



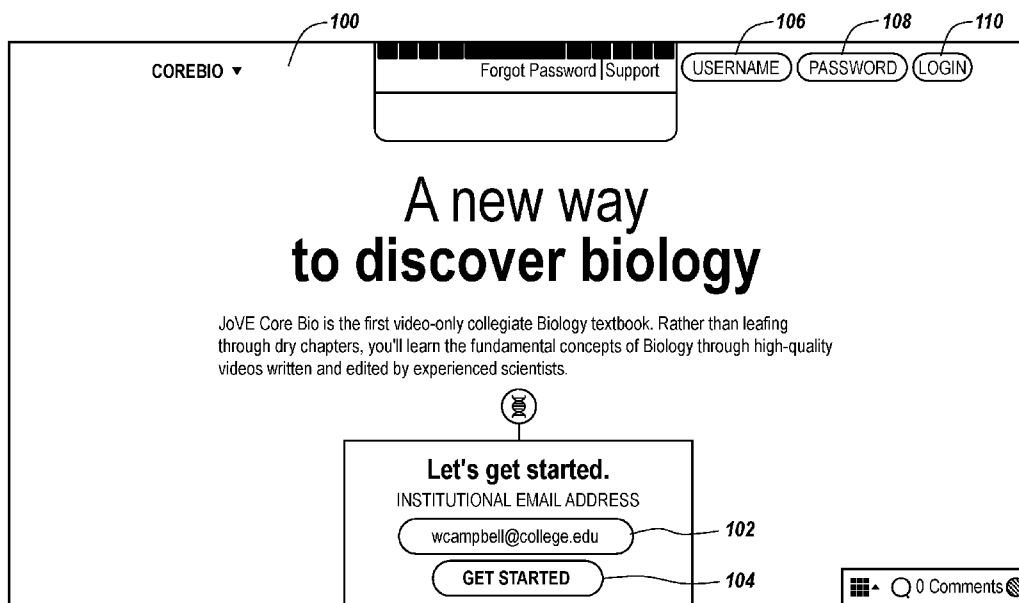
- (51) International Patent Classification:  
*H04N 21/472* (2011.01)
- (21) International Application Number:  
PCT/US2019/047426
- (22) International Filing Date:  
21 August 2019 (21.08.2019)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
16/023,695 29 June 2018 (29.06.2018) US
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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,

(54) Title: VIDEO TEXTBOOK ENVIRONMENT



**Fig. 1**

(57) Abstract: A video textbook environment may provide video textbooks for students in various classes at various institutions. The video textbook environment may provide a web interface that displays videos and enables students to take notes regarding the videos. The student may request bookmarks be placed on a video. These bookmarks may be selected to return the video to the designated portion associated with the bookmark. The notes may be timestamped to correspond with a video counter value, such as where a bookmark is positioned. In this fashion, a student's notes may be associated with a given location in the bookmark. Notes may be aggregated for partitions of the video textbook. In particular, notes can be stored in a database a query may be issued to aggregate notes for a selected partition. The notes may then be displayed or downloaded to a user, such as a student.



SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,  
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

**Published:**

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*
- *with information concerning request for restoration of the right of priority in respect of one or more priority claims (Rules 26bis.3 and 48.2(b)(vii))*

## VIDEO TEXTBOOK ENVIRONMENT

### RELATED APPLICATIONS

This application claims the benefit of priority of U.S. Application No. 16/023,695 (filed on June 29, 2018. The contents of the aforementioned application is hereby incorporated  
5 by reference in their entireties.

### BACKGROUND

Textbooks conventionally have been paper books that are bound and provided to students. These textbooks are organized into chapters and may include illustrations as well as text. Such textbooks may be cumbersome since many of them are heavy and difficult to  
10 transport. Moreover, such textbooks may be easily lost by students. Still further, such textbooks are limited in the content they convey to a user. Specifically, the content is typically limited to text and graphical images.

### SUMMARY

In accordance with an exemplary embodiment, a method is performed by at least one  
15 processor of a computer video textbook environment. The method includes outputting a video as part of a web interface for a video textbook and a designated portion of the web interface. The video relates to a topic for the video textbook. A timestamp reflective of a location of the video is added to notes entered by a party regarding the video via a notes section of the web interface. The notes are stored with the timestamp in a storage. The notes are retrieved with the  
20 timestamp for display on the web interface. In response to the retrieving, the video is cued for output in the designated portion of the web interface starting at the timestamp. In addition, the notes are displayed on the web interface. The notes may include a user id of the party that is stored with the notes. Information that is indicative of the identity of the video may also be stored with the notes. The timestamp may be added responsive to an action of the party. One  
25 example of the action of the party is activation of the user interface element. The current time and date may be added to the notes before the notes are stored.

A non-transitory computer readable storage medium that stores instructions that are executable by a processor for performing this method may be provided in some exemplary embodiments.

In accordance with an exemplary embodiment, a method is performed by at least one processor of a computer video textbook environment. In this method, notes regarding a first video of a video textbook are received. The notes are entered via a web interface for a video textbook environment. The video textbook is partitioned into partitions. The notes regarding the first video are stored in a database on a storage and information identifying that the first video belongs to a selected partition of the partitions of the video textbook is also stored. Notes regarding a second video of the video textbook are received via the web interface and stored in the database. Information identifying that the second video belongs to the selected partition is also stored in the database. A query is issued to the database to retrieve notes stored for the selected partition. Notes regarding the first video and notes regarding the second video are received in response to the query.

The received notes may be forwarded to a party via the web interface. The partitions may include at least one of chapters, sections or lessons.

A non-transitory computer readable storage medium may store instructions executable on a processor for performing this method.

In accordance with some exemplary embodiments, a method is performed by at least one processor of a computer video textbook environment. The method includes outputting a video regarding a topic via web interface for a video textbook. A request is received from a party to add a bookmark to a particular point in the video. In response to the request in the party, the bookmark is added to the video. In response to selection of the bookmark, the video is cued to the point associated with the bookmark. The bookmark may comprise a visual element on the web interface. The visual element may be, for example, an icon position on a timeline for the video. The visual element may be activatable to select the bookmark.

A non-transitory computer readable storage medium may store instructions executable on a processor for performing this method.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 provides an initial screen of a video textbook in accordance with an exemplary embodiment.

FIG. 2 illustrates a table of contents for a video textbook.

5 FIG. 3 illustrates an example of key terms and concepts for a chapter of a video textbook.

FIG. 4 illustrates an example of related research techniques for a chapter of a video textbook.

FIG. 5 illustrates an example of related research items that relate to a chapter of a video textbook.

10 FIG. 6 illustrates an example of a screen in which a video is displayed along with the transcript of video and notes relating to the video.

FIG. 7 illustrates an example of textual content provided in the video textbook as well as a listing of concepts to review.

FIG. 8 illustrates an example of a video and notes relating to a video in a video textbook.

15 FIG. 9 is a flowchart illustrating steps that are performed regarding a timestamp for notes relating to a video.

FIG. 10 is a flowchart illustrating steps performed relating to a bookmark.

FIG. 11 illustrates an example of a video that has been bookmarked.

FIG. 12 illustrates an example of adjustment of a speed of a video in a video textbook.

20 FIG. 13 illustrates a schema suitable for a database for practicing exemplary embodiments.

FIG. 14 is a flowchart illustrating steps that are performed to obtain notes for a given partition.

FIG. 15 illustrates an example interface for obtaining notes for a chapter.

FIG. 16 illustrates an example of an interface that holds class materials, lecture notes and additional resources.

FIG. 17 illustrates an example of an interface that holds information regarding upcoming quizzes and assignments and past quizzes.

FIG. 18 illustrates an example of an interface that includes a listing of newly assigned matters as well as announcements.

FIG. 19 illustrates a distributed environment suitable for practicing the exemplary embodiments.

FIG. 20 illustrates an example of components of the server in exemplary embodiments.

#### DETAILED DESCRIPTION

The exemplary embodiments herein provide a video textbook environment. The video textbook environment may be used to gain access to video textbooks. The video textbooks are akin to conventional paper textbooks but include the additional content of embedded videos as the primary vehicle for delivering content to users. The video textbook may be accessed by a computer and thus there is no need for a student to carry a heavy textbook and keep tabs on the whereabouts of the textbook. The video textbook environment may provide the video textbooks to multiple students for multiple classes at different educational institutions. The video textbook environment provides a mechanism for keeping track of the appropriate textbooks for each of the classes at respective institutions in which the video textbooks are used.

As will be described in more detail below, the video textbooks are logically partitioned into partitions, such as chapters. The chapters may be further divided into sections, and the sections may be further divided into lessons. Alternatively, different logical partitions may be applied to the material in a video textbook. The user may traverse the chapters in sequential order or may view only selective sections or lessons. The instructor of the class is given the option of selecting which chapters, sections and/or lessons are assigned to students in the class.

The student is given options via the user interface to watch videos on relevant topics and to take notes regarding the videos via the interface. These notes may be stored for subsequent retrieval. In some exemplary embodiments, the notes for different partitions may be aggregated and made available to the student. For example, the notes of a single chapter may be aggregated and made available to a student. Still further, notes taken for multiple chapters may be aggregated. This may be especially useful in preparing for tests that span chapters, such as midterm examination or final examinations.

In some exemplary embodiments, a student may bookmark a video at a given point in the video. The bookmark may be subsequently accessed to return to that point in the video. The bookmark may be represented by a user interface element, such as an icon. This allows a student to return to a portion of a video that is of interest after having previously watched the video.

In some exemplary embodiments, a student may timestamp their notes by selecting a user interface element. The timestamp represents a position in the video to which the notes relate. The timestamp may be manifest as a video counter or timer value. This allows a user to correlate the notes with the content in the video. This may be helpful when reviewing information for tests or for reinforcement of the lessons.

The video textbook environment may also provide facilities for an instructor of the class. The facilities may include the ability to post assignments, class materials and quizzes to be taken online by students. The instructor may also post test results or quiz results to the students via the video textbook environment. The video textbook environment may provide a roster of students for a given class.

The video textbook environment may also provide messaging capabilities, such as email messages, online chat or other communication mechanisms. This may allow the instructor to communicate with the students or for students to communicate with each other.

The embodiments described below relate to a distributed implementation in which the user interface is provided over a network such as the Internet. Nevertheless, it should be appreciated that in some embodiments the video textbook environment may be provided locally on a user's machine.

Figure 1 shows an example of an initial screen that may be displayed as part of the interface to a student by the video text book environment. The initial screen 100 includes a location 102 for entering an institutional email address and a “Get Started” button 104 for passing the email address on to the video textbook environment. The students institutional email address is used as an identifier. The user may configure his/her account, including choosing a particular user name or password. For users that have already configured an account, the user may enter the video textbook environment entering a user name 106 and a password 108 and then selecting the login button 110.

