically, the project management module **313** is involved in the creation, modification, or removal of the project-related content **322** stored in the database **32**. The project management module **311** further enables each project group to have one or more slots that are in a unique hierarchical relationship therewith as its project-related content. Furthermore, each slot may be uniquely linked or have a relationship with a plurality of user-related content, media-related content, or the like.

[0070] Regarding the bookmarking module **314**, it facilitates management of one or more bookmark content **3232** as media-related content. More specifically, the bookmarking module **314** is involved in the creation, modification, or removal of the bookmark data files as media-related content stored in the database **32**. Furthermore, bookmarking module **314** facilitates determination of instances of interest within media-related content **3213**, especially audio and/or video content, which may be (i) received from devices in connection with the server **3** in real-time, and/or (ii) stored in database **32**.

[0071] With this, it is to be further stated that the bookmarking module **314** may comprise a time-stamper sub-module **3141**, which shall assist in creation, modification, or removal of the bookmark data files **3213b** by extracting and/or marking at least one instance within

audio and/or video content as an instance of interest in an automated manner or a user-interactive manner.

[0072] In one example implementation of the time-stamper sub-module **3141**, it may mark specific frame(s) within one audio and/or video content that is currently streamed, and upon ending of the stream and its conversion into an audio and/or video file with a temporal length, the time-stamper sub-module **3141** shall further generate timestamp data that corresponds to the frame(s) what were marked during the stream.

[0073] In yet another example implementation of the time-stamper sub-module **3141**, it may mark specific frame(s) within one audio and/or video content that is stored in database **32** to generate timestamp data based on the temporal length of the audio and/or video file.

[0074] Both example implementations of the time-stamper sub-module **3141** may be implemented in a complementary manner.

[0075] With this, it is to be further stated that the bookmarking module **314** may comprise an annotation sub-module **3142**, which shall assist in the creation, modification, or removal of the bookmark data files **3213b** by annotating or adding context to at least one instance within audio and/or video content as an instance of interest in an automated manner or a user-interactive manner.

[0076] In one example implementation of the annotation sub-module **3142**, it may facilitate annotation of specific frame(s) within one audio and/or video content that is currently streamed, and upon ending of the stream and its conversion into an audio and/or video file, the annotation sub-module **3142** shall further generate annotation data that corresponds to the frame(s) what were marked during the stream as per the timestamp data.

[0077] In yet another example implementation of the annotation sub-module **3142**, it may annotate specific frame(s) within one audio and/or video content that is stored in database **32** to generate annotation data per the timestamp data of the audio and/or video content.

[0078] Both example implementations of the annotation sub-module **3142** may be implemented in a complementary manner.

[0079] With this, it is to be further stated that the bookmarking module **314** may comprise a recognition sub-module **3143**, which shall assist in the creation, modification, or removal of the bookmark data files **3213b** by recognising visual and/or audio patterns within least one instance of the audio and/or video content as an instance of interest in an automated manner or a user-interactive manner.

[0080] In one example implementation of the recognition sub-module **3143**, it may facilitate recognition of visual and/or audio patterns of specific frame(s) within one audio and/or video content that is currently streamed, and upon ending of the stream and its conversion into an audio and/or video file, the recognition sub-module **3143** shall further generate recognition data that corresponds to the frame(s) what were recognised during the stream as per the timestamp data.

[0081] In yet another example implementation of the recognition sub-module **3143**, it may recognise visual and/or audio patterns (such as construction site items, speech patterns, vocabulary, etc.) within one audio and/or video content that is stored in database **32** to generate recognition data per the timestamp data of the audio and/or video content.

[0082] Both example implementations of the annotation sub-module **3142** may be implemented in a complementary manner.

[0083] Furthermore, the recognition sub-module **3143** may be further configured to interact with or be equipped with means to operate at least one trained machine learning model for recognising visual and/or audio patterns in an automated manner. In particular, the trained machine learning model may be a convolutional neural network (CNN) that has been trained to recognise visual and/or audio patterns associated with a construction site. The trained machine learning model may also be, by way of example, artificial neural networks (ANN), support vector machine (SVM), or the like. The weights and biases of the trained machine learning model may be stored locally within the database **32** of the server **3**. Alternatively, the recognition sub-module **3143** may interact with the trained machine learning model via cloud computing.

[0084] Regarding the content compiler module **315**, it preferably facilitates compilation of content stored in the database **32** to generate a report data file that is preferably relevant to a slot of a project group, all slots of a project group, and/or all project groups. As such, the

report data file may be regarded as a content documentation of one or more collaboration sessions. In particular, the report data file is in a fixed document format or editable document format that is conventionally known in the art, which may be, by way of example, Portable Document Format (.pdf), Word Document Format (.word), or the like. More specifically, the content compiled by the content compiler module **313** may include any one or a combination of user-related content **3211**, project-related content **3212**, and media-related content **3213**.

[0085] Regarding access control module **316**, it assigns one or more access levels to the users (project supervisor **1** and project workers **2a – 2c**). This is so that the integrity and privacy of the content that are within server **3** or uploaded to server **3** are maintained. For an access level to be assigned to a user, their registered authentication credentials (i.e. username, password) will be requested and verified by access control module **315** through a comparison with user-related content **3211** stored in database **32**. Otherwise, for a new user, access control module **315** shall facilitate registration of the new user within server **3** through means conventionally known in the art.

[0086] It is noted that for the rest of the description, the hardware and software components of the system may not be directly implicated. However, it is to be understood by a skilled person that the descriptions of the hardware and software components above provide support for the rest of the description.

[0087] **FIG. 2** illustrates example information stored in the project data files of the project-related content **322**.

[0088] For example, there may be a project data file that relates to a project group (Project Group #6) that comprises one task slot (Task Slot #61), which may have a relationship with one or more media-related content that may further include a first audio-video data file (audio-video file #512) and a second audio-video data file (audio-video file #513). The first audio-video data file (audio-video file #512) may have a corresponding bookmark data group (bookmark data group #5121) that has a first bookmark data file (bookmark data group #51211) and a second bookmark data file (bookmark data group #51212) associated with it. The second audio-video data file (audio-video file #513) may have a corresponding bookmark data group (bookmark data group #5131) that has a first bookmark data file

(bookmark data group #51311) and a second bookmark data file (bookmark data group #51312) associated with it.

