

APPARATUS, SYSTEM AND METHOD FOR SYNCHRONIZING A PLURALITY OF ELECTRONIC CONTENT

5

TECHNICAL FIELD

[0001] The present disclosure relates to the display of a plurality of electronic content, such as, but not limited to, multimedia content, and synchronization of the plurality of electronic content.

10

BACKGROUND

[0002] The following discussion of the background is intended to facilitate an understanding of the present disclosure only. It should be appreciated that the discussion is not an acknowledgement or admission that any of the material referred to was published, known or is part of the common general knowledge of the person skilled in the art in any jurisdiction as of the priority date of the disclosure.

[0003] Apparatus and systems for synchronizing different types of electronic content, such as presentation content in the form of text, slides and audio/video content, have been proposed.

[0004] However, existing apparatus and systems require some form of manual intervention. For example, synchronization between audio data files and presentation data content (e.g. one or more slides) may require the recording of voice over or talk through while presenting the slides. In addition, any synchronization with subtitling and transcribing typically require multiple tools.

[0005] Further, most apparatus to facilitate synchronization of different electronic content, typically in the form of electronic content media players, may be relatively inflexible in terms of manipulation of the electronic content. For example, some apparatus (in the form of electronic web-based multimedia players) allow audio/video media to be placed in the presentation slide(s) but the display is relatively cumbersome and limited as it is not easily switchable or toggled between the different electronic content, such as presentation slides, audio and video content.

[0006] There thus exists a need for an improved device, system and method for synchronizing different electronic content to alleviate one or more of the aforementioned problems.

SUMMARY

5 **[0007]** The disclosure was conceptualized to provide an integrated web-based application for access by users to synchronize a plurality of electronic content. The plurality of electronic content includes at least two of the following: - audio content, video content, image content, multimedia content, presentation content, text content.

10 **[0008]** The web-based application may include a user interface that can be displayed as a dashboard on various computer devices, such as, but not limited to, a mobile smartphone or a laptop computer. The user interface can include an integrated display for the various types of electronic content to be synchronized so as to allow a user to select different electronic content for synchronization.

15 **[0009]** In some embodiments, a user may upload different electronic content to a remote server, or the electronic content may be stored in a digital repository. Over time, a plurality of electronic content will be available to be selected for synchronization. Selected electronic content will have options to synchronize with other electronic content. Upon the different combination of options, the synchronized content will be formed as an output content.

20 **[0010]** According to an aspect of the disclosure there is an apparatus for synchronizing a plurality of electronic content comprising a processor; a database for storing a first electronic content and/or a second electronic content; an input module configured to remotely receive a first and/or a second electronic content; a memory unit storing codes executable by the processor to determine if the first electronic
25 content is in a first file format and if not, converts the first electronic content to the first file format; determine if the second electronic content is in a second file format and if not, converts the second electronic content to the second file format; generate a first object comprising the converted first electronic content; generate a second object comprising the converted second electronic content; and a synchronizer
30 module to combine the first object with the second object to form a synchronized object, the synchronized object having a third file format.

- 5 **[0011]** In some embodiments, the first electronic content comprises an audio or a video data file, and the second electronic content comprises a presentation data file having a plurality of slides. Each of the plurality of slides may be converted to an image file, and the second object comprises a plurality of image objects corresponding to each of the plurality of slides.
- [0012]** In some embodiments, the input module is arranged in data communication with a content repository storing the second electronic content.
- 10 **[0013]** In some embodiments, the second file format is an image object, the image object comprises the second electronic content in portable network graphic (PNG) format and a metadata.
- 15 **[0014]** In some embodiments, if the first electronic content is an audio data file, the first file format is an advanced audio coding (AAC) file format, and wherein if the first electronic content is a video file, the first file format is a MP4 file format. Where the first electronic content is a video file, the processor may be operable to convert the video file to the MP4 file format using a digital video compression standard. The digital video compression standard may be the H264+AAC standard.
- [0015]** In some embodiments, an original format of the presentation data file is stored in the database.
- 20 **[0016]** In some embodiments, the apparatus further comprises an encryption module configured to encrypt the first electronic content and the second electronic content.
- [0017]** In some embodiments, the synchronized object has a third file format in the form of a Hypertext Markup Language (HTML) 5 file format or a learning object format.
- 25 **[0018]** According to another aspect of the disclosure, there is a system for synchronizing a plurality of electronic content comprising a client application for synchronizing a plurality of electronic content, the client application comprises a cache for storing a first electronic content and/or a second electronic content; a depository arranged in remote communication with the client application to store the

first electronic content and/or the second electronic content; a memory unit storing codes executable by a processor to determine if the first electronic content is in a first file format and if not, converts the first electronic content to the first file format; determine if the second electronic content is in a second file format and if not,
5 converts the second electronic content to the second file format; generate a first object comprising the converted first electronic content; generate a second object comprising the converted second electronic content; and a synchronizer module to combine the first object with the second object to form a synchronized object, the synchronized object having a third file format.