In the exemplary case illustrated herein in Figure 1, the video textbook is for a biology class taught by an instructor at a given institution. As was mentioned above, a user may navigate through the textbook in sequential order or in a random access fashion. In order to facilitate easier navigation, the video textbook environment may provide a user interface element, to display the table of contents. For example, hovering over “video” may cause the table of contents to be displayed in some embodiments. In example shown in Figure 2, the contents are organized by units, such as “Fundamentals” and “Cellular Process” with corresponding chapters under those topics. The video textbook environment may provide a number of different ways to navigate to the various chapters and sections of the chapters.

Figure 3 shows an example of the interface 300 after a user has selected to navigate to chapter 19 directed to “Sensory Systems.” Under each chapter, there are tabs for different topics. In the example shown in Figure 3, a user has selected the “Key Terms and Concepts” tab 302. By selecting tab 302, the user may review the key terms and concepts that are included in the chapter. This tab shows the various sections of the tab with a title and a brief summary for each section 304 as well as a thumbnail 306 of a video. Clicking on the thumbnail will take you to a page where the video may be played.

As shown in Figure 4, the user may also select the “Related Research Techniques” tab 402. This displays content that concerns research techniques that relate to the topic of the chapter. As shown in Figure 4, the interface 400 displays two related research techniques. Each related research technique includes a section 404 with a title and summary and a section with a thumbnail of a video 406.

A user may choose the “Scientists in Action” tab 502 on the interface 500 (Figure 5). This displays a number of pertinent topics relating to research and other activities by scientist concerning the topics of the chapters. The entries have a title 504 and summary as well as a thumbnail of a video 506.

5 As was discussed above, the video textbook may be divided into a number of logical partitions. The logical partitions may include chapters as well as sections and lessons. In the example shown in Figure 6, the interface 600 displays content for chapter 19, section 5 relating to hearing. A video 602 is available for playing by the user. The user also may have a transcript of the video 608 displayed so that the user can follow along while the video plays. The interface  
10 600 may also include a note taking section 610, which will be described in more detail below. The user may enter notes in the section 610 for later storage and retrieval.

Figure 6 also shows that the interface 600 may display a thumbnail image or avatar 608 for a user. Moreover, the interface 600 may display an icon 610 for messages that may indicate whether there are any unread messages. In the example shown in Figure 6, there is one unread  
15 message waiting to be read by the user.

As shown in Figure 7, the video textbook may also include written content 702. In the example shown in Figure 7, the interface 700 includes content relating to hearing that is part of chapter 19, section 5. The video textbook may also include a “Concepts to Review” section that displays related concepts that are useful to review for the topic at hand. In the example shown in  
20 Figure 7, the concepts to review include activation potential 704, ion channel 706 and the nervous video textbook environment 708. These concepts all relate in some manner to hearing.

Figure 8 shows an example where the interface 800 is displaying a video 802 relating to hearing under chapter 19, section 26. The video has a play button 804 as well as a video timeline 806. The darkened portion 808 indicates how much of the video has played and the  
25 current position within the video. The timer in this example case is currently at five (00:05) seconds, and the video is one minute and thirty seconds long. The interface 800 shown in Figure 8 has a transcript button 810 which may cause the transcript of the video to be displayed. The interface 800 also includes a “take notes” button 812 which may be activated so that the notes taking section 814 open and may be used to enter notes.

The notes shown in the notes taking section 814 include an indication of the video and also an indication of chapter and section. Thus, the notes shown in Figure 8 designate that the notes relate to chapter 19, section 26.

5 The notes may also be timestamped. The timestamping in this case entails specifying a point in the video to which the notes relate. In this example case, a timestamp of five seconds is provided as the notes relate to the video at the five second mark. A user interface element, such as an icon may be activated in order to add the timestamp to the notes.

10 Figure 9 provides a flowchart of the steps that are performed for such timestamping. Initially the video is played (step 902). The user then activates the user interface element (step 904). As is discussed above, the user interface element may take different forms, such as an icon, a menu item, etc. The timestamp is then added to the notes in step 906. Additional information may be added by the video textbook environment to the notes. For example, the video textbook environment may add the date and time at which the notes were taken (step 908). This step is not obligatory and may be optional in some embodiments. These notes are then saved for subsequent access. The notes may be saved in persistent storage. In example shown in Figure 9, the notes are added to a database (step 910), which will be described in more detail below.

20 The video textbook environment allows the user to bookmark a position in a video. This bookmark may then be activated to return to the specified video location. Figure 10 shows a flowchart 1000 illustrating the steps performed for such bookmarks. Initially, the party requests a bookmark (step 1002). This request may take different forms, such as activating a bookmark user interface element, making a menu selection or performing an action, such as a mouse click or a designated keystroke. An icon is then added to the video timeline in exemplary embodiments (step 1004).

25 Figure 11 shows an example of a video timeline in which icons 1102 have been added to designate where bookmarks have been positioned. Interface 1100 shown in Figure 11 also includes a bookmark icon 1106 that may be selected to create a new bookmark. This same bookmark icon 1106 may be used to create a times stamp in notes.

As shown in Figure 10, the resulting bookmark may be subsequently used by the user to return to the specified video position. In the example shown in Figure 10, the icon, such as one of icons 1102 in Figure 11, is selected in step 1006. The video is then updated to the position of the icon (step 1008). This may be realized by sending appropriate commands to the video or media player.

Figure 11 also illustrates that a partial portion of the table of contents may be displayed in a scrollable form in some embodiments. In this instance, the chapters of the video textbook are displayed in a scrollable list where a given chapter may be selected to expand to illustrate the sections of the chapter. A button 1110 may be provided to display the full table of contents.

The user may also have control over the speed at which the video is displayed. In an example shown in Figure 12, the interface 1200 includes a video 1202 that has a speed list 1204 that may be expanded to illustrate the speed options. In the example shown in Figure 12, a half speed option (0.5x), a full speed option (1x) and a double speed option (2x) are presented on a list. The full speed option has been selected in Figure 12 and as indicated by the highlighting.

The interface is provided by web pages sent to a client over a network, such as the Internet. The web pages are delivered as HTML pages, XML pages or in other suitable formats. These pages are rendered by a web browser at the client. The web pages reference items stored in a storage such as a database and may include active elements, such as user interface elements with which a user may interact. The database provides some of the content of the web pages.

Those skilled in the art will appreciate that other storage technologies and indexing technologies may be used in some instances.

The database provides an especially useful mechanism for storing and retrieving different information together. The content may be indexed and queryable.

Figure 13 shows an example of a schema for such a database. The schema 1300 includes a number of tables holding different types of records. A first group of these tables relate to the video textbooks. One such table is books table 1302. Each record in the books table may hold information regarding the book, such as descriptive information.

A chapters table 1304 may be provided to hold information regarding the various chapters of an associated video textbook. Each chapter has an associated record that may store identifying and descriptive information for the chapter.

5 A sections table 1306 may be provided for holding sections records for sections. Each sections record may hold descriptive and identifying information for the section.

A lessons table 1308 may be provided for holding lessons records. Each lessons record may hold a title and text for the associated lesson and identifying information.

10 The schema 1300 may also include a number of tables that relate to various administrative portions of the video textbook environment. The tables may include an orders table 1310 that holds information for each order of the video textbook. Each record in the orders table may hold descriptive and identifying information regarding the order.

A users table 1312 may be provided to hold information regarding users of the video textbook. This information may include personal information regarding the user.

15 Each record in the roles table 1314 may hold information regarding the role of an individual (e.g. student, etc.).

An institution table 1316 may be provided to hold information regarding an educational institution.

20 The database may also include a class content table 1318. As was mentioned above, an instructor may provide various class content to students during the course of teaching a class. This table is used for such class content.

As was also mentioned above, an instructor may assign various tasks to the students. The task table 1320 may hold information regarding such tasks.

A classes table 1324 holds information with regard to each class. Each classes record may include identifying and descriptive information regarding the class.

25 A rosters table 1326 may hold records regarding class rosters.

An instructor may assign students various assignment. In order to keep track of the assignments, the database may include an assignments table 1328.

A notes table 1330 may be provided that holds information regarding notes entered by students. Each notes record may include information that associates the notes with the user, and  
5 the content of the notes may be included in the record. A date stamp may be included in the record as was discussed above.

The schema 1300 may also include information regarding tests. As such, a tests table 1340 may be provided where each record relates to a particular test.

The recipients table 1342 holds information regarding recipients of a test, such as  
10 students.

A questions table 1344 may hold questions that may be added to tests. Each record may include information that identifies the order of the question within the test and identifying information.

A question choices table 1346 may be provided to hold information regarding choices for  
15 selection for a given questions. For each choice, there is a choice record.

A results table 1348 may be provided to hold information regarding results of a test or quiz. This record captures the choice by the recipient for the given question.

The database is used in numerous fashions to generate and store content and to query content. One uses the database is helpful and relates to the notes. The content in the web  
20 interface may in large part be generated from the database.

Figure 14 shows a flowchart 1400 of steps that are performed to obtain the notes for a given partition. As was discussed above, partitions may take many forms, including chapters, sections and lessons. The video textbook environment is able to issue a query for a particular partition (step 1402). The database management video textbook environment for the database  
25 then retrieves the notes that satisfy the query (step 1404). Thus, the video textbook environment may access the records in the notes table 1330 to obtain the appropriate notes. For example, if the partition is a chapter, the video textbook environment may retrieve notes for all notes that

have the associated chapter id. The retrieved notes are then downloaded to the party or more generally made available to the party (step 1406). These may take the form of a separate document or may be downloaded as individual documents. Alternatively, the notes may be displayed on a user interface for perusal by the user.

5           Figure 15 shows an example of an interface 1500 in which there is an entry for each chapter. Entry 1502 is for chapter 3 and includes a document icon 1504 indicating that the notes for chapter 3 may be downloaded by activating the appropriate user interface element.

10           The video textbook environment may allow a user to look at various content that is useful for the class in a fashion like that shown in Figure 16. The interface 1600 in Figure 16 includes class materials 1602, lecture notes 1604 and additional resources 1606. The class materials may include information such as a syllabus, required texts and materials. The lecture notes 1604 may include slides presented by an instructor on a specified date. The additional resources may take any of a number of different forms including in the form of a video, document, link or the like.

15           The video textbook environment also enables a student to review quizzes and assignments in a convenient fashion. As shown in Figure 17, the interface 1700 includes a list of upcoming quizzes and assignments 1702. In the example shown in Figure 17, the element 1706 indicates that the quiz has not been taken and provides information 1708 regarding the quiz. In particular, the title of the quiz and the due date are shown in this example. A button 1710 may be provided to allow the user to take the quiz. The video textbook environment retrieves the quizzes and assignments from the database for the user for display.

