

SYSTEM INTEGRATED WITH AN ELECTRONIC DISPLAY UNIT AND METHOD FOR ADAPTIVE REPRESENTATION OF CONTENT

TECHNICAL FIELD

[0001]The present disclosure generally relates to the field of electronic display systems. More particularly, the present disclosure relates to a system integrated with a transparent electronic display unit for adaptive representation of multimedia content.

BACKGROUND

[0002]Transparent display panel allows the user to simultaneously see the digital images displayed over the glass panel and also see the real objects behind the glass panel. These are mostly used in the areas of augmented reality and product promotions at retail point of sale or other relevant locations. The major limitations associated with the conventional transparent displays are multiplicative color, shape and text interference. The colors used for displaying digital images are not produced faithfully to match the colors inclusive in the real objects behind the glass panel to provide a clear vision for the user. Thus the multiplication of colors represented by the real objects and the digital images can overlap and provide a hamper perception of shapes in visualizing both the digital images and the real objects. Also further the legibility of text displayed digitally and included over the real objects can overlap and provide a difficulty to user in reading the text.

[0003]However, user's vision needs to be protected from the predefined colors and illumination selected by the user to display the digital images. The brightness of the display is a combination of how much external light gets through the display and how much light is being used to display images. Thus, if too much external light shines through the display or if too much light is used to display images, the user may experience damage of vision or discomfort in visualizing the images clearly. Thus, the user's vision needs to be protected while still allowing the user to properly see the digital images and real objects properly.

[0004]Typically, the present available applications developed workarounds by carefully selecting the colors of the digital images and/or real objects and/or both and/or arranging the real objects and digital images in such a way that they do not overlap and/or by providing mechanism to manually set the transparency levels based on the backlight illumination levels. Thus the predefined set of backlight illumination levels can be selected by user through mechanical or electronic device which will set the transparency levels. But the users have to manually tweak these settings as per the digital images and the real objects visualized behind the digital images. The main problem

associated with these conventional applications is selecting the illumination levels for displaying multiple contents over multiple screens and manually adjusting the multiple parameters of the multiple contents and also further the method of manually selecting the predefined set of backlight illumination levels can be subjected to human judgment errors in visualizing the real objects and digital images.

[0005]In the light of aforementioned discussion there exists a need for a system integrated with an electronic display unit for adaptive presentation of content.

BRIEF SUMMARY

[0006]The following presents a simplified summary of the disclosure in order to provide a basic understanding to the reader. This summary is not an extensive overview of the disclosure and it does not identify key/critical elements of the disclosure or delineate the scope of the disclosure. Its sole purpose is to present some concepts disclosed herein in a simplified form as a prelude to the more detailed description that is presented later.

[0007]A more complete appreciation of the present disclosure and the scope thereof can be obtained from the accompanying drawings which are briefly summarized below and the following detailed description of the presently preferred embodiments.

[0008]An exemplary objective of the present disclosure is to display multiple multimedia contents over multiple electronic display units.

[0009]Another exemplary objective of the present disclosure is to provide an adaptive representation of the multimedia content over the electronic display unit based on the ambient data.

[0010]Further another exemplary objective of the present disclosure is to provide an enhanced attributes associated with the multimedia content for adaptive representation of the multimedia content over the electronic display unit.

[0011]Still another exemplary objective of the present disclosure is to adaptively set the transparency levels of the electronic display unit based on the multimedia content to be displayed and the data collected from ambience.

[0012] Exemplary embodiments of the present disclosure are directed towards to a system integrated with an electronic display unit for adaptive representation of content. According to a first aspect, the system includes a content management and serving unit to store and serve multimedia content displayed over one or more electronic display units and regularly modifies the stored multimedia content for enhancing one or more attributes associated with the stored multimedia content.

[0013] According to the first aspect, the system includes a content analyzing unit to analyze the multimedia content served by the content management and serving unit for providing a metadata corresponding to the multimedia content and data related to one or more physical objects positioned behind the one or more electronic display units.

[0014] According to the first aspect, the system includes one or more sensors externally positioned around the one or more electronic display units to detect and collect ambient data and store the collected ambient data in an ambient data repository unit.