10 **[0019]** According to another aspect of the disclosure, there is a method for synchronizing a plurality of electronic content comprising the steps of: - storing by a client application, a first electronic content and/or a second electronic content; receiving from a remote depository, a first electronic content and/or a second electronic content; determining if the first electronic content is in a first file format and
15 if not, converting the first electronic content to the first file format; determining if the second electronic content is in a second file format and if not, converting the second electronic content to the second file format; generating a first object comprising the converted first electronic content; generating a second object comprising the converted second electronic content; and combining the first object with the second
20 object to form a synchronized object, the synchronized object having a third file format.

[0020] According to another aspect of the disclosure there is a computer program product for synchronizing a plurality of electronic content, the computer program product comprising a non-transitory computer readable medium having computer
25 readable program code embodied therewith, the computer readable program code configured to:- store, by a client application, a first electronic content and/or a second electronic content; receive, from a remote depository, a first electronic content and/or a second electronic content; determine if the first electronic content is in a first file format and if not, converts the first electronic content to the first file format; determine
30 if the second electronic content is in a second file format and if not, converts the second electronic content to the second file format; generate a first object comprising the converted first electronic content; generate a second object comprising the

converted second electronic content; and combine the first object with the second object to form a synchronized object, the synchronized object having a third file format.

5 [0021] Other aspects and features of the present disclosure will become apparent to those of ordinary skill in the art upon review of the following description of specific embodiments of the disclosure in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF DRAWINGS

10 [0022] Fig. 1 is a network diagram of a system for synchronizing a plurality of electronic content;

[0023] Fig. 2 is a network diagram of another system for synchronizing a plurality of electronic content;

15 [0024] Fig. 3 is a block diagram showing an embodiment of an apparatus for synchronizing a plurality of electronic content;

[0025] Fig. 4 is a block diagram showing another embodiment of an apparatus for synchronizing a plurality of electronic content;

[0026] Fig. 5a, and 5b are flow charts of various methods for synchronizing a plurality of electronic content;

20 [0027] Fig. 6a to 6f show different user interfaces for synchronization of a plurality of electronic content; and

[0028] Fig. 7 shows a concept map of the system and/or apparatus for synchronizing a plurality of electronic content as a PaaS model.

25 DESCRIPTION OF EMBODIMENTS

[0029] In order to illustrate the technical solutions to the embodiments of the present disclosure, description of various embodiments, with reference to the drawings, is provided below. The drawings described below are only some examples or embodiments of the present disclosure. A person having ordinary skill in the art,

without further creative effort, may apply the present disclosure to other scenarios according to these drawings.

[0030] As will be appreciated by one skilled in the art, aspects of the present disclosure may be embodied as a system, method and/or computer program product. Accordingly, aspects of the present disclosure may take the form of an
5 entirely hardware embodiment, an entirely software embodiment (including firmware, micro-codes, etc.) or an embodiment having both hardware and software.

[0031] It will also be appreciated that functional units described in this specification may be referred to as modules. Each module may be implemented as
10 hardware, software, or a combination thereof.

[0032] Computer readable program codes for carrying out operations for aspects of the present disclosure may be written in any combination of one or more programming languages. The one or more programming languages may include object oriented programming, and programming language suitable for mobile app
15 development such as Java, Python, C++ etc.

[0033] Throughout the description, the term 'electronic content' refers to electronic data of various file formats. The file formats may include audio file format such as the advanced audio coding (AAC) file format, video file format such as MPEG (Moving Picture Experts Group) 4 video format, image file format such as the
20 portable network graphic (PNG) format. The term electronic content also broadly includes any data file capable of being converted into any one of the above mentioned file format(s).

[0034] Throughout the description, the term 'computer device' refers to any device having computing capabilities and capable of executing software codes. Non-limiting examples of computer device include general purpose computers, mobile
25 smart phones, laptop computers, tablet PC, etc. Computer devices are typically equipped with memory units such as random access memory (RAM) and network communication modules (wired or wireless) for direct or remote access to other computer devices via the World Wide Web or the Internet. Computer devices may
30 also be equipped with dedicated circuit chips, such as integrated circuit chips and application specific integrated circuit chips (ASIC), for performing specific function(s).

[0035] Throughout the description, the term ‘user’ may include users having different privileges or access rights. Examples of different types of users include administrators, trouble-shooters, test users, general users, and trial users.