            The upcoming quiz and assignment also shows an entry 1712 for an assignment. Information 1714 regarding the assignment and its due date are shown. A link 1716 is provided to view the associated assignment.

25           The interface 1700 also shows a listing of past quizzes 1704. For example, entry 1718 indicates that quiz one has been taken and that a perfect score 30 out of 30 was obtained.

            Figure 18 shows an additional portion the user interface 1800 in which the page has been scrolled further downward relative to the depiction in Figure 11. In this portion of the user

interface 1800, the video section is provided but also a “Newly Assigned” section 1802 is provided and an “Announcement” section 1804 is provided. The “Newly Assigned” section 1802 shows that a quiz 1806 and an assignment 1805 were recently posted within specifiable time window. These assignments may be retrieved from the database for the class for a given time window. The “Announcements” section 1804 holds various announcements including an announcement that a class is canceled due to snow 1810. These announcements may take the form of messages that may be opened by a user.

Figure 19 shows an example of a distributed environment 1900 that is suitable for practicing the exemplary embodiments. As shown in Figure 19, the distributed environment 1900 includes a client 1902, a network 1904 and a server 1906. Client 1902 may take the form of any of a number of different computing devices, including a desktop computer, a laptop computer, a tablet computer, a smart phone or other computational device that is able to provide the requisite functionality. In the example shown in Figure 19, the client 1902 includes a web browser 1908 that can render web pages such as the Internet, with the server 1906. The clients 1902 may include a processor 1910, such as a microprocessor, a field programmable gate array (FPGA), an application specific integrated circuit (ASIC), a controller, a graphical processor unit (GPU) or other processing logic for performing the desired functionality. The client 1902 may include access to a display 1912 for displaying video images and other content. It is presumed that the browser 1908 has capability of using HTTP commands to communicate over the network 1904 to the server 1906. The browser 1908 may process HTML pages, XML pages or other content.

The server 1906 has access to a storage 1914 that includes the database 1916 as well as one or more applications 1918.

Figure 20 shows the server in more detail. The server 2000 includes one or more processors 2002 and has a network interface 2006 for communicating with the network 1904 or a local area network that has access to network 1904. The processors may take many forms, such as those discussed above relative to the client. The storage 2004 may hold applications 2008, a database 2010, a database management video textbook environment 2012, web pages 2014 and various videos 2016. The storage may take the form of magnetic storage, optical storage, solid state storage or the like. The storage 2004 may include non-transitory computer

readable storage media. The medium may be removable or not. The storage 2004 may include both primary storage and secondary storage. Those skilled in the art will appreciate that a number of different types of storage may be used to practice the exemplary embodiments described herein.

5           The database may take many different forms, but in the exemplary embodiments the database is a relational database that includes relational tables as described above. The database management video textbook environment may be provided to issue queries relative to the database as well as to manage the storage within the database. The applications 2008 may include web applications for providing the video textbook environments and provide a video  
10 textbook to students via a client device 1902. The videos 2016 may be stored separately or may be stored as part of the web pages or within the database 2010.

          While the present invention has been described with reference to exemplary  
embodiments herein, those skilled in the art will appreciate the various changes in form and  
detail may be made without departing from the intended scope of the present invention as  
15 defined in the appended claims.

## CLAIMS

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A method performed by at least one processor of a computer system, comprising:  
5        outputting a video as part of a web interface for a video textbook in a designated portion  
of the web interface, wherein the video relates to a topic for the video textbook;  
      adding a timestamp reflective of a location in the video to notes entered by a party  
regarding the video via a notes section of the web interface;  
      storing the notes with the timestamp in a storage;  
10        retrieving the notes with the timestamp for display on the web interface; and  
      in response to the retrieving, cueing the video for output in the designated portion of the  
web interface starting at the timestamp and displaying the notes on the web interface.
  
2. The method of Claim 1 wherein storing the notes comprises storing a user ID of the  
15        party with the notes.
  
3. The method of Claim 1 wherein storing the notes comprises storing information that  
is indicative of an identity of the video.
  
- 20        4. The method of Claim 1 wherein the timestamp is added responsive to an action of the  
party.
  
5. The method of Claim 4, wherein the action of the party is activation of a user  
interface element.

6. The method of Claim 1, further comprising adding a current time and date to the notes before storing the notes.

5           7. A non-transitory computer-readable storage medium storing instructions executable by a processor for:

          outputting a video as part of a web interface for a video textbook in a designated portion of the web interface, wherein the video relates to a topic for the video textbook;

          adding a timestamp reflective of a location in the video to notes entered by a party  
10 regarding the video via a notes section of the web interface;

          storing the notes with the timestamp in a storage;

          retrieving the notes with the timestamp for display on the web interface; and

          in response to the retrieving, cueing the video for output in the designated portion of the web interface starting at the timestamp and displaying the notes on the web interface.

15

8. The non-transitory computer-readable storage medium of Claim 7 wherein storing the notes comprises storing a user ID of the party with the notes.

9. The non-transitory computer-readable storage medium of Claim 7 wherein storing  
20 the notes comprises storing information that is indicative of an identity of the video.

10. The non-transitory computer-readable storage medium of Claim 7 wherein the timestamp is added responsive to an action of the party.

11. The non-transitory computer-readable storage medium of Claim 10 wherein the action of the party is activation of a user interface element.

12. The non-transitory computer-readable storage medium of Claim 7, further storing  
5 instructions executable by the processor for adding a current time and date to the notes before storing the notes.

13. A method, performed by at least one processor of a computer system, comprising:  
receiving notes regarding a first video of a video textbook entered via a web interface for  
10 a video textbook environment, wherein the video textbook is partitioned into partitions;  
storing the notes regarding the first video in a database on a storage and information  
identifying that the first video belongs to a selected partition of the partitions;  
receiving notes regarding a second video of the video textbook via the web interface;  
storing the notes regarding the second video in the database and information identifying  
15 that the second video belongs to the selected partition;  
issuing a query to the database to retrieve notes stored for the selected partition; and  
receiving the notes regarding the first video and the notes regarding the second video in  
response to the query.

20 14. The method of Claim 13 further comprising forwarding received notes to a party via the web interface.

15. The method of Claim 13 wherein the partitions include at least one of chapters, sections or lessons.

16. The method of Claim 15 wherein the selected partition is a chapter.

17. The method of Claim 15 wherein the selected partition is a section.

5 18. A non-transitory computer-readable storage medium storing instructions executable on a processor for:

receiving notes regarding a first video of a video textbook entered via a web interface for a video textbook environment, wherein the video textbook is partitioned into partitions;

storing the notes regarding the first video in a database on a storage and information

10 identifying that the first video belongs to a selected partition of the partitions;

receiving notes regarding a second video of the video textbook via the web interface;

storing the notes regarding the second video in the database and information identifying that the second video belongs to the selected partition;

issuing a query to the database to retrieve notes stored for the selected partition; and

15 receiving the notes regarding the first video and the notes regarding the second video in response to the query.

19. The non-transitory computer-readable storage medium of Claim 18, further storing instruction executable by a processor for:

20 forwarding received notes to a party via the web interface.

20. The non-transitory computer-readable storage medium of Claim 18, wherein the partitions include at least one of chapters, sections or lessons.

21. The non-transitory computer-readable storage medium of Claim 20 wherein the selected partition is a chapter.

5 22. The non-transitory computer-readable storage medium of Claim 20 wherein the selected partition is a section.

23. A method performed by at least one processor of a computer system, the method comprising:

10 outputting a video regarding a topic via a web interface for a video textbook;  
receiving a request from a party to add a bookmark at a particular point in the video;  
in response to the request from the party, adding a bookmark to the video; and  
in response to selection of the bookmark, cueing the video to the point associated with  
the bookmark.

15 24. The method of Claims 23, wherein adding a bookmark comprises adding a visual element to the web interface indicative of the bookmark.

20 25. The method of Claim 24, wherein the visual element is an icon positioned on a timeline for the video.

26. The method of Claim 23, wherein the visual element is activactable to select the bookmark.

27. The non-transitory computer-readable storage medium storing instructions executable by a processor for:

outputting a video regarding a topic via a web interface for a video textbook;

receiving a request from a party to add a bookmark at a particular point in the video;

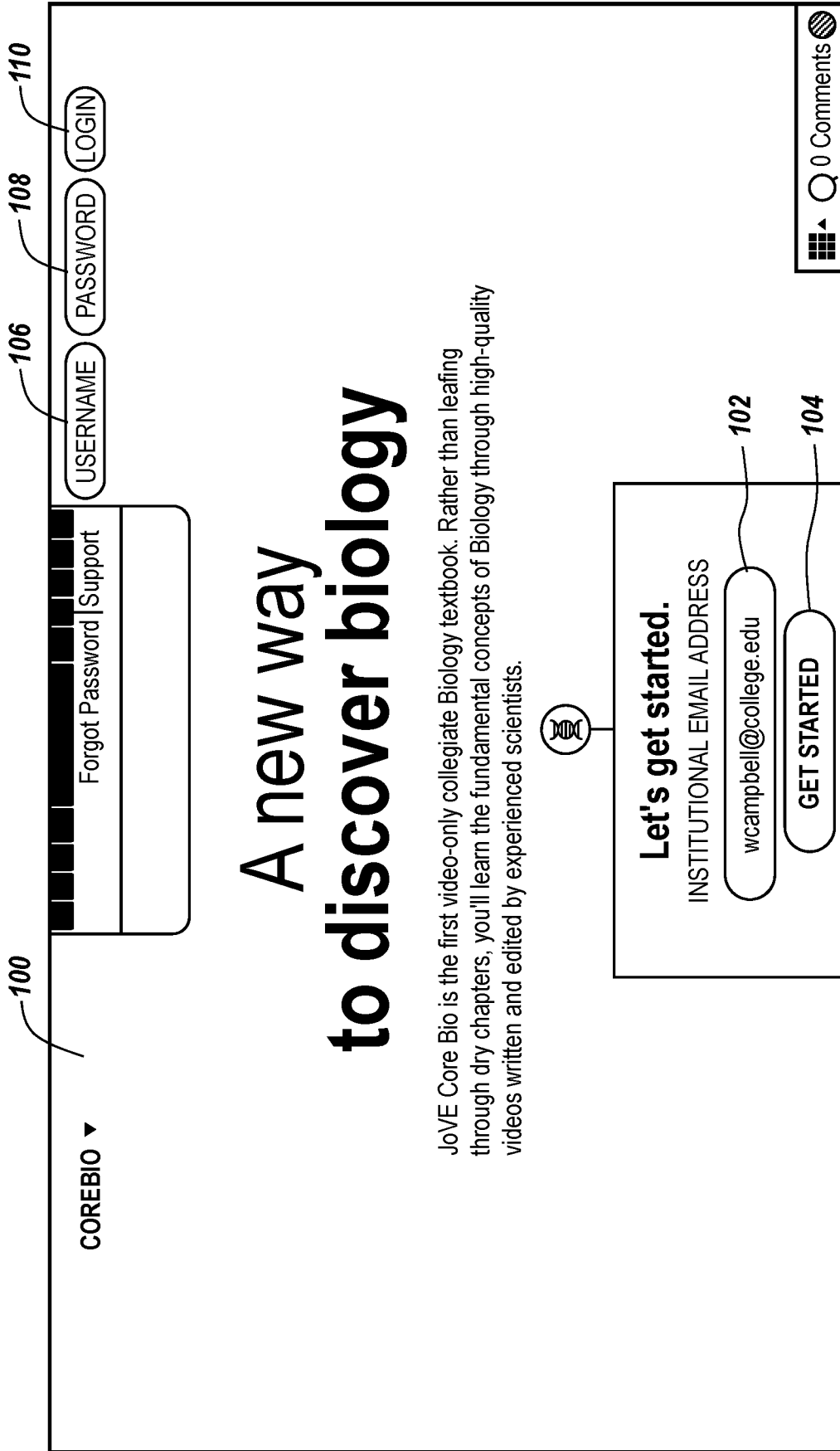
5 in response to the request from the party, adding a bookmark to the video; and

in response to selection of the bookmark, cueing the video to the point associated with the bookmark.