[0089] For example, there may be a project data file that relates to a project group (Project Group #6) that comprises one or more task slots (Task Slot #61, Task Slot #62). Each task slot may have an independent relationship with one or more media-related content. One of the task slots (Task Slot #61) may have a relationship with an audio-video data file (audio-video file #611) that has a bookmark data group (bookmark data group #6111) that corresponds to it, with the said bookmark data group having a first bookmark data file (bookmark data group #61111) and a second bookmark data file (bookmark data group #61112) associated with it. Similarly, the other task slot (Task Slot #62) may have a relationship with an audio-video data file (audio-video file #622) that has a bookmark data group (bookmark data group #6221) that corresponds to it, with the said bookmark data group having a first bookmark data file (bookmark data group #62211) and a second bookmark data file (bookmark data group #62212) associated with it.

[0090] FIG. 3 illustrates a change of state within a task slot of the project group. For example, it may have five states. There may be a first state, where the task slot is considered to be in a “Planning” state, which corresponds to a task being planned by all relevant users. There may be a second state, where the slot is considered to be in an “Execution” state, which corresponds to a task that is being carried out by all relevant users. There may be a third state, where the slot is considered to be in a “Finalize” state, which corresponds to a task that is nearing completion and has been reviewed by all relevant users. There may be a fourth state, where the slot is considered to be in a “Pending Acknowledgement” state, which corresponds to a task being pending acknowledgement by a relevant user, preferably being the supervisor **1**. Finally, there may be a fifth state, where the slot is considered to be a “Completed” state or a “Rejected state, depending on the decision of the supervisor **1** in the “Pending Acknowledgement” state.

[0091] FIGS 4 – 5 illustrate a first example flowchart describing an interaction between the server **3** and the users via their devices, which involves the creation of a project group, the creation of a task slot for the project group, holding of a conference call, and generation of a report data file. The task slot is to preferably undergo a change of states as shown in **FIG. 3**. It is noted that the steps described in this flowchart are not to be interpreted as non-limiting,

and minor modifications to the steps (e.g. additions, omissions, or swaps) are permissible by a skilled person without substantial deviation from as described.

[0092] First, in step **SA1**, the step of interacting with the server **3**, by at least one project supervisor **1** through their first device **11**, is performed. More specifically, for creating of at least one project group with at least one slot by the project supervisor **1**, which is further in relationship with to one or more parties that include themselves and one or more project workers **2a – 2c**. The parties may further include project stakeholders.

[0093] Next, in step **SA2**, the step of interacting with the server **3**, by any one or both project supervisor **1** and the project workers **2a – 2c** via their devices, is performed. More specifically, for scheduling a conference call for one selected slot of one selected project group, with invitations extended to all parties within the selected project group.

[0094] Next, in step **SA3**, the step of interacting with the server **3**, by any one or both project supervisor **1** and the project workers **2a – 2c** via their devices, is performed. More specifically, for uploading and/or providing a relationship for relevant media-related content with the slot in which the conference call is scheduled, for viewing by all parties within the project group prior to the conference call.

[0095] Next, in step **SA4**, the step of interacting with the server **3**, by any one or both the project supervisor **1** and the project workers **2a – 2c** via their devices, is performed. More specifically, for starting the conference call. Preferably, all relevant parties will be in attendance.

[0096] Next, in step **SA5**, the step of recording the conference call in real-time, is performed by any one or a combination of the server **3** or any one device of the project supervisor **1** and the project workers **2a – 2c**.

[0097] Next in step **SA6**, the step of interacting with the server **3**, by at least one of the project workers **2a – 2c** via their devices, is performed. More specifically, for providing at least one live stream of at least one site at their location, wherein their devices receive content, by capturing or recording audio and/or visual data or information of the said site or location, for these content to be provided and viewed by the project supervisor **1**, preferably by streaming in real-time.

[0098] Next in step **SA7**, the step of interacting with the server **3**, by any one or both the project supervisor **1** and the project workers **2a – 2c** via their devices is performed. More specifically, for initiating of one or a combination of a first bookmarking action and a second bookmarking action via their devices upon the live stream of the conference call.

[0099] Next, in step **SA8**, the step of generating, by the server **3**, one or more first bookmark data files for the live stream of the conference call, is performed. More specifically, this generation of first bookmark data files is done as per the first bookmarking actions and the second bookmarking actions, and they are subsequently saved into the database **32**.

[00100] Next, in step **SA9**, the step of interacting with the server **3**, by any one or both the project supervisor **1** and the project workers **2a – 2c** via their devices, is performed. More specifically, for ending the conference call.

[00101] Next, in step **SA10**, the step of saving the recording of the conference call as an audio-video data file, is performed by the server **3**. It is to be noted that this audio-video data file may be referred to as a “recorded conference call”. This audio-video data file is stored in database **32** as audio-video content of the database **32**.

[00102] Next in step **SA11**, the step of providing a relationship between the recorded conference call and its generated first bookmark data files, is performed by the server **3**.

[00103] Next in step **SA12**, the step of providing a relationship between the recorded conference call, together with its first bookmark data files, and the selected slot of the selected group, for them to be one of its media-related content, is performed by the server **3**.

[00104] Next, in step **SA13**, the step of interacting with the server **3**, by any one or both the project supervisor **1** and the project workers **2a – 2c** via their devices, is performed. More specifically, for reviewing the recorded conference call.

[00105] Next, in step **SA14**, the step of interacting with the server **3**, by any one or both the project supervisor **1** and the project workers **2a – 2c** via their devices, is performed. More specifically, for initiating any one of the first bookmarking action or the second bookmarking action via their devices upon the recorded conference call.

[00106] The following step **SA15** may comprise one or more sets of sub-steps that may be independent from each other.

[00107] Step **SA15** may have a first set of sub-steps comprising steps **SA151** to **SA153**. More specifically, in step **SA151**, the step of generating, by the server **3**, one or more second bookmark data files for the recorded conference call, is performed. More specifically, this generation of second bookmark data files is done as per the first bookmarking actions or second bookmarking actions performed in step **SA14**. These second bookmark data files are subsequently saved into the database **32**. Following step **SA151** is step **SA152**, wherein the step of providing a relationship between the recorded conference call and its generated second bookmark data files, is performed by the server **3**. Following step **SA152** is step **SA153**, wherein the step of providing a relationship between the recorded conference call, together with its second bookmark data files, and the selected slot of the selected group, for them to be one of its media-related content, is performed by the server **3**.

[00108] Step **SA15** may have a second set of sub-steps comprising step **SA154**. More specifically, in step **SA154**, the step of modifying or removing the one or more first bookmark data files in relationship with the recorded conference call stored in its database **32**, is performed by the server **3**. More specifically, this is done based on the first bookmarking actions or second bookmarking actions performed in step **SA14**.