[0015] According to the first aspect, the system includes an adaptive representation decision engine in communication with the content analyzing unit and the ambient data repository unit for analyzing the metadata corresponding to the multimedia content and the stored ambient data for providing one or more protocol to the one or more electronic display units. The one or more protocol enables an enhancement of one or more attributes associated with the multimedia content for adaptive representation of the multimedia content over the one or more electronic display units.

[0016] According to the first aspect, the system includes an external image capturing unit configured to capture adaptively represented multimedia content displayed over the one or more electronic display units and transmits the captured adaptively represented multimedia content to the content analyzing unit and the adaptive representation decision engine.

[0017] According to the first aspect, the system includes learning and training engine in communication with the external image capturing unit configured to receive the adaptively represented multimedia content and compare the adaptively represented multimedia content with the multimedia content stored in the content management and serving unit for enhancing the one or more attributes associated with the multimedia content. The one or more enhanced attributes associated with the multimedia content are transmitted to the adaptive representation decision engine for adaptive representation of multimedia content over the one or more electronic display units.

[0018]According to the first aspect, the system includes a content adapter in communication with the adaptive representation decision engine for adapting the one or more enhanced attributes associated with the multimedia content transmitted by the learning and training engine and adaptively represent the enhanced attributes associated with the multimedia content over the one or more electronic display units.

[0019]According to a second aspect, a system integrated with an electronic display unit for adaptive representation of content is disclosed. According to the second aspect, the system includes a content management and serving unit to store and serve multimedia content to be displayed over one or more electronic display units and regularly modifies the stored multimedia content for enhancing one or more attributes associated with the stored multimedia content.

[0020]According to the second aspect, the system includes a content analyzing unit to analyze the multimedia content served by the content management and serving unit for providing a metadata corresponding to the multimedia content and data related to one or more physical objects positioned behind the one or more electronic display units.

[0021]According to the second aspect, the system includes one or more sensors externally positioned around the one or more electronic display units to detect and collect ambient data and store the collected ambient data in an ambient data repository unit.

[0022]According to the second aspect, the system includes an adaptive representation decision engine in communication with the content analyzing unit and the ambient data repository unit for analyzing the metadata corresponding to the multimedia content and the stored ambient data for providing one or more protocol to the one or more electronic display units. The one or more protocol enable an enhancement of one or more attributes associated with the multimedia content for adaptive representation of the multimedia content over the one or more electronic display units.

[0023]According to the second aspect, the system includes a backlight illumination controlling unit in communication with the adaptive representation decision engine to control transparency parameters by adjusting backlight illumination levels of the one or more electronic display units based on type of the content displayed and the illumination levels detected from the ambience and the ambient data stored in the ambient data repository unit for providing the adaptive representation of the multimedia content over the one or more electronic display units.

[0024]According to the second aspect, the system includes a display setting controlling unit in communication with the adaptive representation decision engine to control audio and visual settings of the one or more electronic display units for adaptive representation of multimedia content.

[0025]According to the second aspect, the system includes a content display engine in communication with the adaptive representation decision engine for adaptively representing the multimedia content at a specified location over the one or more electronic display units based on at least one of the dimensions of the one or more electronic display units and the enhanced attributes of the multimedia content to be displayed over the one or more electronic display units.

[0026]According to a third aspect, a method for adaptive representation of content over an electronic display unit is disclosed. According to the third aspect, the method includes analyzing the multimedia content served by a content management and serving unit in a content analyzing unit to provide a metadata corresponding to the multimedia content and data related to one or more physical objects positioned behind the one or more electronic display units.

[0027]According to the third aspect, the method includes detecting and collecting ambient data by one or more sensors externally positioned around the one or more electronic display units and stores the collected ambient data in an ambient data repository unit.

[0028]According to the third aspect, the method includes analyzing the metadata corresponding to the multimedia content and the stored ambient data by an adaptive representation decision engine in communication with the content analyzing unit and the ambient data repository unit for providing one or more protocols to the one or more electronic display units. The one or more protocols enables an enhancement of one or more attributes associated with the multimedia content for adaptive representation of the multimedia content over the one or more electronic display units.