5 **[0036]** Throughout the description, the term ‘object’ may be construed to include an electronic content portion and an identifier portion. The identifier portion may include a metadata having information to identify the electronic content and provide context as to the relation and association with other electronic content.

[0037] Fig. 1 is a network diagram of a system 100 for synchronizing a plurality of electronic content. The system 100 comprises a client application 102 for
10 synchronizing a plurality of electronic content, the client application 102 arranged in data communication with a depository 108 arranged in remote communication with the client application 102 to receive a first electronic content 106 and second electronic content 110. The system 100 further includes a synchronizer module 112 to combine the first electronic content 106 with the second electronic content 110 to
15 form a synchronized content 114, the synchronized content 114 having specific file format. The synchronized content 114 may be in the form of an object. The specific file format may be in the form of at least one of the following:- a Hypertext Markup Language (HTML) file extension or file format, a learning object format. Identification of the synchronized content 114 may adhere to international standards such as the
20 IEEE 1484.12 learning object metadata (LOM) standard, or the HTML metadata standard, for tagging to the synchronized content 114.

[0038] For ease of identification, the metadata of each synchronized content 114 may include contextual information relating to the learning content. Non-limiting examples may include subjects such as mathematics, physics, chemistry, language.

25 **[0039]** The client application 102 may be a dedicated software application installed on a computer device to facilitate access to the depository 108 by a user. The client application 102 may also be a web-based application hosted by a remote server, the web-based application accessible via a registered account. Advantageously, the web-based application 102 is therefore device agnostic. A user
30 may login using a set of user credentials using any computer device(s) to access the web-based application 102 for the performance of various synchronization functions.

[0040] Fig. 2 shows another embodiment of the system 100. In Fig. 2, the client application 102 may include a database 104 for storage of the first electronic content 106. In this embodiment, the database 104 may be a local cache or dedicated memory space for use by the client application 102 to access the first electronic content 106. In the embodiment shown in Fig. 2, the client application 102 and the first electronic content 106, which may be regarded as a primary electronic content, may be hosted locally on a specific computer device and does not require network access. In the embodiment shown in Fig. 2, the synchronizer module 112 can be integrated with the client application 102. If the second electronic content 110 can be received by the client application 102 without network access, synchronization operations may be performed. If the second electronic content 110 cannot be received by the client application 102, a user may access the first electronic content 106 without synchronization to the second electronic content 110.

[0041] In some embodiments, the system 100 may be part of a remote network, such as a cloud computer network. The remote network may be distributed or non-distributed and can include one or more computer servers. With the use of remote networks such as the cloud computer network, user(s) of the system 100 may access the second and/or first electronic content, in the form of, for example, presentations, audio and/or video data files. Any computer devices with network communication capabilities may be used to access the system 100 via, for example, the world-wide web.

[0042] The client application 102 (when installed on a computer device) may include or be allocated a memory unit for storing codes executable by a processor of the computer device to convert the first electronic content to a first file format and the second electronic content to a second file format. It is contemplated that the conversion of the first electronic content and/or second electronic content to specific file formats may include conversion to one or more objects. Each object may include the content (e.g. audio, video, presentation, text) and a metadata.

[0043] The system 100 may form at least part of a learning management system (LMS), a content management system (CMS), a training management system (TMS) or platform. The system 100 facilitates the synchronization between electronic content such as presentation slides and audio/video data files. A synchronized

- content may suitably include illustrations and instructor's explanation/voice over for each presentation slide. In the context of the LMS, the first electronic content 106 may be the presentation information or files having at least one of the following file formats: - .ppt, .pptx (for powerpoint™ presentation), .key (for keynote™ presentation), .gslides (for Google™ slide presentation) and the second electronic content 110 may be at least one of the audio data file, the video data file and one or more text files. It is to be appreciated that in some embodiments, the first electronic content 106 may instead be the audio data file, the video data file and/or text file; and the second electronic content 110 may be the presentation information or files.
- 10 **[0044]** Fig. 3a shows an apparatus 300 for synchronizing a plurality of electronic content in accordance with some embodiments. The apparatus 300 may be a computer device having an input module 320, a user interface in the form of a dashboard module 340, a synchronization module 360 and an encryption module 380.
- 15 **[0045]** The input module 320 is configured to receive the first electronic content, the second electronic content, and/or other derived or modified electronic content. The input module 320 is may also be configured with an uploader to upload the first electronic content 106 and/or second electronic content 110 to the remote depository 108 a local cache for storage.
- 20 **[0046]** The dashboard module 340 provides a user interface for a user to manage one or more synchronization processes between the first electronic content and the second electronic content (see Fig. 5). The dashboard module 340 may include an area for a user to select the first and second electronic content for synchronization, an area for a user to manage his/her account, settings and preference, an area for designating where the first and second electronic content will be uploaded to/downloaded from, and actuators to commence, pause or stop the synchronization process.
- 25 **[0047]** The synchronization module 360 implements the synchronization based on one or more synchronization rule-base or algorithms. The encryption module 380 provides data file manipulation of the first electronic content 106 and/or the second electronic content 110. The encryption module is configured to encrypt the first
- 30