[00109] Following step **SA15** is step **SA16**, the step of interacting with the server **3**, by any one or both the project supervisor **1** and the project workers **2a – 2c** via their devices, is performed. More specifically, for prompting generation a report data file pertaining to the selected slot of the selected project group, in which the recorded conference call is in a relationship therewith.

[00110] Next, in step **SA17**, the step of compiling media-related content that is in relationship with the selected slot of the selected project group, is performed by the server **3**. Preferably, this shall include the first bookmark files and the second bookmark files.

[00111] Next, in step **SA18**, the step of generating, by the server **3**, a report data file that includes information of the media-related content in relationship with the selected slot of the selected project group. Preferably, the report data file shall include information related to the first bookmark files and the second bookmark files.

[00112] Next, in step **SA19**, the step of enabling any one or both the project supervisor **1** and the project workers **2a – 2c** to acknowledge or reject the generated report data file, is performed by the server **3**.

[00113] Finally, in step **SA20**, the step of archiving the generated report data file for future audits, is performed by the server **3**.

[00114] **FIG. 6** is a first example sequence diagram illustrating bookmarking operations performed within the system of the present invention, which involves (i) a first bookmarking action being performed by a project supervisor **1** during a conference call, (ii) a second bookmarking action being automatically performed by the server **3** during a conference call. It is noted that the steps described in this flowchart are not to be interpreted as non-limiting, and minor modifications to the steps (e.g. additions, omissions, or swaps) are permissible by a skilled person without substantial deviation from as described.

[00115] First, in step **SB1**, the project supervisor **1**, which is at a first location, interacts with the server **3** via their first device **11** to initiate or join a two-way conference call. Preferably, initiation or joining of the conference call may be done by the project supervisor **1** scanning a two-dimensional code, such as a Quick-Response code, using their first device **11**.

[00116] Next, in step **SB2**, the first device **11** makes a request to connect to the server **3** for establishing a conference call.

[00117] Next, in step **SB3**, at a second location, a foreman **2a** of the project workers **2a – 2c** interacts with the server **3** via their primary second device **21a** to initiate or join the two-way conference call. Preferably, initiation or joining of the conference call may be done by the foreman **2a** scanning a two-dimensional code, such as a Quick-Response code, using their primary second device **21a**.

[00118] Next, in step **SB4**, the primary second device **21a** makes a request to connect to the server **3** for establishing the conference call with the first device **11**.

[00119] Next, in step **SB5**, the server **3** establishes a connection with the first device **11**.

[00120] Next, in step **SB6**, the first device **11** acknowledges the established connection and establishes the two-way conference call.

[00121] Next, in step **SB7**, the server **3** establishes a connection with primary second device **21a**.

[00122] Next, in step **SB8**, the primary second device **21a** enables a two-way conference call to be established. With this, the project supervisor **1** and the project workers **2a – 2c** are able at least substantially communicate with each other.

[00123] Next, in step **SB9**, the subordinates **2b – 2c** of the foreman **2a** initiates at least one stream of at least one site at the second location via their secondary second devices **21b, 21c**. Preferably, the subordinates **2b – 2c** may join the conference call by a two-dimensional code, such as a Quick-Response code, using their secondary second devices **21b, 21c**.

[00124] Next, in step **SB10**, the secondary second devices **21b, 21c** pushes their stream(s) to the server **3**.

[00125] Next, in step **SB11**, the server **3** pushes the stream(s) provided by the secondary second devices **21b, 21c** to the first device **11**.

[00126] Next, in step **SB12**, the project supervisor **1** is enabled to view the stream(s) from of secondary second devices **21b, 21c** via their first device **11**.

[00127] Next, in step **SB13**, the project supervisor **1** interacts with the first device **11** to initiate a recording process for the conference call to be recorded. With this, visual and/or audio communication between the project supervisor **1** and the project workers **2a – 2c** may begin to be recorded.

[00128] Next, in step **SB14**, the project supervisor **1** interacts with the first device **11** for performing a first bookmarking action, in which a specific instance in the conference call is bookmarked in a manual manner.

[00129] Next, in step **SB15**, the first device **11** is informed of the instance in which the first bookmarking action was performed by the project supervisor **1** in step **SB14**.

[00130] Next, in step **SB16**, the first device **11** informs the server **3** to mark and store the timestamp of the specific instance in the conference call that was bookmarked by the project supervisor **1** via their first bookmarking action in step **SB14**.

[00131] Next, in step **SB17**, the project supervisor **1** interacts with the first device **11** to enable the server **3** to perform second bookmarking actions. With this, the server **3** is enabled to perform second bookmarking actions.

[00132] Next, in step **SB18**, the server **3** that receives the stream from the secondary second devices **21b**, **21c** and is also enabled to perform a second bookmarking action, detects a pattern of interest within a specific instance in the conference call.

[00133] Next, in step **SB19**, the server **3** marks and stores the timestamp of the specific instance in the conference call that was detected by the server **3** via its second bookmarking action in step **SB18**.

[00134] Next, in step **SB20**, the project supervisor **1** interacts with the first device **11** for performing yet another first bookmarking action, in which a specific instance in the conference call is bookmarked in a manual manner.

[00135] Next, in step **SB21**, the first device **11** is informed of the instance in which the first bookmarking action was performed by the project supervisor **1** in step **SB20**.

[00136] Next, in step **SB22**, the first device **11** informs the server **3** to mark and store the timestamp of the specific instance in the conference call that was bookmarked by the project supervisor **1** via their first bookmarking action in step **SB20**.

[00137] Next, in step **SB23**, the server **3** that receives the stream from the secondary second devices **21b**, **21c** and is also enabled to perform a second bookmarking action, detects yet another a pattern of interest within a specific instance in the conference call.

[00138] Next, in step **SB24**, the server **3** marks and stores the timestamp of the specific instance in the conference call that was detected by the server **3** via its second bookmarking action in step **SB23**.

[00139] Next, in step **SB25**, the project supervisor **1** interacts with the first device **11** to disable the server **3** from performing second bookmarking actions. With this, the server **3** is stopped from performing further second bookmarking actions.

[00140] Next, in step **SB26**, the project supervisor **1** interacts with the first device **11** to stop the recording process for the conference call. With this, visual and/or audio communication between the project supervisor **1** and the project workers **2a – 2c** is stopped from being recorded, and the recording is pushed to the server **3** and saved thereonto.

[00141] Next, in step **SB27**, the subordinates **2b – 2c** of the foreman **2a** stop the stream of at least one site at the second location via their secondary second devices **21b, 21c**.

[00142] Next, in step **SB28**, the secondary second devices **21b, 21c** stops pushing their stream(s) to the server **3**.

[00143] Next, in step **SB29**, the server **3** stops pushing the stream(s) provided by the secondary second devices **21b, 21c** to the first device **11**.