28. The non-transitory computer-readable storage medium of Claim 27 wherein adding  
10 a bookmark comprises adding a visual element to the web interface indicative of the bookmark.

29. The non-transitory computer-readable storage medium of Claim 28 wherein the visual element is an icon positioned on a timeline for the video.

15 30. The non-transitory computer-readable storage medium of Claim 27 wherein the visual element is activatable to select the bookmark.



JoVE Core Bio is the first video-only collegiate Biology textbook. Rather than leafing through dry chapters, you'll learn the fundamental concepts of Biology through high-quality videos written and edited by experienced scientists.

Fig. 1

COREBIO		VIDEO	NOTES	ASSIGNMENTS & QUIZZES	SYLLABUS & RESOURCES	
TABLE OF CONTENTS						
FUNDAMENTALS	CELLULAR PROCESS	GENETICS	HUMAN BIOLOGY	ECOLOGY	EVOLUTION	
<b>CHAPTER 1</b> Scientific Inquiry	<b>CHAPTER 4</b> Cell Structure and Function	<b>CHAPTER 11</b> Meiosis	<b>CHAPTER 17</b> Nutrition and Digestion	<b>CHAPTER 26</b> Behavior	<b>CHAPTER 31</b> Speciation and Diversity	
<b>CHAPTER 2</b> Chemistry of Life	<b>CHAPTER 5</b> Membranes and Cellular Transport	<b>CHAPTER 12</b> Classical and Modern Genetics	<b>CHAPTER 18</b> Nervous System	<b>CHAPTER 27</b> Biospheres and Ecosystems	<b>CHAPTER 32</b> Natural Selection	
<b>CHAPTER 3</b> Macromolecules	<b>CHAPTER 6</b> Cell Signaling	<b>CHAPTER 13</b> DNA Structure and Function	<b>CHAPTER 20</b> Musculoskeletal System	<b>CHAPTER 28</b> Population and Community Ecology	<b>CHAPTER 33</b> Population Genetics	
	<b>CHAPTER 7</b> Metabolism	<b>CHAPTER 14</b> Gene Expression	<b>CHAPTER 21</b> Endocrine System	<b>CHAPTER 29</b> Conservation and Climate		
	<b>CHAPTER 8</b> Cellular Respiration	<b>CHAPTER 15</b> Biotechnology	<b>CHAPTER 22</b> Circulatory and Pulmonary Systems	<b>CHAPTER 30</b> Biological Diversity		
	<b>CHAPTER 9</b> Photosynthesis	<b>CHAPTER 16</b> Viruses	<b>CHAPTER 23</b> Regulation and Excretion			
	<b>CHAPTER 10</b> Cell Cycle and Division		<b>CHAPTER 24</b> Immune System			
			<b>CHAPTER 25</b> Reproduction and Development			
<b>19.1: What is a sensory System?</b> Inceptos parturient a quam a adipiscing suscipit dui nec dapibus eros dui dapibus at fames montes ornare placerat conubia parturient tristique nostra dignissim. Purus pulvinar sapien	<b>19.2: The Tongue and Taste Buds</b> Inceptos parturient a quam a adipiscing suscipit dui nec dapibus eros dui dapibus at fames montes ornare placerat conubia parturient tristique nostra dignissim. Purus pulvinar sapien	<b>19.3: Gustation</b> Inceptos parturient a quam a adipiscing suscipit dui nec dapibus eros dui dapibus at fames montes ornare placerat conubia parturient tristique nostra dignissim. Purus pulvinar sapien				

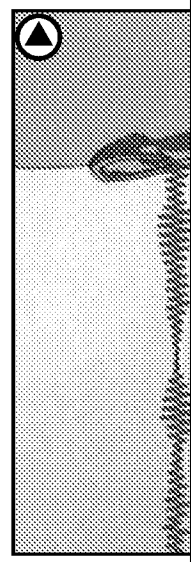
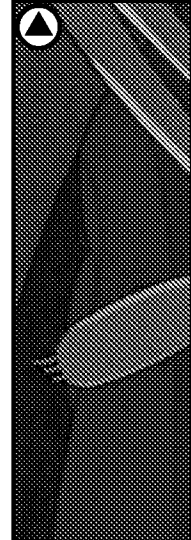


Fig. 2

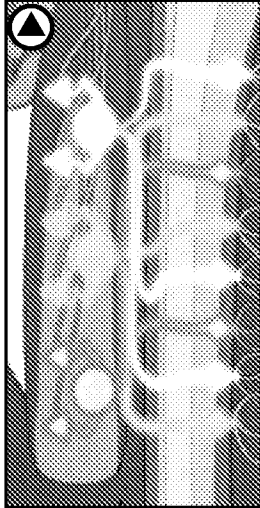
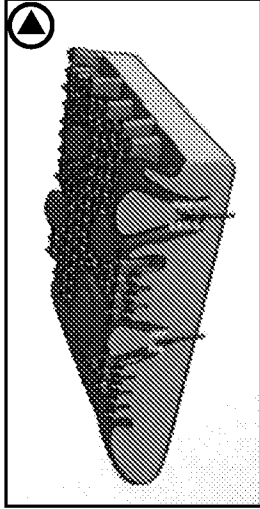
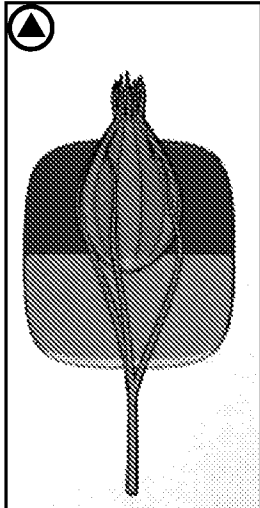
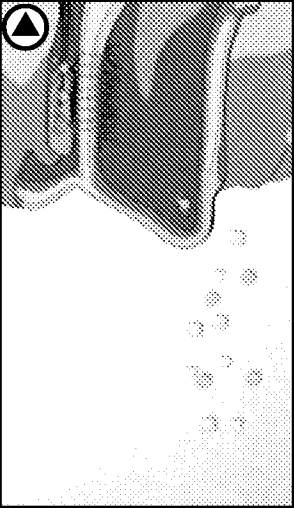
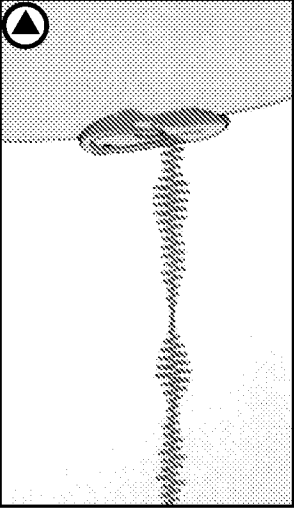
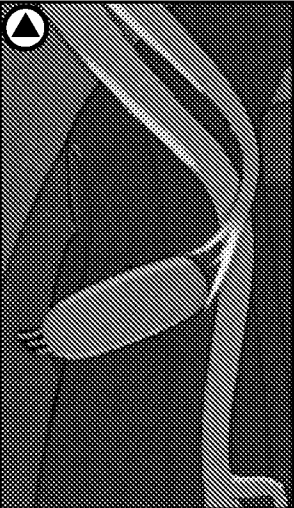
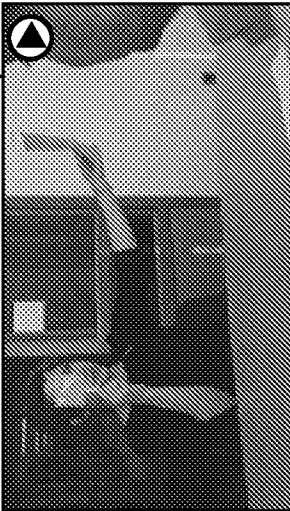

CHAPTER 19 <b>Sensory Systems</b>		
KEY TERMS AND CONCEPTS	RELATED RESEARCH TECHNIQS	SCIENTISTS IN ACTION
<p>306</p>  <p>304</p> <p><b>19.22: What is a Sensory System?</b> Sensory systems detect stimuli - such as light and sound waves - and transduce them into neural signals, so they can be interpreted by the ...</p>	 <p><b>19.23: The Tongue and Taste Buds</b> The surface of the tongue is covered in various small bumps called papillae, which either serve to distribute what has been ingested (i.e., filiform) ...</p>	 <p><b>19.24: Gustation</b> Gustation is a chemical sense that largely participates in our perception of taste. It starts with the activation of receptors by chemical compounds ...</p>
 <p><b>19.25: Olfaction</b></p>	 <p><b>19.26: Hearing</b></p>	 <p><b>19.27: Hair Cells</b></p>

Fig. 3

400

<p>CHAPTER 19</p> <p><b>Sensory Systems</b></p>		<p>SCIENTISTS IN ACTION</p>
<p>KEY TERMS AND CONCEPTS</p>	<p>RELATED RESEARCH TECHNIQS</p>	
<p>406</p>  <p><b>19.34: Finding Your Blindspots</b></p> <p>In the back of everyone's eye is a small piece of neural tissue called the retina. The retina has photosensitive cells that respond to ...</p>	 <p><b>19.35: Rubber Hand Illusion</b></p> <p>Our physical actions - whether we are reaching for objects or walking without hitting obstacles - depend on an ability to perceive our own ...</p>	<p>402</p> <p>408</p>

404

**Fig. 4**

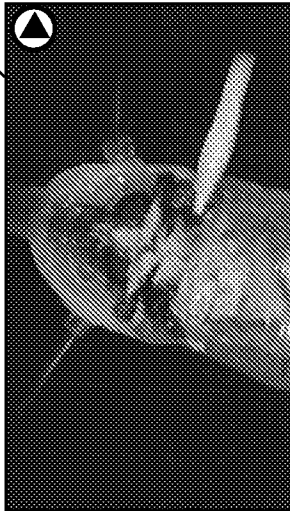
500

CHAPTER 19

**Sensory Systems**

506

KEY TERMS AND CONCEPTS



**19.36: Neuroscience: Gustatory Coding**

Researchers can use simple animal models, like the moth *Manduca sexta*, to study basic principles in the neural coding of taste. This ...