electronic content and/or the second electronic content. The encryption may include compression of the first and second electronic content 106, 110. The compression operation may be performed before or after the encryption.

5 **[0048]** Before synchronization, the first electronic content 106 and/or the second electronic content 110 may be converted to suitable file/object format. The conversion may be performed by the input module 320, the synchronization module 360 and/or the encryption module 380.

10 **[0049]** The second electronic content 106 can be the presentation data file, and can include one or more presentation slides or deck of slides. The slides or deck of slides may be converted to one or more image objects.

15 **[0050]** In some embodiments, each image object includes the actual content and a metadata. The metadata associates the image object with one or more other image objects and/or the synchronization project. For example, the image object may include (i.) the presentation content converted to an image file, such as portable network graphic (PNG) file format, and (ii.) a metadata providing the context of the image object. The conversion from presentation information to one or more image objects may include the steps of converting each slide within the presentation file into a separate image object. For example, presentation information comprising a deck of ten slides will be converted to ten image objects. Each of the ten image objects is then tagged (via the metadata) to be associated with other images objects within the same presentation information. The number of image objects may be arbitrary and depends on actual operating scenarios.

25 **[0051]** The first or second electronic content can include at least one of a video data file, an audio data file and a text file. Once synchronized, the text file may suitably be in the form of subtitles or transcripts accompanying the presentation data file together with any audio and/or video data files.

30 **[0052]** In a non-limiting example, the first electronic content can include an audio data file, a video data, and a text file and/or a combination of any one of the aforementioned data files. Where the first electronic content includes an audio data file, it is converted to a first object having file format that includes an advanced audio coding (AAC) file format. Where the first electronic content includes a video file, the

first file format includes an MP4 file format. The conversion to an MP4 file format may be achieved using a digital compression standard, such as a H264+AAC standard.

5 **[0053]** In some embodiments, the original format of the presentation data file may be stored in the depository 108 or in a cache 104 of the client application 102.

[0054] The first electronic content 106 and the second electronic content 110 are combined to form the synchronized content. The file format of the synchronized content may be in a Hypertext Markup Language 5 (HTML 5) object or a learning object.

10 **[0055]** Fig. 4 shows another apparatus 300 for synchronizing a plurality of electronic content in accordance with some embodiments. The apparatus 300 shown in Fig. 4 includes an authentication module 420, a statistic/analysis module 440, a notification module 460, and an artificial intelligence engine 480.

[0056] The authentication module 420 may be utilized for management of a user
15 account settings, such as account settings and security. The authentication module 420 may also include account management functions such as user set-up, creation of new user account(s), password reset or password change. Once configured, a user may have to provide a user name and password/passcode to access to the synchronization service. Additional security measures such as biometric, face
20 recognition and multi-factor authentication may be configured as necessary by the user.

[0057] The statistic/analysis module 440 provides a user with different statistical data in relation to the synchronization service. Examples of statistical data include the number of synchronization tasks performed over a user defined period, average
25 speed per synchronization task performed over a user defined period, number of stored electronic content over a user defined period, number of deleted electronic content over a user defined period. The statistic/analysis module 440 may also track the total views of a published synchronized content, the total learners within the system 100 (in relation to a LMS), and whether the consumption of the synchronized
30 content has been completed.

[0058] The notification module 460 provides a user or a group of users with one or more notifications based on pre-determined preferences. The notifications may be in the form of alerts sent to the user via email messages, text messages or other electronic alerts. Examples of notifications include when a new synchronized content is published, when an existing synchronized content is updated or modified, or when feedback is received from any third party. Notifications may also be in the form of security alerts such as when an existing user logs into his account using a new device.

[0059] The artificial intelligence (AI) engine 480 includes an AI logic operable to detect a speaker's language from an electronic content, such as audio/video electronic content, and generate another electronic content, which may be a third electronic content, in the form of a transcript or caption format for display instantly with the Audio/Video content.