[00144] Next, in step **SB30**, the project supervisor **1** will not see the stream(s) from of secondary second devices **21b, 21c** via their first device **11**.

[00145] Next, in step **SB31**, the project supervisor **1** interacts with their first device **11** to leave the two-way conference call.

[00146] Next, in step **SB32**, the first device **11** disconnects from the two-way conference call while informing the server **3**.

[00147] Next, in step **SB33**, the foreman **2a** interacts with their primary second device **21a** to leave the two-way conference call.

[00148] Finally, in step **SB34**, the primary second device **21a** disconnects from the two-way conference call while informing the server **3**.

[00149] **FIG. 7** is a second example sequence diagram illustrating bookmarking operations performed within the system of the present invention, which involves (i) a first bookmarking action being performed by a project supervisor **1** during a conference call, (ii) a second

bookmarking action being automatically performed by the first device **11** during a conference call. It is noted that the steps described in this flowchart are not to be interpreted as non-limiting, and minor modifications to the steps (e.g. additions, omissions, or swaps) are permissible by a skilled person without substantial deviation from as described.

[00150] First, in step **SC1**, the project supervisor **1** that is at a first location interacts with the server **3** via their first device **11** to initiate or join a two-way conference call. Preferably, initiation or joining of the conference call may be done by the project supervisor **1** scanning a two-dimensional code, such as a Quick-Response code, using their first device **11**.

[00151] Next, in step **SC2**, the first device **11** makes a request to connect to the server **3** for establishing a conference call.

[00152] Next, in step **SC3**, at a second location, a foreman **2a** of the project workers **2a – 2c** interacts with the server **3** via their primary second device **21a** to initiate or join the two-way conference call. Preferably, initiation or joining of the conference call may be done by the foreman **2a** scanning a two-dimensional code, such as a Quick-Response code, using their primary second device **21a**.

[00153] Next, in step **SC4**, the primary second device **21a** makes a request to connect to the server **3** for establishing the conference call with the first device **11**.

[00154] Next, in step **SC5**, the server **3** establishes a connection with the first device **11**.

[00155] Next, in step **SC6**, the first device **11** acknowledges the established connection and establishes the two-way conference call.

[00156] Next, in step **SC7**, the server **3** establishes a connection with primary second device **21a**.

[00157] Next, in step **SC8**, the primary second device **21a** enables a two-way conference call to be established. With this, the project supervisor **1** and the project workers **2a – 2c** are able to at least substantially communicate with each other.

[00158] Next, in step **SC9**, the subordinates **2b – 2c** of the foreman **2a** initiates at least one stream of at least one site at the second location via their secondary second devices **21b, 21c**.

Preferably, the subordinates **2b – 2c** may join the conference call by a two-dimensional code, such as a Quick-Response code, using their secondary second devices **21b, 21c**.

[00159] Next, in step **SC10**, the secondary second devices **21b, 21c** pushes their stream(s) to the server **3**.

[00160] Next, in step **SC11**, the server **3** pushes the stream(s) provided by the secondary second devices **21b, 21c** to the first device **11**.

[00161] Next, in step **SC12**, the project supervisor **1** is enabled to view the stream(s) from of secondary second devices **21b, 21c** via their first device **11**.

[00162] Next, in step **SC13**, the project supervisor **1** interacts with the first device **11** to initiate a recording process for the conference call to be recorded. With this, visual and/or audio communication between the project supervisor **1** and the project workers **2a – 2c** may begin to be recorded.

[00163] Next, in step **SC14**, the project supervisor **1** interacts with the first device **11** for performing a first bookmarking action, in which a specific instance in the conference call is bookmarked in a manual manner.

[00164] Next, in step **SC15**, the first device **11** is informed of the instance in which the first bookmarking action was performed by the project supervisor **1** in step **SC14**.

[00165] Next, in step **SC16**, the first device **11** informs the server **3** to mark and store the timestamp of the specific instance in the conference call that was bookmarked by the project supervisor **1** via their first bookmarking action in step **SC14**.

[00166] Next, in step **SC17**, the project supervisor **1** interacts with the first device **11** to enable the first device **11** to perform second bookmarking actions. With this, first device **11** is enabled to perform second bookmarking actions.

[00167] Next, in step **SC18**, the first device **11** that receives the stream from the secondary second devices **21b, 21c** and is also enabled to perform a second bookmarking action, detects a pattern of interest within a specific instance in the conference call.

[00168] Next, in step **SC19**, the first device **11** informs the server **3** to mark and store the timestamp of the specific instance in the conference call that was detected by the first device **11** via its second bookmarking action in step **SC18**.

[00169] Next, in step **SC20**, the project supervisor **1** interacts with the first device **11** for performing yet another first bookmarking action, in which a specific instance in the conference call is bookmarked in a manual manner.

[00170] Next, in step **SC21**, the first device **11** is informed of the instance in which the first bookmarking action was performed by the project supervisor **1** in step **SC20**.

[00171] Next, in step **SC22**, the first device **11** informs the server **3** to mark and store the timestamp of the specific instance in the conference call that was bookmarked by the project supervisor **1** via their first bookmarking action in step **SC20**.

[00172] Next, in step **SC23**, the first device **11** that receives the stream from the secondary second devices **21b**, **21c** and is also enabled to perform a second bookmarking action, detects yet another a pattern of interest within a specific instance in the conference call.

[00173] Next, in step **SC24**, the first device **11** informs the server **3** to mark and store the timestamp of the specific instance in the conference call that was detected by the first device **11** via its second bookmarking action in step **SC23**.

[00174] Next, in step **SC25**, the project supervisor **1** interacts with the first device **11** to disable the first device **11** from performing second bookmarking actions. With this, the first device **11** is stopped from performing further second bookmarking actions.

[00175] Next, in step **SC26**, the project supervisor **1** interacts with the first device **11** to stop the recording process for the conference call. With this, visual and/or audio communication between the project supervisor **1** and the project workers **2a** – **2c** is stopped from being recorded, and the recording is pushed to the server **3** and saved thereonto.

[00176] Next, in step **SC27**, the subordinates **2b** – **2c** of the foreman **2a** stop the stream of at least one site at the second location via their secondary second devices **21b**, **21c**.

[00177] Next, in step **SC28**, the secondary second devices **21b**, **21c** stops pushing their stream(s) to the server **3**.

[00178] Next, in step **SC29**, the server **3** stops pushing the stream(s) provided by the secondary second devices **21b**, **21c** to the first device **11**.

[00179] Next, in step **SC30**, the project supervisor **1** will not see the stream(s) from of secondary second devices **21b**, **21c** via their first device **11**.