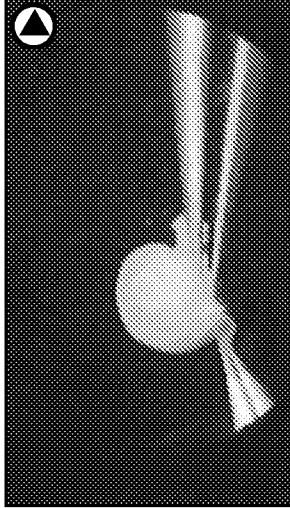
RELATED RESEARCH TECHNIQS



**19.37: Behavior: Visual Adaption**

Sensory systems continuously adjust to the context that they are exposed - a concept referred to as adaptation. This article describes a novel ...

SCIENTISTS IN ACTION



**19.38: Medicine: Cochlear Explant Technique**

The most common sensory deficit in humans is hearing loss. Complete cochlear models are necessary to improve treatment options, particularly for more ...

502

504

**Fig. 5**

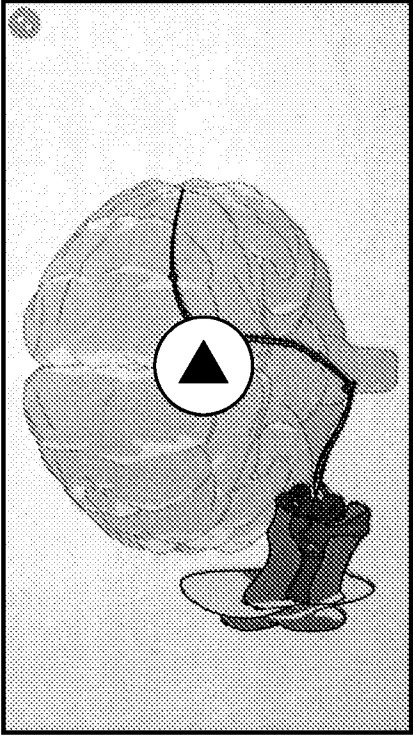
604

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600

TRANSCRIPT

19.5 Hearing



Next Video  
**19.6: Hair Cells**

Previous Video  
**19.4: Olfaction**

When we hear a sound, our nervous system is detecting sound waves - pressure waves of air molecules. The frequency of the wave is perceived as pitch, while the amplitude is perceived as loudness.

Sound waves are collected by the external ear, and amplified as they travel through the ear canal. When they reach the middle ear, they vibrate the tympanic membrane - the eardrum - causing the attached ossicles - a set of small bones - to move.

19.4 Olfaction: 00:54

Ullamcarper eu vitae magna trincidunt lacus mus aenean magna quam eros aliquet hac parturient.

Est aptent sapien ut tristique mollis a duis vitae a non ut a facilisi cum justo. Libero ullamcorper habitant a condimentum penatibus quisque luctus.

Last saved Jan 23, 2018 21:23

602

Fig. 6

700



19.5: Hearing

702

Sounds are mechanical waves of increased and decreased pressure, due to the compression and rarefaction (expansion) of the molecules the sound is traveling in - usually air. Sound waves are often depicted as simple sine waves, but most natural sounds have more complex waveforms.

The nervous system detects sound waves and interprets their characteristics. For example, frequency is perceived as pitch - the higher the frequency, the higher the pitch - and amplitude correlates with loudness.

Sound waves are collected by the part of the ear outside of the head, and then directed through the ear canal, where they are amplified. At the end of the ear canal, they vibrate the tympanic membrane - the eardrum - in the middle ear. This causes the ossicles - three tiny bones attached to the tympanic membrane - to move, further amplifying the sound wave.

The ossicles push on the oval window of the cochlea in the inner ear. This causes fluid within the cochlea to move, displacing the cilia of the inner hair cells - the sensory receptors of the auditory system. The movement triggers the hair cells to change their rate of neurotransmitter release onto auditory nerve cells - effectively encoding the characteristics of the sound wave into neural signals.


The auditory nerve carries this information to the brain. there are several auditory pathways through the brain, but generally, the first stop- is in the brainstem. Here, information from both ears is integrated, helping the brain determine the location of the sound source.

Sound information is then sent through a series of neurons to the thalamus of the brain.

References ⊕


Concepts to Review

704




Action Potentials

706



Ion Channels

708



The Nervous System

Fig. 7

8/21

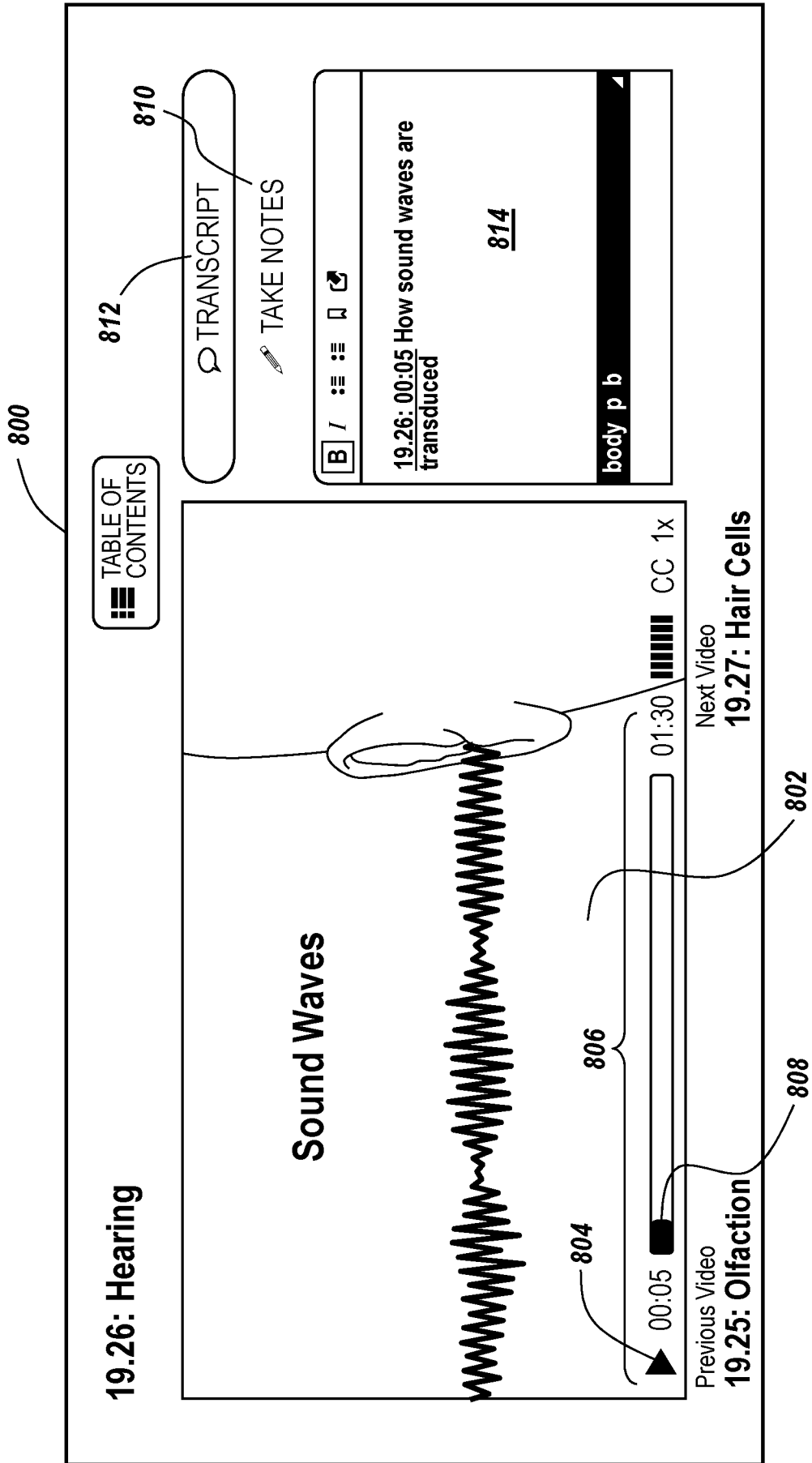
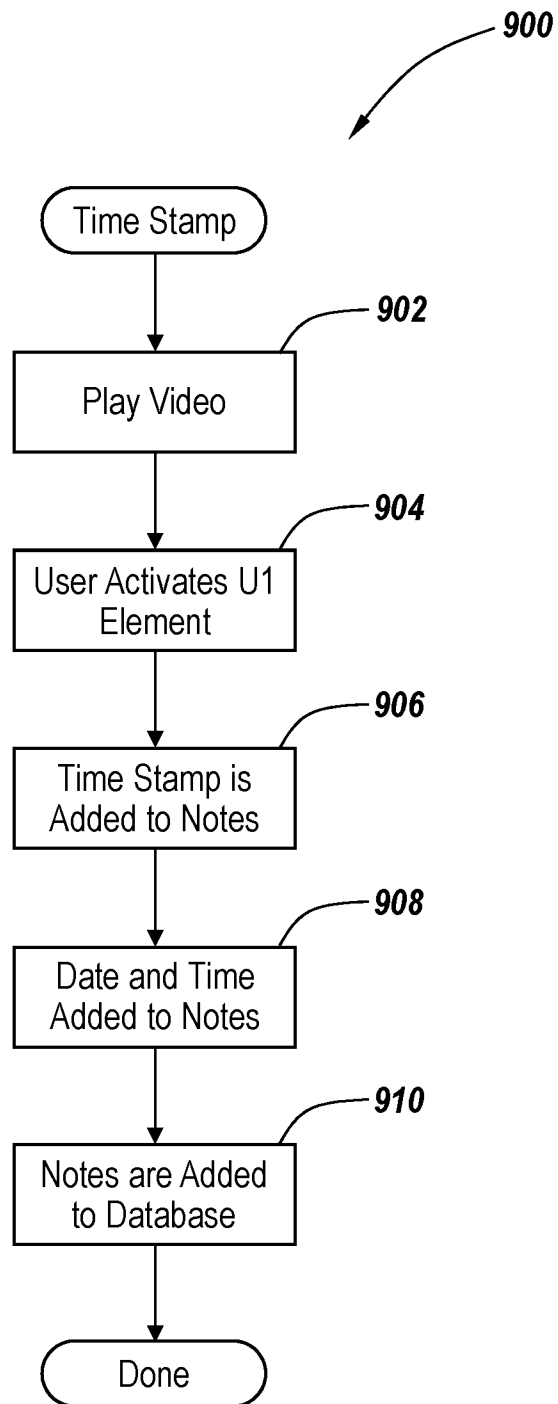