[0029]According to the third aspect, the method includes capturing adaptively represented multimedia content displayed over the electronic display unit by an external image capturing unit and transmits the captured adaptively represented multimedia content to the content analyzing unit and the adaptive representation decision engine.

[0030]According to the third aspect, the method includes comparing the adaptively represented multimedia content received from the external image capturing unit with the multimedia content

stored in the content management and serving unit for enhancing the one or more attributes associated with the multimedia content. The one or more enhanced attributes associated with the multimedia content transmitted to the adaptive representation decision engine for adaptive representation of multimedia content over the one or more electronic display units.

[0031]According to the third aspect, the method includes adapting the one or more enhanced attributes associated with the multimedia content transmitted by the learning and training engine in a content adapter communicating with the adaptive representation decision engine and adaptively represent the enhanced attributes associated with the multimedia content over the one or more electronic display units.

[0032]According to a fourth aspect, a method for adaptive representation of content over an electronic display unit is disclosed. According to the fourth aspect, the method includes analyzing the multimedia content served by a content management and serving unit in a content analyzing unit to provide a metadata corresponding to the multimedia content and data related to one or more physical objects positioned behind the one or more electronic display units.

[0033]According to the fourth aspect, the method includes detecting and collecting ambient data by one or more sensors externally positioned around the one or more electronic display units and store the collected ambient data in an ambient data repository unit.

[0034]According to the fourth aspect, the method includes analyzing the metadata corresponding to the multimedia content and the stored ambient data by an adaptive representation decision engine in communication with the content analyzing unit and the ambient data repository unit for providing one or more protocols to the one or more electronic display units. The one or more protocols enables an enhancement of one or more attributes associated with the multimedia content for adaptive representation of the multimedia content over the one or more electronic display units.

[0035]According to the fourth aspect, the method includes controlling transparency parameters by adjusting backlight illumination levels of the one or more electronic display units based on type of the content displayed and the illumination levels detected from the ambience and the ambient data stored in the ambient data repository unit by a backlight illumination controlling unit in communication with the adaptive representation decision engine for providing the adaptive representation of the multimedia content over the one or more electronic display units.

[0036]According to the fourth aspect, the method includes controlling audio and visual parameters which may include but not limited to brightness, sound, contrast and the like of the one or more electronic display units by a display setting controlling unit in communication with the adaptive representation decision engine for adaptive representation of multimedia content.

[0037]According to the fourth aspect, the method includes adaptively representing the multimedia content at a specified location over the one or more electronic display units based on at least one of the dimensions of the one or more electronic display units and the enhanced attributes of the multimedia content to be displayed over the one or more electronic display units by a content display engine in communication with the adaptive representation decision engine.

[0038]According to a fifth aspect, a method for providing enhanced adaptive representation over electronic display unit is disclosed. According to the fifth aspect, the method includes capturing adaptively represented multimedia content displayed over one or more electronic display units by an external image capturing unit.

[0039]According to the fifth aspect, the method includes comparing the adaptively represented multimedia content received from the external image capturing unit with the multimedia content stored in a content management and serving unit for enhancing the one or more attributes associated with the multimedia content in conjunction with the content management and serving unit. The one or more enhanced attributes associated with the multimedia content transmitted to the one or more electronic display units for adaptive representation of multimedia content.

[0040]According to the fifth aspect, the method includes analyzing the one or more enhanced attributes associated with the multimedia content transmitted by the learning and training engine in an adaptive representation decision engine for adaptively representing the enhanced attributes associated with the multimedia content over the one or more electronic display units.

[0041]According to the fifth aspect, the method includes adapting the one or more enhanced attributes associated with the multimedia content transmitted by the learning and training engine in content adapter communicating with the adaptive representation decision engine and adaptively represent the enhanced attributes associated with the multimedia content over the one or more electronic display units.

[0042]According to the fifth aspect, the method includes controlling transparency parameters by adjusting backlight illumination levels of the one or more electronic display units based on the type of the content displayed and the illumination levels detected from the ambient by a backlight illumination controlling unit in communication with the adaptive representation decision engine and the one or more electronic display units for providing the adaptive representation of the multimedia content over the one or more electronic display units.