[00180] Next, in step **SC31**, the project supervisor **1** interacts with their first device **11** to leave the two-way conference call.

[00181] Next, in step **SC32**, the first device **11** disconnects from the two-way conference call while informing the server **3**.

[00182] Next, in step **SC33**, the foreman **2a** interacts with their primary second device **21a** to leave the two-way conference call.

[00183] Finally, in step **SC34**, the primary second device **21a** disconnects from the two-way conference call while informing the server **3**.

[00184] **FIG. 8** is a third example sequence diagram illustrating bookmarking operations performed within the system of the present invention, which involves (i) a first bookmarking action being performed by any one of the project workers **2a – 2c** during a conference call, (ii) a second bookmarking action being automatically performed by the secondary second devices **2b**, **2c** during a conference call. It is noted that the steps described in this flowchart are not to be interpreted as non-limiting, and minor modifications to the steps (e.g. additions, omissions, or swaps) are permissible by a skilled person without substantial deviation from as described.

[00185] First, in step **SD1**, the project supervisor **1**, which is at a first location, interacts with the server **3** via their first device **11** to initiate or join a two-way conference call. Preferably, initiation or joining of the conference call may be done by the project supervisor **1** scanning a two-dimensional code, such as a Quick-Response code, using their first device **11**.

[00186] Next, in step **SD2**, the first device **11** makes a request to connect to the server **3** for establishing a conference call.

[00187] Next, in step **SD3**, at a second location, a foreman **2a** of the project workers **2a – 2c** interacts with the server **3** via their primary second device **21a** to initiate or join the two-way conference call. Preferably, initiation or joining of the conference call may be done by the foreman **2a** scanning a two-dimensional code, such as a Quick-Response code, using their primary second device **21a**.

[00188] Next, in step **SD4**, the primary second device **21a** makes a request to connect to the server **3** for establishing the conference call with the first device **11**.

[00189] Next, in step **SD5**, the server **3** establishes a connection with the first device **11**.

[00190] Next, in step **SD6**, the first device **11** acknowledges the established connection and establishes the two-way conference call.

[00191] Next, in step **SD7**, the server **3** establishes a connection with primary second device **21a**.

[00192] Next, in step **SD8**, the primary second device **21a** enables a two-way conference call to be established. With this, the project supervisor **1** and the project workers **2a – 2c** are able to at least substantially communicate with each other.

[00193] Next, in step **SD9**, the subordinates **2b – 2c** of the foreman **2a** initiate at least one stream of at least one site at the second location via their secondary second devices **21b, 21c**. Preferably, the subordinates **2b – 2c** may join the conference call by a two-dimensional code, such as a Quick-Response code, using their secondary second devices **21b, 21c**.

[00194] Next, in step **SD10**, the secondary second devices **21b, 21c** pushes their stream(s) to the server **3**.

[00195] Next, in step **SD11**, the server **3** pushes the stream(s) provided by the secondary second devices **21b, 21c** to the first device **11**.

[00196] Next, in step **SD12**, the project supervisor **1** is enabled to view the stream(s) from of secondary second devices **21b, 21c** via their first device **11**.

[00197] Next, in step **SD13**, the project supervisor **1** interacts with the first device **11** to initiate a recording process for the conference call to be recorded. With this, visual and/or audio communication between the project supervisor **1** and the project workers **2a – 2c** may begin to be recorded.

[00198] Next, in step **SD14**, any one of the project workers **2a – 2c** interacts with their secondary second device **21b, 21c** for performing a first bookmarking action, in which a specific instance in the conference call is bookmarked in a manual manner.

[00199] Next, in step **SD15**, the secondary second device **21b, 21c** is informed of the instance in which the first bookmarking action was performed by any one of the project workers **2a – 2c** in step **SD14**.

[00200] Next, in step **SD16**, the secondary second device **21b, 21c** informs the server **3** to mark and store the timestamp of the specific instance in the conference call that was bookmarked by any one of the project workers **2a – 2c** via their first bookmarking action in step **SD14**.

[00201] Next, in step **SD17**, any one of the project workers **2a – 2c** interacts with their secondary second device **21b, 21c** to perform second bookmarking actions. With this, the secondary second device **21b, 21c** is enabled to perform second bookmarking actions.

[00202] Next, in step **SD18**, the secondary second device **21b, 21c** that receives the stream from and is also enabled to perform a second bookmarking action, detects a pattern of interest within a specific instance in the conference call.

[00203] Next, in step **SD19**, the secondary second device **21b, 21c** informs the server **3** to mark and store the timestamp of the specific instance in the conference call that was detected by the secondary second device **21b, 21c** via its second bookmarking action in step **SD18**.

[00204] Next, in step **SD20**, any one of the project workers **2a – 2c** interacts with their secondary second device **21b, 21c** for performing yet another first bookmarking action, in which a specific instance in the conference call is bookmarked in a manual manner.

[00205] Next, in step **SD21**, the secondary second device **21b, 21c** is informed of the instance in which the first bookmarking action was performed by any one of the project workers **2a – 2c** via their first bookmarking action in step **SD20**.

[00206] Next, in step **SD22**, the secondary second device **21b, 21c** informs the server **3** to mark and store the timestamp of the specific instance in the conference call that was bookmarked by any one of the project workers **2a – 2c** via their first bookmarking action in step **SD20**.

[00207] Next, in step **SD23**, the secondary second device **21b, 21c** that receives the stream and is also enabled to perform a second bookmarking action, detects yet another pattern of interest within a specific instance in the conference call.

[00208] Next, in step **SD24**, the secondary second device **21b, 21c** informs the server **3** to mark and store the timestamp of the specific instance in the conference call that was detected by the secondary second device **21b, 21c** via its second bookmarking action in step **SD23**.

[00209] Next, in step **SD25**, any one of the project workers **2a – 2c** interacts with the first device **11** to disable the secondary second device **21b, 21c** from performing second bookmarking actions. With this, the secondary second device **21b, 21c** is stopped from performing further second bookmarking actions.

[00210] Next, in step **SD26**, the project supervisor **1** interacts with the first device **11** to stop the recording process for the conference call. With this, visual and/or audio communication between the project supervisor **1** and the project workers **2a – 2c** is stopped from being recorded, and the recording is pushed to the server **3** and saved thereonto.

[00211] Next, in step **SD27**, the subordinates **2b – 2c** of the foreman **2a** stop the stream of at least one site at the second location via their secondary second devices **21b, 21c**.

[00212] Next, in step **SD28**, the secondary second devices **21b, 21c** stops pushing their stream(s) to the server **3**.