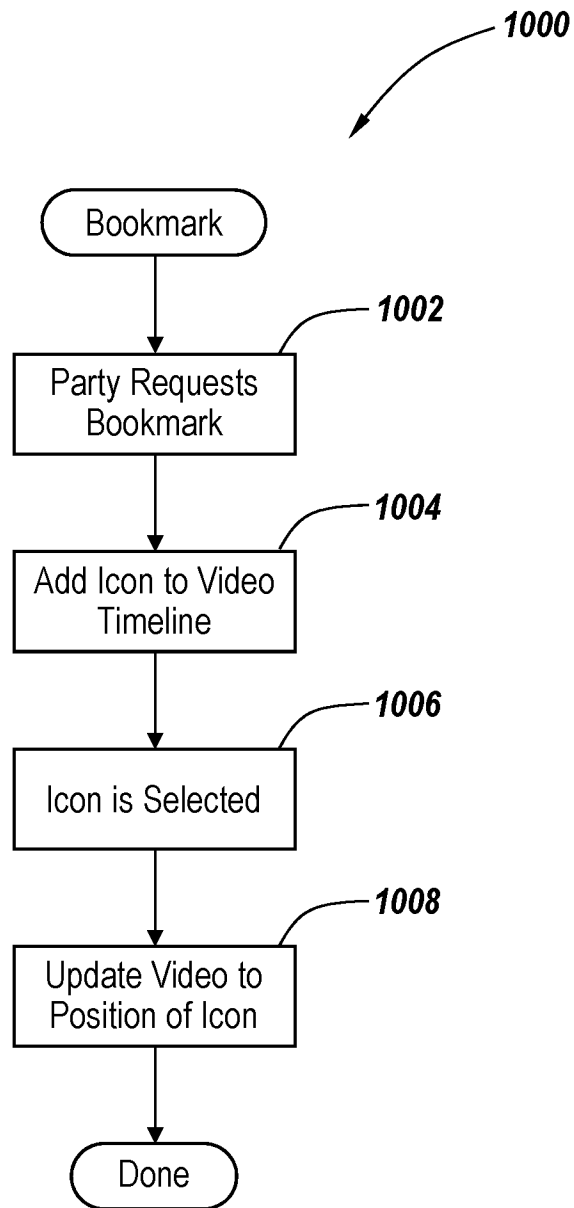
Fig. 8

9/21



**Fig. 9**

10/21



**Fig. 10**

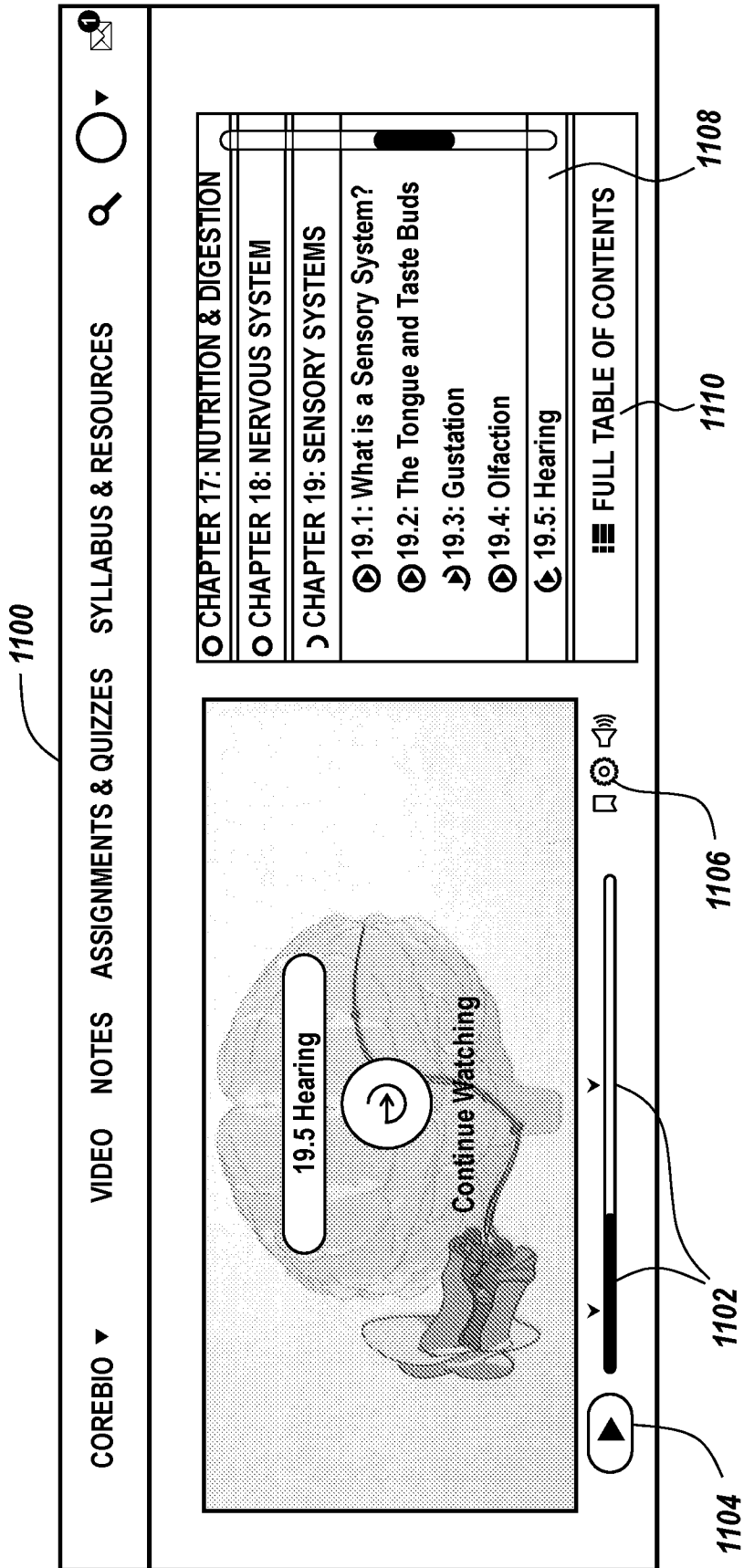


Fig. 11

12/21

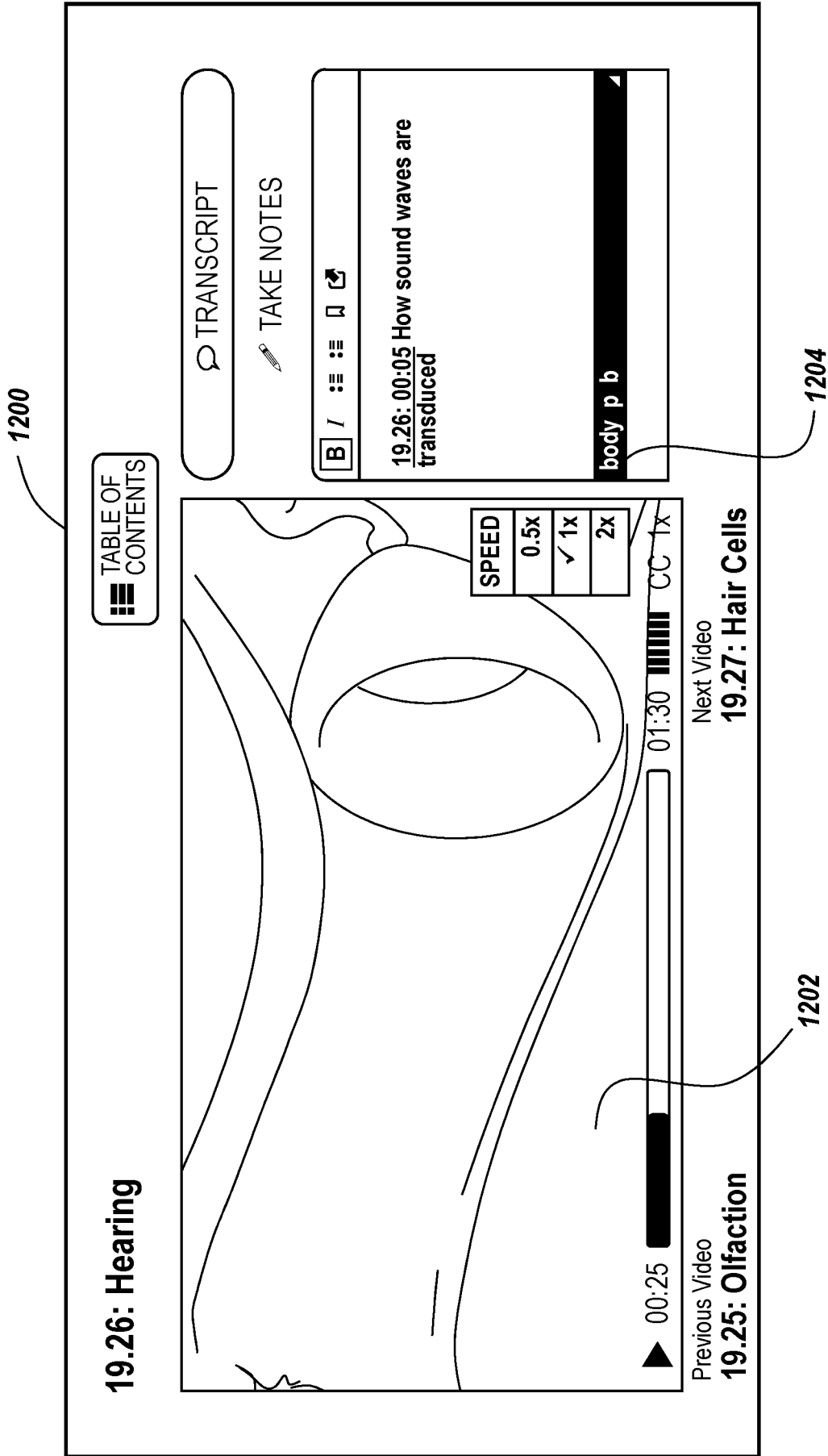
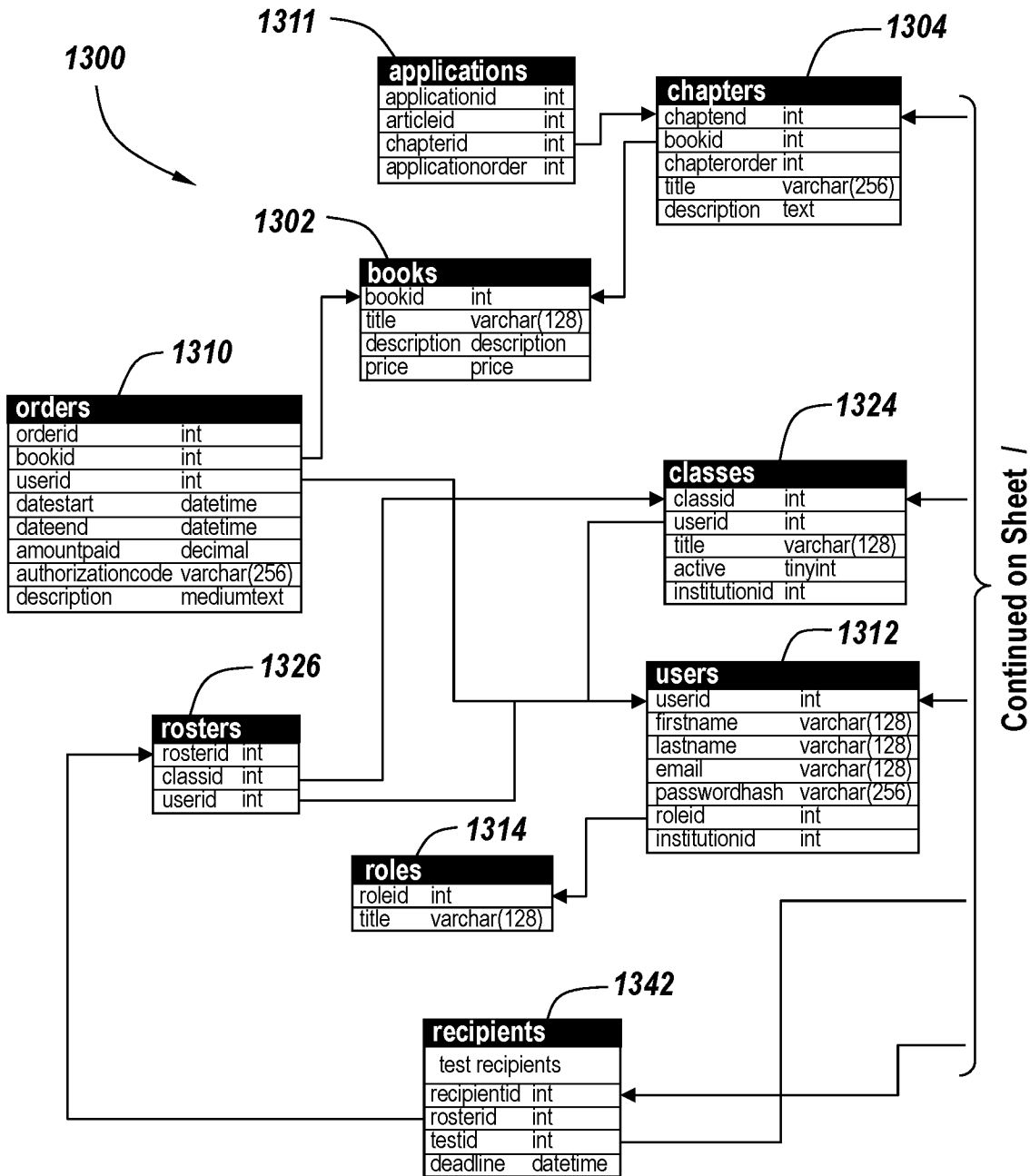