[0060] The system 100 and apparatus 300 may be described in the context of an exemplary operation as a method 500 for synchronizing a plurality of electronic content, shown in Fig. 5a. The method 500 is especially suited for implementing or deployment as a LMS or as part of the LMS, and may be used for synchronizing a base content such as a deck of presentation slides with audio, video, or other multimedia content. To promote a growing ecosystem or learning community, it is appreciable that the LMS may include various features for electronic account sign-ups, creation, log-ins, and validation. Other features as known to skilled persons in the art may be included and are not discussed further in the specification.

[0061] The method 500 commences when a user uploads the first electronic content and/or the second electronic content to the depository 108 (step s502). The depository 108 may provide a user interface in the form of a dashboard. The dashboard may be linked to a content library to facilitate the user upload of the first and/or second electronic content. The content library may also be used for the creation of the synchronized content.

[0062] In some embodiments, the first and/or second electronic content may be stored (step s504). The step of storing the first and second electronic content may be via the depository 108 or on the local memory unit of the apparatus 300. In some

embodiments, the first electronic content may be maintained via a database separate from the depository 108.

5 **[0063]** Where the second electronic content is stored on a remote depository 10, the user may access the dashboard to receive the second electronic content (step s506).

[0064] The first electronic content may be converted to a suitable first file format (step s508), such as PNG and the second electronic content may be converted to a second file format (step s510), such as MP4 or ACC.

10 **[0065]** The first electronic content and the second electronic content may be combined by the synchronizer module 112 to form the synchronized content. The synchronized content may have a file format - HTML 5 or learning object (step s512).

15 **[0066]** In some embodiments, any resultant content generated may be listed on the dashboard for preview by the user or else the resultant synchronized content may be published with or without preview (step s514). It is appreciable that any generated preview may be edited by the user. In addition, any draft versions may be saved, and at any time a user may avail himself / herself to any of the draft content.

20 **[0067]** Upon generation of the synchronized content, the process may end if there are no other data file to be synchronized. Otherwise depending on the data file available, the process may loop back to any of the steps s502, s506, s508, s510 or s512.

25 **[0068]** In some embodiments, the dashboard module 340 may be provided with multiple display portions displaying the first electronic content and the second electronic content. The display portions may be switched or toggled between the first electronic content display (e.g. audio/video) and second electronic content display (e.g. presentation). Once the first and second electronic content have been synchronized or integrated, a player may synchronously play the electronic content (e.g. audio/video, presentation and transcript) together via dynamic rendering of each image object with the audio/video object.

[0069] Fig. 5b shows a specific embodiment 530 wherein the first electronic

content 106 is an audio data file and/or a video data file. A second electronic content 110 in the form of a presentation file is to be synchronized with the audio data file or video data file. The two electronic content may already be uploaded and stored in a remote repository 108 or local cache 104 as described in steps s502 and s504.

5 Alternatively, only one of the two electronic content may be uploaded and stored.

[0070] It is appreciable that if the two electronic content are uploaded by the same user to the relevant database 104, 108 in relation to the same project; identifiers such as metadata tags may be automatically generated for each electronic content associating the two electronic content to be related data files (step s532).

10 For example, the metadata tag may comprise a header having a user ID and a project title, for example [user 001, chem01] indicating that the two electronic content belong to the particular user user001 and for a specific project chem01.

[0071] As a user selects the first electronic content 106 for display on the dashboard module 340 in preparation for synchronization, the system 100 operates to check if there are related electronic content 110 based on the metadata information generated (step s534). If there is no related electronic content 110, the system 100 prompts the user, via the dashboard module 340, to upload the electronic content 110 for synchronization with the first electronic content 106 (step s536). Once the user uploads the electronic content 110, the system 100 operates to link the electronic content 110 with the electronic content 106 (step s538), if not already performed. The system 100 then waits for a user input for synchronization (step s540).

[0072] The system 100 also determines if the audio file, video file and/or presentation file are in the desired format and if not, converts the same (see step s508 and/or step s510 of Fig. 5a). In particular, each slide within the presentation file is converted to an image object.

[0073] Once the user indicates his intent to synchronize, the system 100 may, via the dashboard module 340, display all the linked electronic content associated with the project (step s542). The user can then select the audio and/or video file of the first electronic content for synchronization with each image object associated with the presentation file (step s544).

[0074] The dashboard module 340 provides the user an interface to provide a start time and an end time for each image object. Each start time and end time corresponds to a particular time in the audio and/or video file (step s546).

[0075] For example, the second electronic content 110 may comprise three image objects, OS1, OS2, OS3. To synchronize the second electronic content 110 with the first electronic content 106, the user is prompted to provide start times and end time for each of the three image objects. Table 1 below illustrates an example.