[00213] Next, in step **SD29**, the server **3** stops pushing the stream(s) provided by the secondary second devices **21b, 21c** to the first device **11**.

[00214] Next, in step **SD30**, the project supervisor **1** will not see the stream(s) from of secondary second devices **21b**, **21c** via their first device **11**.

[00215] Next, in step **SD31**, the project supervisor **1** interacts with their first device **11** to leave the two-way conference call.

[00216] Next, in step **SD32**, the first device **11** disconnects from the two-way conference call while informing the server **3**.

[00217] Next, in step **SD33**, the foreman **2a** interacts with their primary second device **21a** to leave the two-way conference call.

[00218] Finally, in step **SD34**, the primary second device **21a** disconnects from the two-way conference call while informing the server **3**.

[00219] Whilst not shown, it is to be understood that the first device **11** of the supervisor **1** may be capable of streaming content by receiving content, by capturing or recording audio and/or visual data or information of the site or location of the supervisor **1**, for these content to be provided and viewed by the site workers **2a – 2c**, preferably by streaming in real-time. Hence descriptions that relate to the second devices **2a – 2c** may be implemented on or carry out by the first device **11** should it be configured to do so.

[00220] Whilst not shown, it is to be noted that should there be multiple streams that are concurrently or simultaneously streamed during the conference call, these streams are to be received by all devices and are to be viewable on all devices, preferably in real-time. In such a case, the conference call may have multiple windows that each displays the streamed content in a substantially concurrent or simultaneous manner.

[00221] **FIG. 9** illustrate a second example flowchart describing first bookmarking actions performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** upon a recorded conference call after the said conference call between them. It is noted that the steps described in this flowchart are not to be interpreted as non-limiting, and minor modifications to the steps (e.g. additions, omissions, or swaps) are permissible by a skilled person without substantial deviation from as described.

[00222] First, in step **SE1**, the step of selecting one audio-video data file with a unique identification number from a list of audio-video data files pertaining to one or more recorded conference calls, is performed. This step is preferably performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** onto their devices.

[00223] Next, in step **SE2**, the step of requesting the selected audio-video data file and web content pertaining to a bookmark management page for the selected audio-video data file selected in Step **SE1**, is performed. This step is performed by any one or both the first device **11** and the second devices **21a – 21c**.

[00224] Next, in step **SE3**, the step of retrieving the selected audio-video data file and its corresponding bookmark data groups, is performed. This step is performed by the server **3** based on the request received from any one or both the first device **11** and the second devices **21a – 21c** in step **SE2**.

[00225] Next, in step **SE4**, the step of returning a response that includes the selected audio-video data file, its corresponding bookmark data groups, and the requested web content is performed by the server **3**. Should the selected audio-video data file have been recently recorded, its bookmark data group may only have first bookmark data files.

[00226] Next, in step **SE5**, upon receipt of the response from the server **3** by any one or both the first device **11** and the second devices **21a – 21c**, they shall perform the step of initialising a current playback of the selected audio-video data file to start from its beginning, or at a time of 0:00.

[00227] Next, in step **SE6**, the step of displaying a bookmark management page by any one or both the first device **11** and the second devices **21a – 21c** is performed. Preferably, the bookmark management page has a web-player to enable playback of the selected audio-video data file, and one or more bookmark controls to enable any one or both the project supervisor **1** and any one of the project workers **2a – 2c** to add, modify or remove bookmarks associated with the selected audio-video data file.

[00228] Next, in step **SE7**, the step of interacting with the bookmark management page is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices. It is to be noted that step **SE7** may further have one or more sets of sub-steps that may be performed independently and/or sequentially one after another.

[00229] In particular, step **SE7** may involve a first set of sub-steps **SE711 – SE712**. Within this first set of sub-steps, the first sub-step **SE711** involves the step of fast-forwarding or rewinding the selected audio-video data file through user interactions with the web-player on the bookmark management page, which is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices. The second sub-step **SE712** involves the step of updating a current timestamp of the selected audio-video data files, by the devices. After the first set of sub-steps **SE711 – SE712**, the flow returns to step **SE6** and continues therefrom.

[00230] In particular, step **SE7** may involve a first set of sub-steps **SE711 – SE712**. Within this first set of sub-steps, the first sub-step **SE711** involves the step of fast-forwarding or rewinding the selected audio-video data file through user interactions with the web-player on the bookmark management page, which is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices. The second sub-step **SE712** involves the step of updating a current timestamp of the selected audio-video data files, by the devices. After the first set of sub-steps **SE711 – SE712**, the flow returns to step **SE6** and continues therefrom.

[00231] In particular, step **SE7** may involve a second set of sub-steps **SE721 – SE722**. Within the second set of sub-steps, the first sub-step **SE721** involves the step of playing or pausing the selected audio-video data file through user interactions with the web-player on the bookmark management page, which is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices. The second sub-step **SE722** involves the step of updating a current timestamp of the selected audio-video data files, by the devices. After the second set of sub-steps **SE721 – SE722**, the flow returns to step **SE6** and continues therefrom.

[00232] In particular, step **SE7** may involve a third set of sub-steps **SE731 – SE733**. Within the third set of sub-steps, the first sub-step **SE721** involves the step of adding a bookmark to the selected audio-video data file by marking a timestamp through user interactions with the bookmark controls on the bookmark management page, which is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices. The second sub-step **SE722** involves the step of sending the marked timestamp to the server **3** by the devices. The third sub-step **SE722** involves the step of creating and saving a second

bookmark data file that is associated with the selected audio-video data file, by the server **3**, based on the marked timestamp received by the devices. After the third set of sub-steps **SE731 – SE733**, the flow returns to step **SE6** and continues therefrom.

[00233] In particular, step **SE7** may involve a fourth set of sub-steps **SE741 – SE743**. Within the fourth set of sub-steps, the first sub-step **SE741** involves the step of selecting a bookmark data file associated with the selected audio-video data file for removal, through user interactions with the bookmark controls on the bookmark management page, which is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices. The second sub-step **SE742** involves the step of sending the respective identification number of the selected bookmark data file to the server **3** by the devices. The third sub-step **SE743** involves the step of removing the selected bookmark data file and its associated information from the database **32** of the server **3**. After the fourth set of sub-steps **SE741 – SE743**, the flow returns to step **SE6** and continues therefrom.

[00234] In particular, step **SE7** may involve a fifth set of sub-steps **SE751 – SE752**. Within the fifth set of sub-steps, the first sub-step **SE751** involves the step of selecting a bookmark data file associated with the selected audio-video data file for viewing its annotation data, through user interactions with the bookmark controls on the bookmark management page, which is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices. The second sub-step **SE752** involves the step of retrieving the annotation data of the selected bookmark datafile from the server **3** for displaying it on the bookmark management page, which is performed by the devices. After the fourth set of sub-steps **SE751 – SE752**, the flow returns to step **SE6** and continues therefrom.