Fig. 12

13/21



```

To get a template is shown but you just change the type and objectid
based on the type of quiz.
SELECT * FROM questionchoices
JOIN questions USING(questionid)
JOIN tests USING(testid)
WHERE type = 'template'
AND objectid = ?
ORDER BY questionorder ASC choiceorder ASC/lessonid
Loop in the results and recipients table to get the results of a quiz
SELECT * FROM questionchoices
JOIN questions USING(questionid)
JOIN tests USING(testid)
LEFT JOIN results USING(choiceid)
LEFT JOIN recipients USING(recipientid)
    
```

**Fig. 13**

14/21

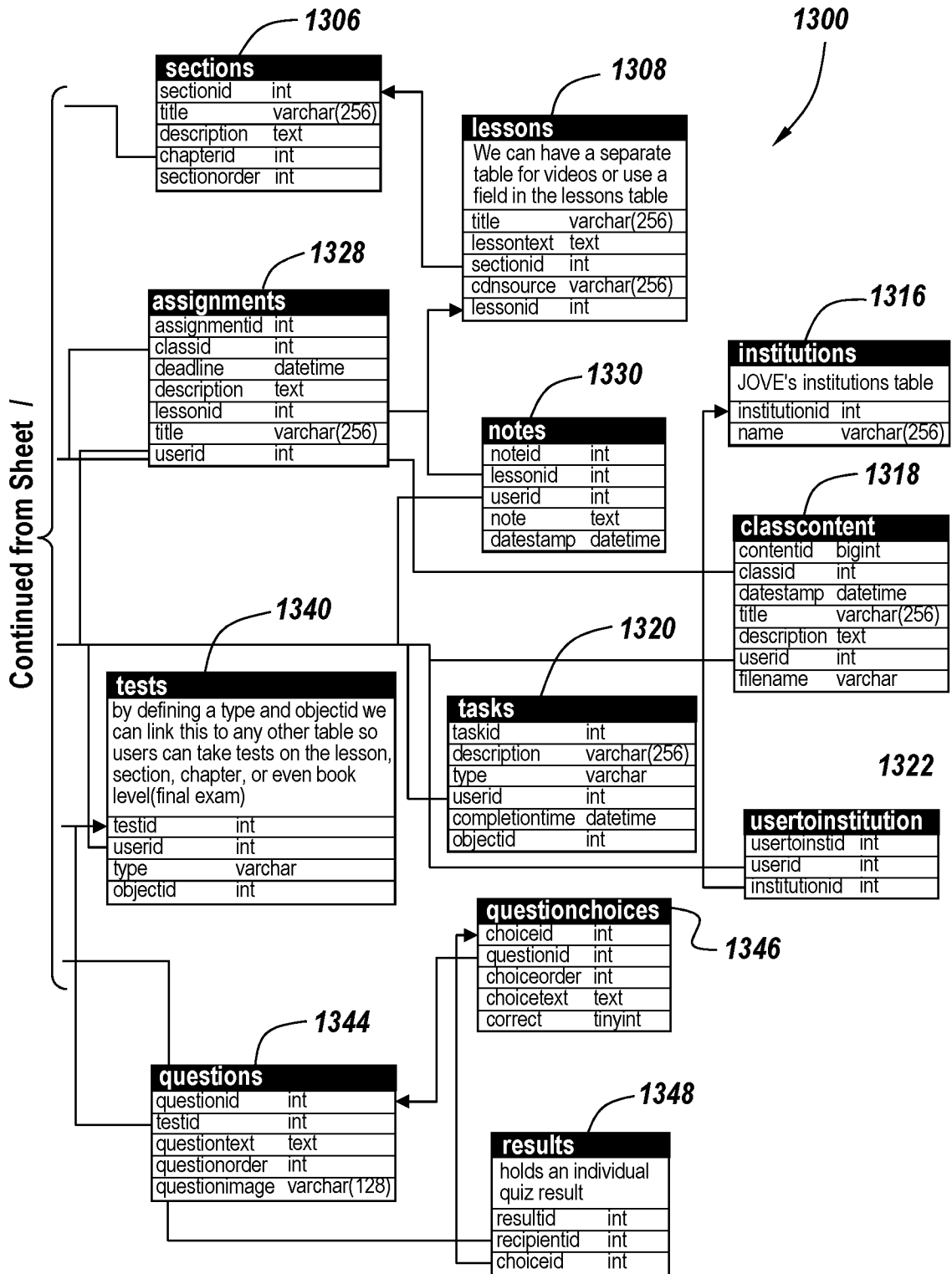
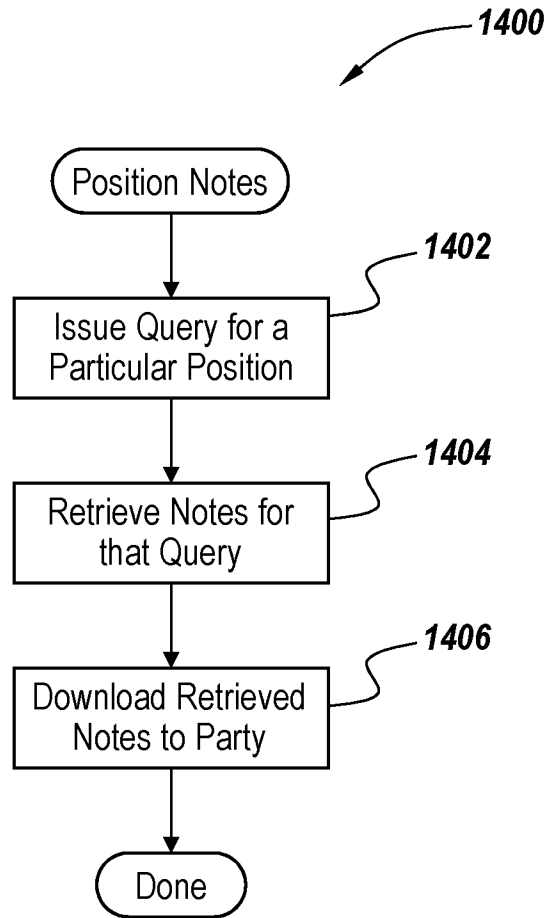