[0076] Table 1: Example of synchronization

Image object	Start time (corresponding to play time of video/audio object)	End time	Synchronized object (e.g. Learning object format)
OS1	2 nd second	5 th second	Image object 1 will be rendered at 2-5 seconds when the video/audio file is played.
OS2	7 th second	11 th second	Image object 2 will be rendered at the 7-11 seconds when video/audio file is played.
OS3	12 th second	20 th second	Image object 3 will be rendered at the 12-20 seconds when video/audio file is played.

[0077] When executed, the synchronized object may include a trigger that

constantly queries the current play time of the audio/video file and the start and end time of each image object. The image objects are hence rendered dynamically and in a sequential manner in accordance with the start and end time which is associated with the play time of the audio/video object.

- 5 **[0078]** In some embodiments, each image object OS1, OS2, and OS3 may be stored in the depository/ local cache together with start and end time to display and be associated with the audio/video object.

- 10 **[0079]** In embodiments involving another electronic content, also referred to as a third electronic content, synchronization may be achieved in the same manner. As an example, a third electronic content may be in the form of a subtitle or transcript in relation to the audio/video file of the first electronic content 106. The subtitle or transcript is typically in the form of a text file. In a similar manner, each text to display is associated to the audio/video object together with start and end time to display.

- 15 **[0080]** It is contemplated that the synchronization of three or more electronic content may be achieved by querying the current display time of the first electronic content which is audio/video.

[0081] Although the examples have been described using two electronic content, it is contemplated that for the third and subsequent electronic content, new synchronized object may be formed as and when required.

- 20 **[0082]** In embodiments involving electronic content in the form of transcript or text file, it is appreciable that any editing of the text file (e.g. in the correction of spelling of transcript text) will not affect the synchronized object.

- 25 **[0083]** In embodiments involving audio/video content, any trimming of the video or audio content will modify the image object associated with the trimmed timestamp such that the image object of the trimmed audio/video will not be displayed.

[0084] Although the synchronization process in Fig. 5b is described in the context of the first electronic content being an audio and/or video file and the second electronic content being presentation information, it is appreciable that the first and second electronic content may be interchangeable.

[0085] In some embodiments, where the first electronic content is an audio data file, the presentation may be the only visual display. The player may play the presentation content synchronously with the audio data file.

[0086] In some embodiments, where the first electronic content includes a transcript (which may also be a third electronic content), any generated transcript from an audio or a video data file can be edited. Edited transcript will be synchronized with the audio/video.

[0087] Fig. 6a to 6f show embodiments of the dashboard module 340 having multiple user interfaces 610, 620, 630, 640, 650, 660. Each user interface 610, 620, 630, 640, 650, and 660 may be in the form of frames.

[0088] Fig. 6a shows a user interface 610 without any project. The interface 610 comprises a side panel 611 and a main panel 616. The empty interface 610 or clean slate interface is typically shown when a new user uses the system 100 or apparatus 300 for the first time or when an existing user resets his account. A side panel 611 provides the user multiple options to access various projects/content. The options may be in the form of icon displaying 'active content' 612, 'draft content' 613, 'archive content' 614, and 'create new content' 615. As there are no existing content, options 612, 613 and 614 are deactivated. Only 615 allows for user selection. The main panel 616 may include comments or instructions such as 'Click on create new content' to assist the user in commencing a synchronization project.

[0089] Fig 6b shows a user interface 620 with an ongoing project and for uploading a first electronic content 106 in the form of video data files. Interface 620 comprises the side panel 611, a middle panel 621, the main panel 616, and an end panel 622. The middle panel 621 provides a list of uploaded video data files, in the form of thumbnails for example, for easy viewing by a user. In the main panel 616 there comprises the unfinished/unpublished content in the form of an ongoing presentation. In the end panel 622 there is a listings of created synchronized content or lessons for publication or preview. Navigation buttons 623 are provided on the main panel 616 for selecting the various projects from the end panel 622.

[0090] Fig. 6c is a user interface 630 illustrating the selection of a first electronic content 106, in the form of a video data file, the video data file converted to a first

object (video object) 632 for integration or synchronization with a second electronic content 110, in the form of a presentation data file, the presentation data file converted to one or more image objects 634. The user interface 630 also includes generated transcript 636. The transcript 636 may be a text object. A user may toggle
5 between the video object 632 and the image object 634 via clicking on the relevant portion on the main panel 616. An actuator, in the form of buttons, may be clicked upon by the user to integrate the presentation, video, and generate a transcript in the form of a text file.