[00235] In particular, step **SE7** may involve a sixth set of sub-steps **SE761 – SE763**. Within the sixth set of sub-steps, the first sub-step **SE761** involves the step of selecting a bookmark data file associated with the selected audio-video data file for editing its annotation data, through user interactions with the bookmark controls on the bookmark management page, which is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices. The second sub-step **SE762** involves the step of displaying an input field by the devices for the user to edit contextual information. The third sub-step **SE763** involves the step of sending, by the devices, the inputs made by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** to the server **3**. The fourth sub-step **SE764** involves updating and storing the annotation data of the selected bookmark

data file. After the fourth set of sub-steps **SE761 – SE764**, the flow returns to step **SE6** and continues therefrom.

[00236] The final step, step **SE8**, is a decision step whereby it is determined, by any one or both the project supervisor **1** and any one of the project workers **2a – 2c**, whether or not all intended first bookmarking actions are performed. Should this be the case, the flowchart ends. Else, the flowchart returns to step **SE7** and continues therefrom.

[00237] **FIG. 10** illustrate a third example flowchart describing second bookmarking actions performed by the server **3** upon a recorded conference call after the said conference call between them. It is noted that the steps described in this flowchart are not to be interpreted as non-limiting, and minor modifications to the steps (e.g. additions, omissions, or swaps) are permissible by a skilled person without substantial deviation from as described.

[00238] First, in step **SF1**, the step of selecting, by any one or both the project supervisor **1** and any one of the project workers **2a – 2c**, at least one project group or at least one task slot of a project group, for second bookmarking actions to be performed upon, is performed.

[00239] Next, in step **SF2**, the step of requesting a list of audio-video data files associated with the selected project group or task slots, and web content pertaining to a bookmark management page for the project group or task slots selected in Step **SE1**, is performed. This step is performed by any one or both the first device **11** and the second devices **21a – 21c**.

[00240] Next, in Step **SF3**, the step of compiling a list of audio-video data files with their unique video identification number, is performed by the server **3**. Preferably, the compiled audio-video data files are under the project group or task slots selected in Step **SE1**.

[00241] Next, in Step **SF4**, the step of returning a response that includes a list of audio-video data files associated with the selected project group or task slots, and the requested web content, is performed by the server **3**.

[00242] Next, in Step **SF5**, the step of displaying a bookmark management page by any one or both the first device **11** and the second devices **21a – 21c** is performed. Preferably, the bookmark management page has a list of audio-video data files associated with the selected project group or task slots, and one or more bookmark controls to enable any one or both the

project supervisor **1** and any one of the project workers **2a – 2c** to add or remove bookmarks associated with the selected audio-video data file through second bookmarking actions.

[00243] Next, in Step **SF6**, the step of selecting one or more audio-video files, is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices.

[00244] Next, in Step **SF7**, the step of selecting one machine-learning model is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices.

[00245] Next, in Step **SF8**, the step of toggling an option to override or maintain previous bookmark data files for each of the selected audio-video files is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices.

[00246] Next, in Step **SF9**, the step of prompting the server **3** to initiate second bookmarking actions, is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices.

[00247] Next, in Step **SF10**, the step of providing the selected or toggled user parameters to the server **3**, is performed by any one or both the first device **11** and the second devices **21a – 21c**.

[00248] Next, in Step **SF11**, the step of loading the machine learning model selected in Step **SF7** is performed by the server **3**.

[00249] Next, in Step **SF12**, the step of retrieving and buffering all of the selected audio-video data files is performed by the server **3**.

[00250] Next, in Step **SF13**, the step of pattern matching for each visual and audio frame within the selected audio-video data files is performed by the server **3**.

[00251] Following Step **SF13** is Step **SF14**, which is a decision step in which it is determined whether or not a current visual and audio frame within an audio-video data file matches a

pattern that is recognised by the machine learning model. Should there be a match, then Step **SF14** proceeds to step **SF15**. Else, Step **SF14** loops back to step **SF13**.

[00252] In Step **SF15**, since it was determined that a current visual and audio frame in an audio-video data file matches a pattern that is recognised by the machine learning model, recognition data and the timestamp data are used for creating a second bookmark data file that is saved in the database **32**.

[00253] Following Step **SF15** is Step **SF16**, which is a decision step in which it is determined whether or not the second bookmarking action performed by the server **3** is to be continued. Should there still be remaining frames within an audio-video data file or remaining audio-video data files, the bookmarking action performed by the server **3** shall continue and Step **SF16** loops back to step **SF13**. Else, the flowchart ends.

[00254] **FIG. 11** illustrate a fourth example flowchart describing generation of a report data file within the system of the present invention. In particular, the report data file may be regarded as a content documentation of one or more collaboration sessions. It is noted that the steps described in this flowchart are not to be interpreted as non-limiting, and minor modifications to the steps (e.g. additions, omissions, or swaps) are permissible by a skilled person without substantial deviation from as described.

[00255] First, in step **SG1**, the step of selecting a project group or a task slot is performed. Preferably, this step is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices.

[00256] Next, in step **SG2**, the step of prompting for a generation of a report data file for the selected project group or a task slot is performed. Preferably, this step is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices.

[00257] Next, in step **SG3**, the step of sending a request to the server **3** for generation of the report data file, is performed. Preferably, this step is performed by any one or both the first device **11** and the second devices **21a – 21c**.

[00258] Next, in step **SG4**, the step of compiling the user-related content, project-related content and media-related content for the selected project group or a task slot is performed by the server **3**. More specifically, user information that is associated with the selected project group or task slot and an identification number of the selected project group or task slot are compiled from the database **32** of the server **3**.

[00259] Next, in step **SG5**, the step of extracting information from the user-related content and project-related content for the selected project group or a task slot is performed by the server **3**.

[00260] Next, in step **SG6**, the step of extracting images pertaining to instances of interest from audio-video data files in relationship with the selected project group or task slot is performed by the server **3**. Preferably, the images are extracted based on the information from the bookmark data files in relationship with the said audio-video data files that are available in the database **32** of the server **3**.

[00261] Next, in step **SG7**, the step of iterating through the media-related content that pertains to one or more document data files in relationship with the selected project group or task slot, and converting them into one or more image data files, is performed by the server **3**.

[00262] Next, in step **SG8**, the step of extracting media-related content that pertains to one or more signature data files in relationship with the user-related content of the selected project group or task slot is performed by the server **3**.