Fig. 13 continued




**Fig. 14**

1500

COREBIO ▾ VIDEO NOTES ASSIGNMENTS & QUIZZES SYLLABUS & RESOURCES

Chapter 1: Scientific Method

Chapter 2: Chemistry of Life

Chapter 3: Macromolecules  1502

Chapter 4: Cell Structure and Function

Chapter 5: Membranes and Cell Transport

Chapter 6: Metabolism

Chapter 7: Cellular Respiration

Chapter 8: Photosynthesis

Chapter 9: Cell Cycle and Division

Chapter 10: Mitosis

Chapter 11: Mendelian Genetics

Chapter 12: DNA Structure and Function

Chapter 13: Transcription and Translation

1504

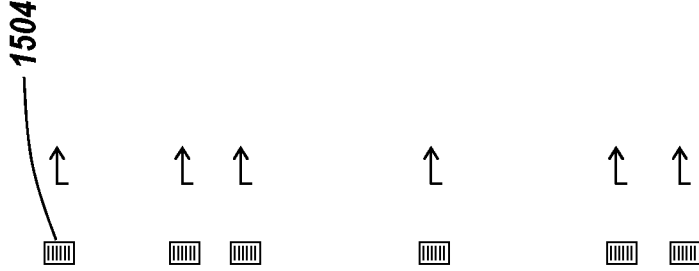



Fig. 15

1600














COREBIO ▾	VIDEO	NOTES	ASSIGNMENTS & QUIZZES	SYLLABUS & RESOURCES
<b>1602</b>	<b>Class Materials</b>			
		BIO 101 Syllabus	Doc	January 12
		Required Texts and Materials	Doc	January 12
<b>1604</b>	<b>Lecture Notes</b>			
		January 23 Class Slides	Slides	January 23
		January 21 Class Slides	Slides	January 21
		January 19 Class Slides	Slides	January 19
		January 17 Class Slides	Slides	January 18
<b>1606</b>	<b>Additional Resources</b>			
		Genetics Light Board	Video	January 14
		Biology Lingo for Those in the Know	Doc	January 14
		Cloning: What could go wrong?	Link	January 14
		Theoretical Photosynthesis	Video	January 14
		Polymerase Chain Reaction and You	Link	January 14

Fig. 16

1700

COREBIO ▾ VIDEO NOTES ASSIGNMENTS & QUIZZES SYLLABUS & RESOURCES 🔍

1702 Upcoming Quizzes and Assignments 1710

1706  Quiz 4 Due Jan. 23, 2018 at 11:59 EST 1714	TAKE THE QUIZ
1712  Assignment 5 posted Due Jan. 23, 2018 at 11:59 EST	<a href="#">VIEW ASSIGNMENT</a> 1716

1704 Past Quizzes





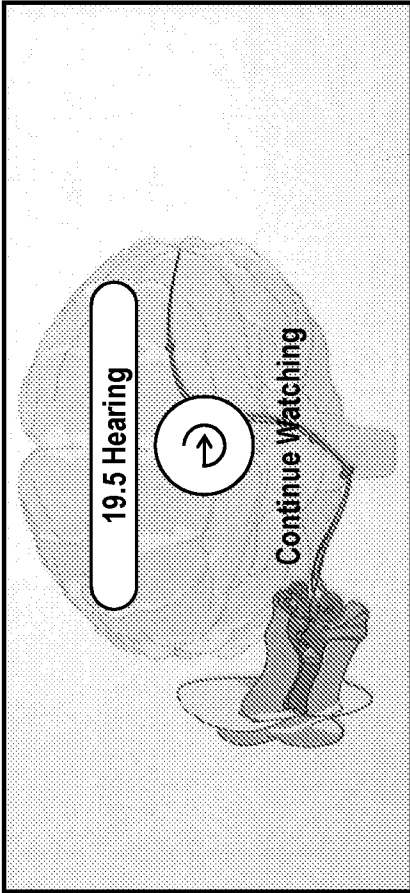
1718  Quiz 1	30/30
 Quiz 2	15/30
 Quiz 3	20/30
 Quiz 4	15/30

Fig. 17

1800

COREBIO ▾ VIDEO NOTES ASSIGNMENTS & QUIZZES SYLLABUS & RESOURCES 🔍 ○ ▾



- CHAPTER 17: NUTRITION & DIGESTION
- CHAPTER 18: NERVOUS SYSTEM
- ▷ CHAPTER 19: SENSORY SYSTEMS
  - ▶ 19.1: What is a Sensory System?
  - ▶ 19.2: The Tongue and Taste Buds
  - ▶ 19.3: Gustation
  - ▶ 19.4: Olfaction
  - ▶ 19.5: Hearing
- ☰ FULL TABLE OF CONTENTS

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**Newly Assigned** SEE ALL 1804

**1806** **Quiz 4**  
Due Jan. 23, 2018 at 11:59 EST

**1808** **Assignment 5 posted**  
Due Jan. 23, 2018 at 11:59 EST

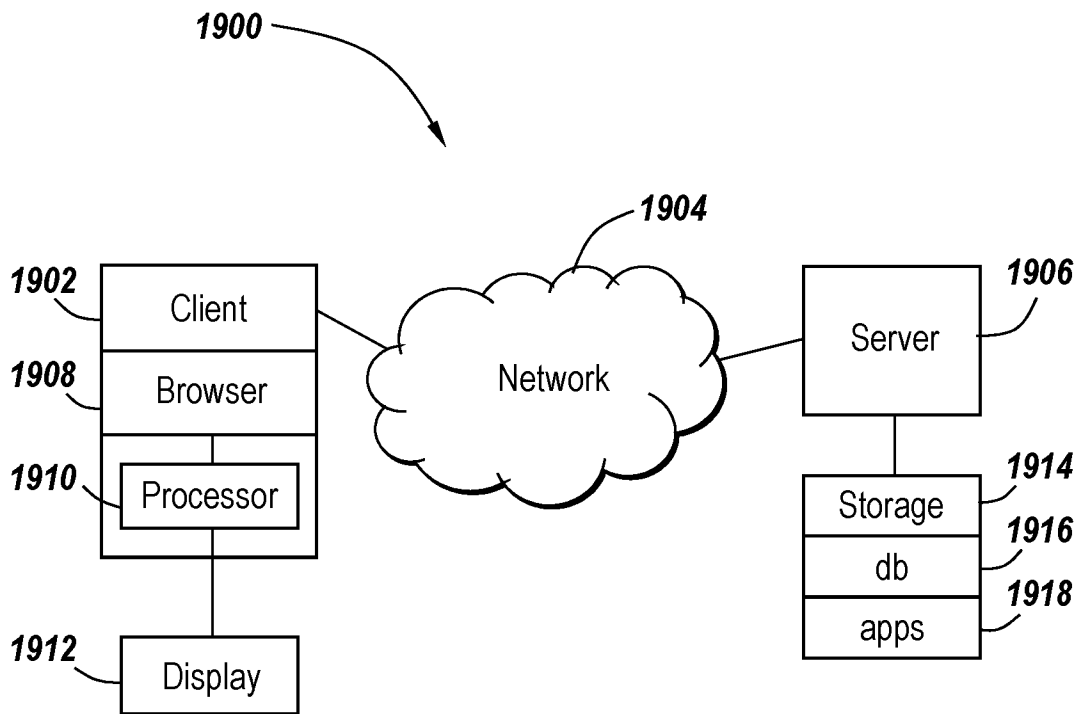
**Announcements** SEE ALL 1810

JAN 20, 2018  
**Tuesday class cancelled due to snow**  
Dr. Nandu

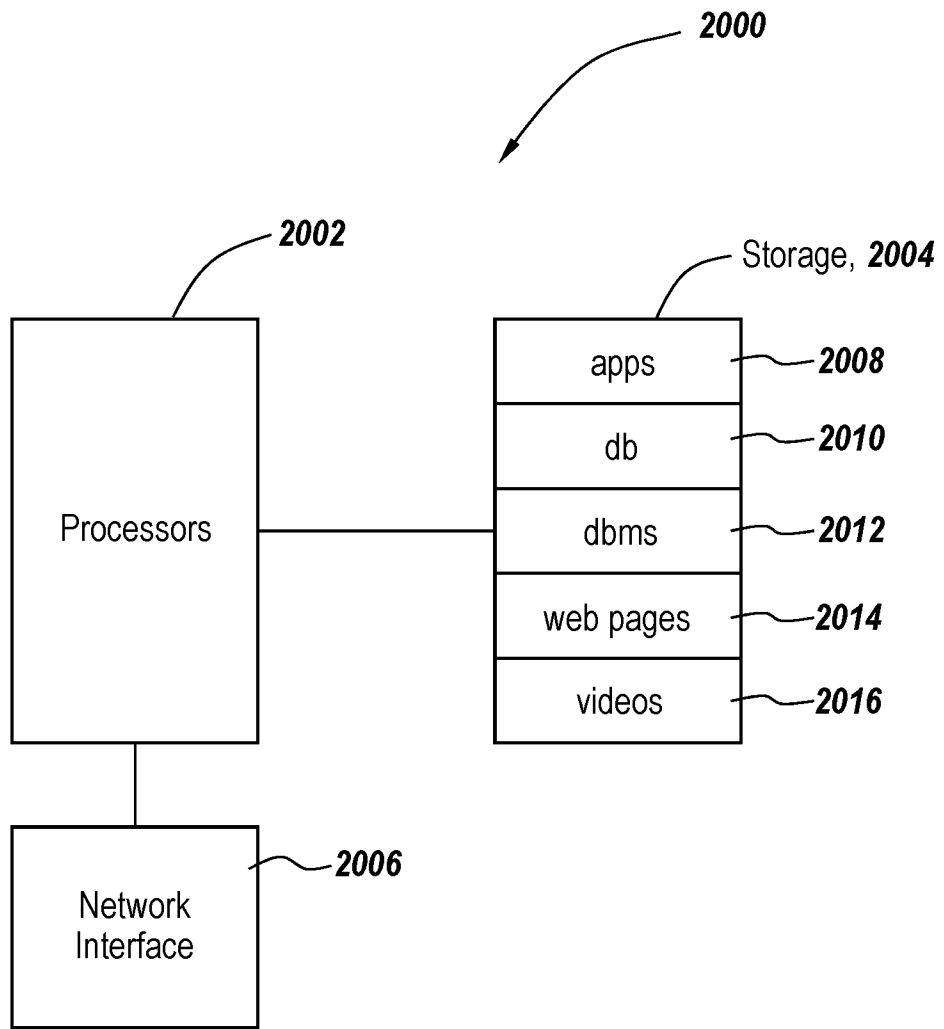
JAN 20, 2018  
**Maintenance this weekend**  
Product Team

☰ 🔍 0 Comments

Fig. 18



**Fig. 19**



**Fig. 20**

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2019/047426

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC: H04N 21/472, 21/8547; G09B 5/06; G06F 3/0483, 17/24 CPC: G11B 27/105, 27/034, 27/329; H04N 5/85, 9/8042		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols)		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2017/0053543 A1 (AGRAWAL ET AL.) 23 February 2017 (23.02.2017), entire document.	1-30
Y	US 2012/0216101 A1 (YONEMOTO) 23 August 2012 (23.08.2012), entire document.	1-30
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>		
Date of the actual completion of the international search <b>14 November 2019 (14.11.2019)</b>		Date of mailing of the international search report <b>18 NOV 2019</b>
Name and mailing address of the ISA/US <b>COMMISSIONER FOR PATENTS MAIL STOP PCT, ATTN: ISA/US P.O. BOX 1450 ALEXANDRIA, VA 22313-1450, UNITED STATES OF AMERICA</b>		Authorized officer <b>HARRY KIM</b>
Facsimile No. (571)273-8300		Telephone No. 571-272-4300