[0043]According to the fifth aspect, the method includes controlling audio and visual parameters of the one or more electronic display units by a display setting controlling unit in communication with the adaptive representation decision engine and the one or more electronic display units for adaptive representation of multimedia content.

[0044]According to the fifth aspect, the method includes adaptively representing the multimedia content at a specified location over the one or more electronic display units based on at least one of the dimensions of the one or more electronic display units and the enhanced attributes of the multimedia content provided by the learning and training engine by a content display engine in communication with the adaptive representation decision engine and the one or more electronic display units.

BRIEF DESCRIPTION OF DRAWINGS

[0045]Other objects and advantages of the present disclosure will become apparent to those skilled in the art upon reading the following detailed description of the preferred embodiments, in conjunction with the accompanying drawings, wherein like reference numerals have been used to designate like elements, and wherein:

[0046]FIG. 1 is a block diagram illustrating a system integrated with an electronic display unit for adaptive representation of multimedia content.

[0047]FIG. 2 is a block diagram illustrating a system integrated with an electronic display unit for initial adaptive representation of multimedia content.

[0048]FIG. 3 is a flow diagram illustrating a method for adaptive representation of multimedia content over an electronic display unit.

[0049]FIG. 4 is a flow diagram illustrating a method for initial adaptive representation of

multimedia content over an electronic display unit.

[0050]FIG. 5 is a flow diagram illustrating a feedback mechanism employed for adaptive representation of multimedia content over the electronic display unit.

[0051]FIG. 6 is a flow diagram illustrating a method of providing an enhanced adaptive representation of multimedia content over the electronic display unit.

DETAIL DESCRIPTION

[0052]It is to be understood that the present disclosure is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the drawings. The present disclosure is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting.

[0053]The use of “including”, “comprising” or “having” and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items. The terms “a” and “an” herein do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced item. Further, the use of terms “first”, “second”, and “third”, and the like, herein do not denote any order, quantity, or importance, but rather are used to distinguish one element from another.

[0054]Figure 1 is a block diagram 100 illustrating a system integrated with an electronic display unit for adaptive representation of multimedia content. According to a non limiting exemplary embodiment of the present disclosure, the electronic display unit 120 may include but not limited to transparent glass, transparent liquid crystal display, transparent light emitting diode glass, transparent screen, display unit used in augmented reality applications and the like used for adaptive representation of multimedia content. For convenience, system 100 is discussing only about the system integrated with the electronic display unit 120. However it should be understood that in practice this system could be integrated with an augmented reality display as similar as the system integrated with an electronic display unit 120. Therefore the present disclosure is not limited to see-through/transparent display, augmented reality display, augmented reality glasses and the like that may be included and/or supported by a system integrated with the electronic display unit for adaptive representation of multimedia content consistent with the disclosed embodiments.

[0055]As shown in Figure 1, the system integrated with an electronic display unit includes a content management and serving unit 102 used to store and serve multimedia content to be displayed over the electronic display unit 120 and also to regularly modify the stored multimedia content for enhancing attributes associated with the stored multimedia content. The multimedia content may include but not limited to text, audio, still images, video, animation or interactivity content forms and the like. For convenience, the system 100 is discussing only about the system integrated with the electronic display unit 120. However it should be understood that in practice there may be number of electronic display units as similar as electronic display unit 120. Therefore the present disclosure is not limited in the number of electronic display units that may be included and/or supported by a system integrated with the electronic display unit for adaptive representation of multimedia content consistent with the disclosed embodiments. Also further, the system 100 is not limited to integrate with only a single electronic display unit 120. The system 100 can also integrated with the multiple electronic display units used in practice for displaying the similar multimedia content over multiple electronic display units.

[0056]Further, the multimedia content stored in the content management and serving unit 102 is related to the physical objects positioned behind the electronic display unit 120 and the data collected from the ambiance for adaptive representation of the multimedia content over the electronic display unit 120. The content management and serving unit 102 in communication with a content analyzing unit 104 serves the stored multimedia content to the content analyzing unit 104 for analyzing and providing the metadata corresponding to the multimedia content to be displayed over the electronic display unit 120 and data related to the physical objects positioned behind the electronic display unit 120. The metadata corresponding to the multimedia content may include but not limited to heavy graphics, graphics with text, colors used, text position, dimensions and the like.