[00263] Next, in step **SG9**, the step of combining the extracted and converted content into a single report data file pertaining to the selected project group or task slot is performed by the server **3**. More specifically, the user-related content, the project-related content, and media-related content that includes snapshots of instances of interest from its audio-video data files, snapshots of its document data files, and signature data files, are combined and formatted into a single report data, which is preferably in a Portable Document Format (.pdf), or a Word Document Format (.word).

[00264] Next, in step **SG10**, the step of receiving the generated report data file is performed by any one or both the first device **11** and the second devices **21a – 21c**. This report data file

may be further displayed to any one or both the project supervisor **1** and any one of the project workers **2a – 2c**.

[00265] Finally, in step **SG11**, the step of downloading the generated report data file is performed by any one or both the project supervisor **1** and any one of the project workers **2a – 2c** via their devices.

[00266] The present disclosure includes as contained in the appended claims, as well as that of the foregoing description. Although this invention has been described in its preferred form with a degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangements of parts may be resorted to without departing from the scope of the invention.

CLAIMS

1. A system for enabling collaboration between users in the construction sector, comprising

at least one first device that receives content being streamed;

at least one second device that receives content for being streamed to the first device;

a database that stores a plurality of content; and

at least one server interfaced with any one or a combination of the first device, the second device, and the database, for operating a plurality of modules to provide

synchronous or asynchronous exchange of content between any one or a combination of the first device, the second device, or the database for one or more collaboration sessions; and

management of content stored in the database and content streamed from the second device for its storage in the database;

wherein

the content at least relates to visual and/or audio communication between the users, with

the users being enabled to perform a first bookmarking action through the devices upon content being streamed or content stored in the database,

the server and/or the devices being enabled to perform a second bookmarking action automatically upon content being streamed, and

the server being further enabled to perform the second bookmarking action automatically upon content stored in the database,

and wherein

the server and/or the devices analyse the content when performing the second bookmarking action to determine patterns of interest within specific instances of the content being streamed or content stored in the database,

for generation of bookmark data files from the first bookmarking action and/or the second bookmarking action for inclusion in a content documentation of the one or more collaboration sessions generated by the server.

2. The system according to claim 1, wherein the server operates a bookmarking module that comprises a recognition sub-module for generating recognition data as part of bookmark

data files based on any one or both the content stored in the server, and the content streamed during the collaboration sessions.

3. The system according to claim 2, wherein the recognition data recognised by the recognition module include any one or a combination of
 - object patterns within the content stored in the server or content being streamed; and
 - audio patterns within the content stored in the server or content being streamed.
4. The system according to any one of the preceding claims, wherein bookmarking module further comprises an annotation module for providing annotations onto the recognition data as part of bookmark data files.
5. The system according to any one of the preceding claims, wherein the server further operates a content delivery and receipt module for establishing communication between the first device and the second device for the collaboration sessions.
6. The system according to any one of the preceding claims, wherein the database stores content that includes any one or a combination user-related content, project-related content, and media-related content that comprises image files, audio files, video files, audio-video files, text files, user data files, and mixed-media files.
7. The system according to any one of the preceding claims, wherein the server further operates a content management module for management of content stored in the database, content streamed from the devices for their storage in the database, and the recognition data.
8. The system according to any one of the preceding claims, wherein the server further operates a project management module for
 - scheduling, modifying, or removing the one or more project groups or task slots, and/or their associated content; and/or
 - linking the one or more collaboration sessions and their associated content into the project groups or task slots.

9. The system according to any one of the preceding claims, wherein the server further operates a content compiler module that is interfaced with the database for generation of the content documentation relating to the one or more collaboration sessions.
10. The system according to any one of claims 5 to 9, wherein the content delivery and receipt module further enables text communication between the first device and the second device during the collaboration sessions.
11. The system according to any one of claims 5 to 10, wherein the content delivery and receipt module further enables the first device to perform any one or a combination of
viewing of content streamed from the second device;
interaction with content stored within the database or the content streamed from the second device; and
input of annotation data based on the content stored within the database or the content streamed from the devices.
12. The system according to any one of the preceding claims, wherein the first device further streams content therefrom that is to be received by the second device.
13. A method for enabling collaboration between users in the construction sector, comprising the steps of
operating a server that is interfaced with any one or a combination of a first device, a second device, and a database;
allowing synchronous or asynchronous exchange of content between any one or a combination of the first device, the second device, or the database for one or more collaboration sessions, by the server;
receiving content being streamed, by the first device;
receiving content for being streamed to the first device, by the second device; and
performing management of content stored in the database and content streamed from the second device for its storage in the database, by the server;
wherein
the content at least relates to visual and/or audio communication between the users,
with

the users being enabled to perform a first bookmarking action through the devices upon content being streamed or content stored in the database,

the server and/or the devices being enabled to perform a second bookmarking action automatically upon content being streamed, and

the server being further enabled to perform the second bookmarking action automatically upon content stored in the database,

and wherein

the server and/or the devices analyse the content when performing the second bookmarking action to determine patterns of interest within specific instances of the content being streamed or content stored in the database,

for generation of bookmark data files from the first bookmarking action and/or the second bookmarking action for inclusion in a content documentation of the one or more collaboration sessions generated by the server.

14. The method according to claim 13, further comprising the step of generating recognition data as part of bookmark data files based on any one or both the content stored in the server, and the content streamed during the collaboration sessions, by a recognition sub-module of a bookmarking module.

15. The method according to claim 14, wherein the recognition data recognised by the recognition module includes any one or a combination of
object patterns within the content stored in the server or content being streamed; and
audio patterns within the content stored in the server or content being streamed.

16. The method according to any one of claim 14 or 15, further comprising the step of providing annotations data onto the recognition data as part of bookmark data files, by an annotation module of the bookmarking module.

17. The method according to any one of the claims 13 to 16, further comprising the step of establishing communication between the first device and the second device for the collaboration sessions, by a content delivery and receipt module.

18. The method according to any one of the claims 13 to 17, wherein the database stores content that includes any one or a combination user-related content, project-related content,

and media-related content that comprises image files, audio files, video files, audio-video files, text files, user data files, and mixed-media files.

19. The method according to any one of the claims 13 to 18, further comprising the step of generating the content documentation, which relates to the one or more collaboration sessions, by a content compiler module.

20. The method according to any one of the claims 13 to 19, further comprising the steps of

viewing of content streamed from the second device, through the first device;

interacting with content stored within the database or the content streamed from the devices, through the devices; and

inputting annotation data based on the content stored within the database or the content streamed from the devices, through the devices.