[0091] Fig. 6d is a user interface 640 illustrating the selection of a first electronic
10 data file 106, in the form of an audio data file, for integration or synchronization with a second electronic content 110, in the form of a presentation data file, with generated transcript. The audio data file is converted to a first object (audio object) 642 for integration or synchronization. The presentation data file is converted to one or more image objects 644 for integration or synchronization. The user interface 640
15 also includes generated transcript 646. The transcript 646 may be a text object. A user may toggle or switch between the audio object 642 and the image object 644 via clicking on the relevant portion on the main panel 616. An actuator, in the form of buttons, may be clicked upon by the user to integrate the presentation, audio, and generate a transcript in the form of a text file. The middle panel 621 displays a list of
20 audio data files for synchronization.

[0092] Fig. 6e is a user interface 650 illustrating the possibility of illustrating a generated transcript data file for an audio object. Where transcript data files are generated as part of the synchronization process, the generated transcript may be edited manually by a user.

[0093] Fig. 6f shows a user interface 660 illustrating the synchronization or
25 integration of a first object 662 with a second object 664. The first object 662 may be converted from a video data file, and the second object 664 may be converted from a presentation data file. The side panel 611 shows the selected presentation data file in thumbnail form for ease of viewing by a user. The end panel 622 displays each
30 converted image object associated with a presentation data file for selection by a user. Upon selection of both the electronic content 106 and 110 for synchronization, the selected content (in the form of converted objects 662 and 664) will appear on

the main panel 616 as overlay for ease of manipulation by the user. A timeline indicator 668 showing the start time and stop time for the display of each image object 664 may be displayed on the user interface 660 to facilitate the process of synchronization. The start time and stop time may be with reference to the video object 662. As a user moves a timeline 670 via an electronic pointer, the electronic content (i.e. video and presentation slides) will be displayed according to the timeline. Once the user is satisfied with the synchronization between the objects, he may then integrate the data files, which will result in the conversion to a synchronized object such as a learning object or a HTML 5 object.

10 **[0094]** It is appreciable that the user interfaces 610, 620, 630, 640, 650 and 660 may be regarded as creator dashboard and is the main platform use interface. Various creator actions may be triggered from that user interfaces.

[0095] In some embodiments, the system 100 and method 500 may be provided as a platform as a service (PaaS) model. The PaaS may be a cloud computing
15 model in which a host, for example a third-party provider, delivers the web interface application to users over the Internet.

[0096] Fig. 7 shows an example of a PaaS platform 700 incorporating the system 100. The PaaS platform 700 includes a dashboard module 340, content depository 104/108, as described, to affect the synchronization of various electronic content.
20 The PaaS platform 700 further incorporates a creator (user) account profile 720 for managing the dashboard module 340 and the content depository. Any published content is sent to a central admin module 740 which includes a subscription or payment service 760 where applicable. The subscription or payment service 760 may be linked with the account of a user to retrieve the necessary information from
25 the user so as to bill or charge the user for using the synchronization service. The payment service may be based on different billing model, such as pay-per-use, or a limited or unlimited use for a predefined period. In some embodiments, limitations in the predefined period may be in the form of a predetermined number of service hours to generate transcript per month; a predetermined number of storage space in
30 Gigabytes (GB) etc.

[0097] Although not explicitly illustrated, it is appreciable that a user may be

availed the following functions via the system 100 or apparatus 300.

[0098] (i.) The first electronic content and the second electronic content may be saved as draft versions in either the local cache 104 or remote depository 108.

[0099] (ii.) Before any synchronized content is published, it may be previewed.

5 **[00100]** (iii.) The first electronic content 106 and/or the second electronic content 110 may be edited, deleted, archived, or reused.

[00101] (iv.) Any related object for synchronization may be modified if a linked or associated object is modified. For example, if a transcript file is modified by deleting some words or sentences, the corresponding video or audio file may be
10 modified to remove the associated words, sentences or video frames (in the form of video files). In other words, the system 100 includes an auto-detection is present to modify a related content for synchronization if the base content has been modified.

[00102] If the transcript is edited to remove any associated words or sentences, an AI engine 480 may detect the timestamps of those words or sentences
15 associated to audio/video data file, the relevant frames or portions from the timeline of audio/video may be removed. Any modified data files may be saved as edited audio/video files.

[00103] The system 100 and apparatus 300, through providing an integrated user interface via the dashboard module 340, provides for content creation and
20 synchronization to be simplified even for non-professional content creators. Advantageously this reduces production time for the integration or synchronization of the audio/video media with presentation slides.

[00104] In addition, the switchable player (in the form of overlays) between audio/video data files and presentation data files will provide flexibility to the viewer
25 as well as improve visibility of the content from both the audio/video data files and presentation data files.

[00105] In embodiments where transcripts are generated, the synchronous display of the transcripts along with the switchable player will help viewers who are hearing impaired.