[0057]As shown in Figure 1, the system 100 includes one or more sensors (may also be referred as detectors) 106a, 106b and 106c externally positioned around the electronic display unit 120 to detect and collect ambient data which may include but not limited to lighting levels, temperature, humidity, physical object location and the like. The collected ambient data is stored in an ambient data repository unit 108 in communication with the one or more sensors 106a, 106b and 106c. For convenience, the system 100 is discussing only about the three sensors 106a, 106b and 106c. However it should be understood that in practice there may be any number of sensors as similar as the sensors 106a, 106b and 106c and it could be externally positioned to the electronic display unit 120, which can be included in the system. Therefore the present disclosure is not limited in the

number of sensors that may be included and/or supported by a system integrated with an electronic display unit consistent with the disclosed embodiments.

[0058]Further as shown in Figure 1, the content analyzing unit 104 and the ambient data repository unit 108 communicating with an adaptive representation decision engine 110 transmits the metadata corresponding to the multimedia content and the stored ambient data for analyzing and providing protocols to the electronic display unit 120. The protocols provided by the adaptive representation decision engine enables an enhancement of the attributes associated with the multimedia content for adaptive representation of the multimedia content over the electronic display unit 120. The attributes associated with the multimedia content may include but not limited to text, graphics, colors and the like. The protocols or set of instructions provided by the adaptive representation decision engine 110 are transmitted to the electronic display unit 120 for adaptive representation of multimedia content based on the backlight illumination controlling unit 114, display setting controlling unit 116 and the content display engine 118.

[0059]Also further as shown in Figure 1, the backlight illumination controlling unit 114 in communication with the adaptive representation decision engine 110 and the electronic display unit 120 is used to control transparency parameters by adjusting backlight illumination levels of the electronic display unit 120 based on type of the multimedia content displayed and the illumination levels detected from the ambiance. The type of the multimedia content may include color of the multimedia content, font size, font style and the like. The display setting controlling unit 116 in communication with the adaptive representation decision engine 110 and the electronic display unit 120 is used to control audio and visual parameters which may include but not limited to sound, contrast, brightness, color and the like of the electronic display unit 120 for adaptive representation of multimedia content. Further the content display engine 118 in communication with the adaptive representation decision engine 110 and the electronic display unit 120 is used to provide adaptive representation of the multimedia content at a specified location like at center or top left end or top right end or bottom right end or bottom left end of the electronic display unit 120 based on the dimensions of the electronic display unit 120.

[0060]Moreover as shown in Figure 1, the system 100 is also integrated with an external image capturing unit 122 used to capture adaptively represented multimedia content displayed over the electronic display unit 120 at predetermined periodic time intervals to enhance the adaptively represented multimedia content. The captured adaptively represented multimedia content is transmitted to a learning and training engine 124 to compare the adaptively represented multimedia

content with the multimedia content stored in the content management and serving unit 102 for enhancing the attributes associated with the multimedia content in conjunction with the content management and serving unit 102. The enhanced attributes associated with the multimedia content are transmitted to the content analyzing unit 104 and the adaptive representation decision engine 110 through the learning and training engine 124 for adaptive representation of multimedia content over the electronic display unit 120. Further a content adapter 112 in communication with the adaptive representation decision engine 110 is used to adapt the enhanced attributes associated with the multimedia content transmitted by the learning and training engine 124 and adaptively represent the enhanced attributes associated with the multimedia content over the electronic display unit 120. Thus the enhanced attributes associated with the multimedia content transmitted to the electronic display unit 120 provides an improved visual experience to the users viewing the electronic display unit 120.

[0061]Figure 2 is a block diagram 200 illustrating a system integrated with an electronic display unit for initial adaptive representation of multimedia content. According to a non limiting exemplary embodiment of the present disclosure, the system integrated with an electronic display unit includes a content management and serving unit 202 used to store and serve multimedia content to be displayed over the electronic display unit 220 and to regularly modify the stored multimedia content for enhancing attributes associated with the stored multimedia content. The stored multimedia content is modified based on the feedback provided by a learning and training engine detailed in Figure 1, by comparing the adaptively represented multimedia content displayed over the electronic display unit 220 with the initial multimedia content stored in the content management and serving unit 202. The content management and serving unit 202 in communication with a content analyzing unit 204 serves the stored multimedia content to the content analyzing unit 204 for analyzing and providing the metadata corresponding to the multimedia content to be displayed over the electronic display unit 220 and data related to the physical objects positioned behind the electronic display unit 220.