[00106] It will now be apparent that a new apparatus, system and method for synchronizing a plurality of electronic content has been described in the specification with sufficient particularity as to be understood by one of ordinary skill in the art. Moreover, it will be apparent to those skilled in the art that various modifications, variations, substitutions and equivalents exist for features of the apparatus and system which do not materially depart from the scope of the disclosure.

[00107] It should be further appreciated by the person skilled in the art that variations and combinations of features described above, not being alternatives or substitutes, may be combined to form yet further embodiments falling within the intended scope of the disclosure.

CLAIMS

1. An apparatus for synchronizing a plurality of electronic content comprising
a processor;
a database for storing a first electronic content and/or a second electronic
5 content;
an input module configured to remotely receive a first and/or a second
electronic content;
a memory unit storing codes executable by the processor to
determine if the first electronic content is in a first file format and if not,
10 converts the first electronic content to the first file format;
determine if the second electronic content is in a second file format and
if not, converts the second electronic content to the second file format;
generate a first object comprising the converted first electronic content;
generate a second object comprising the converted second electronic
15 content; and
a synchronizer module to combine the first object with the second object to
form a synchronized object, the synchronized object having a third file format.
2. The apparatus of claim 1, wherein the first electronic content comprises an audio
or a video data file, and the second electronic content comprises a presentation data
20 file having a plurality of slides.
3. The apparatus of claim 2, wherein each of the plurality of slides is converted to
an image file, and the second object comprises a plurality of image objects
corresponding to each of the plurality of slides.
4. The apparatus of any one of the preceding claims, wherein the input module is
25 arranged in data communication with a content repository storing the second
electronic content.
5. The apparatus of claim 2, wherein the second file format is an image object
comprising content in portable network graphic (PNG) format and a metadata.

6. The apparatus of claim 2, wherein if the first electronic content is an audio data file, the first file format is an advanced audio coding (AAC) file format, and wherein if the first electronic content is a video file, the first file format is a MP4 file format.
7. The apparatus of claim 6, wherein if the first electronic content is a video file, the processor operates to convert the video file to the MP4 file format using a digital video compression standard.
8. The apparatus of claim 7, wherein the digital video compression standard is the H264+AAC standard.
9. The apparatus of claim 2 or 3, wherein an original format of the presentation data file is stored in the database.
10. The apparatus of any one of the preceding claims, further comprises an encryption module configured to encrypt the first electronic content and the second electronic content.
11. The apparatus of any one of the preceding claims, wherein the synchronized object has a Hypertext Markup Language (HTML) 5 file format or a learning object format.
12. A system for synchronizing a plurality of electronic content comprising
- a client application for synchronizing a plurality of electronic content, the client application comprises a cache for storing a first electronic content and/or a second electronic content;
 - a depository arranged in remote communication with the client application to store the first electronic content and/or the second electronic content;
 - a memory unit storing codes executable by a processor to
 - determine if the first electronic content is in a first file format and if not, converts the first electronic content to the first file format;
 - determine if the second electronic content is in a second file format and if not, converts the second electronic content to the second file format;
 - generate a first object comprising the converted first electronic content;

generate a second object comprising the converted second electronic content; and

a synchronizer module to combine the first object with the second object to form a synchronized object, the synchronized object having a third file format.

5

13. A method for synchronizing a plurality of electronic content comprising the steps of: -

a. storing by a client application, a first electronic content and/or a second electronic content;

10 b. receiving from a remote depository, a first electronic content and/or a second electronic content;

c. determining if the first electronic content is in a first file format and if not, converting the first electronic content to the first file format;

15 d. determining if the second electronic content is in a second file format and if not, converting the second electronic content to the second file format;

e. generating a first object comprising the converted first electronic content;

f. generating a second object comprising the converted second electronic content; and

20 g. combining the first object with the second object to form a synchronized object, the synchronized object having a third file format.

14. A computer program product for synchronizing a plurality of electronic content, the computer program product comprising a non-transitory computer readable medium having computer readable program code embodied therewith, the
25 computer readable program code configured to:-

a. storing by a client application, a first electronic content and/or a second electronic content;

- b. receiving from a remote depository, a first electronic content and/or a second electronic content;
- c. determining if the first electronic content is in a first file format and if not, converting the first electronic content to the first file format;
- 5 d. determining if the second electronic content is in a second file format and if not, converting the second electronic content to the second file format;
- e. generating a first object comprising the converted first electronic content;
- f. generating a second object comprising the converted second electronic content; and
- 10 g. combining the first object with the second object to form a synchronized object, the synchronized object having a third file format.