[0062]As shown in Figure 2, the system 200 includes one or more sensors/detectors 206a, 206b and 206c externally positioned around the electronic display unit 220 to detect and collect ambient data which may include but not limited to lighting levels, temperature, humidity, physical object location and the like. The collected ambient data is stored in an ambient data repository unit 208 in communication with the one or more sensors/detectors 206a, 206b and 206c. For convenience, system 200 is discussing three sensors 206a, 206b and 206c. However it should be understood that in practice there may be any number of sensors as similar as the sensors 206a, 206b and 206c and it

could be externally positioned to the electronic display unit 220, which can be included in the system. Therefore the present disclosure is not limited in the number of sensors that may be included and/or supported by a system integrated with an electronic display unit 220 consistent with the disclosed embodiments.

[0063]Further as shown in Figure 2, the content analyzing unit 204 and the ambient data repository unit 208 communicating with an adaptive representation decision engine 210 transmits the metadata corresponding to the multimedia content and the stored ambient data to analyze and provide protocols or set of instructions to the electronic display unit 220. The protocols provided by the adaptive representation decision engine 210 enables an enhancement of attributes associated with the multimedia content for adaptive representation of the multimedia content over the electronic display unit 220. The attributes associated with the multimedia content may include but not limited to text, graphics, colors and the like. The protocols or set of instructions provided by the adaptive representation decision engine 210 are transmitted to the electronic display unit 220 based on the backlight illumination controlling unit 214, display setting controlling unit 216 and the content display engine 218.

[0064]Moreover as shown in Figure 2, the system 200 integrated with the backlight illumination controlling unit 214 is in communication with the adaptive representation decision engine 210 and the electronic display unit 220 to control transparency parameters by adjusting backlight illumination levels of the electronic display unit 220 based on type of the multimedia content displayed and the illumination levels detected from the ambiance. The display setting controlling unit 216 in communication with the adaptive representation decision engine 210 and the electronic display unit 220 is used to control audio and visual parameters which may include but not limited to sound, contrast, brightness, color and the like of the electronic display unit 220 for adaptive representation of multimedia content. Further the content display engine 218 in communication with the adaptive representation decision engine 210 and the electronic display unit 220 is used to provide adaptive representation of the multimedia content at a specified location like at center or top right end or top left end or bottom right end or bottom left end of the electronic display unit 220 based on the dimensions of the electronic display unit 220.

[0065]Figure 3 is a flow diagram 300 illustrating a method for adaptive representation of multimedia content over an electronic display unit. According to a non limiting exemplary embodiment of the present disclosure, the method for adaptive representation of multimedia content starts at 302 for analyzing the multimedia content served by a content management and serving unit

in a content analyzing unit. Next at 304 the multimedia content analyzed at 302 provides metadata corresponding to the multimedia content to be displayed over the electronic display unit and data related to physical objects positioned behind the electronic display unit.

[0066]As shown in Figure 3, the method at 306 detects and collects ambient data by one or more sensors externally positioned around the electronic display unit and store the collected ambient data in an ambient data repository unit at step 308. Next at 310, the metadata corresponding to the multimedia content and physical objects positioned behind the electronic display unit provided by the content analyzing unit and ambient data stored in the ambient data repository unit are analyzed by an adaptive representation decision engine in communication with the content analyzing unit and the ambient data repository unit for providing protocols or set of instructions to the electronic display unit. Further at step 312, the protocols or set of instructions provided by the adaptive representation decision engine enables an enhancement of attributes associated with the multimedia content for adaptive representation of the multimedia content over the electronic display unit.

[0067]Moreover as shown in Figure 3, at step 314 the adaptively represented multimedia content displayed over the electronic display unit is captured by an external image capturing unit. Next at 316 the adaptively represented multimedia content received from the external image capturing unit is compared with the multimedia content stored in the content management and serving unit by learning and training engine for enhancing the attributes associated with the multimedia content to be displayed over the electronic display unit. At step 318 the enhanced attributes associated with the multimedia content are transmitted to the content analyzing unit and the adaptive representation decision engine through the learning and training engine for adaptive representation of multimedia content over the electronic display unit. Further at 320 the enhanced attributes associated with the multimedia content received by the adaptive representation decision engine are adapted by a content adaptor for displaying adaptive representation of enhanced attributes associated with the multimedia content over the electronic display unit.

[0068]Figure 4 is a flow diagram 400 illustrating a method for initial adaptive representation of multimedia content over an electronic display unit. According to a non limiting exemplary embodiment of the present disclosure, the method for initial adaptive representation of multimedia content starts at 402 for analyzing the multimedia content served by a content management and serving unit in a content analyzing unit. Next at 404 the multimedia content analyzed at 402 provides metadata corresponding to the multimedia content to be displayed over the electronic display unit and data related to physical objects positioned behind the electronic display unit.

[0069]As shown in Figure 4, the method at 406 detects and collects ambient data by one or more sensors externally positioned around the electronic display unit and store the collected ambient data in an ambient data repository unit at step 408. Next at 410, the metadata corresponding to the multimedia content and physical objects positioned behind the electronic display unit provided by the content analyzing unit and the ambient data stored in the ambient data repository unit are analyzed by an adaptive representation decision engine for providing protocols or set of instructions to the electronic display unit. Further at step 412, the protocols or set of instructions provided by the adaptive representation decision engine enables an enhancement of attributes associated with the multimedia content for adaptive representation of the multimedia content over the electronic display unit.

[0070]Further as shown in Figure 4, the protocols or set of instructions provided by the adaptive representation decision engine are transmitted to electronic display unit to control transparency parameters by adjusting backlight illumination levels of the electronic display unit at step 414 by a backlight illumination controlling unit based on type of the multimedia content displayed and the illumination levels detected from ambience and the ambient data stored in the ambient data repository unit for providing adaptive representation of multimedia content over the electronic display unit. Next at step 416 the audio and visual parameters of the electronic display unit are controlled by a display setting controlling unit in communication with the adaptive representation decision engine and the electronic display unit for adaptive representation of multimedia content. Further at step 418, the adaptively represented multimedia content is displayed over the electronic display unit at a specified location based on the dimensions of the electronic display unit.

[0071]Figure 5 is a flow diagram 500 illustrating feedback mechanism of the adaptively represented multimedia content over the electronic display unit. According to a non limiting exemplary embodiment of the present disclosure, the feedback mechanism starts at step 502 by capturing adaptively represented multimedia content displayed over the electronic display unit by an external image capturing unit. Next at 504, the adaptively represented multimedia content received from the external image capturing unit and the multimedia content stored in a content management and serving unit are compared by a learning and training engine for enhancing the attributes associated with the multimedia content .

[0072]As shown in Figure 5 at step 506, the enhanced attributes associated with the multimedia content received from the learning and training engine are analyzed by an adaptive representation

decision engine for adaptively representing the enhanced attributes associated with the multimedia content over the electronic display unit. Next at 508, the enhanced attributes associated with the multimedia content received by the adaptive representation decision engine are adapted by a content adapter in communication with the adaptive representation decision engine for adaptive representation of enhanced attributes associated with the multimedia content over the electronic display unit.

[0073]Further as shown in Figure 5, at step 510 the transparency parameters are controlled by adjusting backlight illumination levels of the electronic display unit based on type of the multimedia content displayed and the illumination levels detected from the ambient by a backlight illumination controlling unit in communication with the adaptive representation decision engine for providing the adaptive representation of the multimedia content over the electronic display unit. Next at step 512, the audio and visual parameters of the electronic display unit are controlled by a display setting controlling unit in communication with the adaptive representation decision engine for adaptive representation of multimedia content over the electronic display unit. Further at step 514, the adaptively represented multimedia content is displayed over the electronic display unit at a specified location based on the dimensions of the electronic display unit and the enhanced attributes associated with the multimedia content provided by the learning and training engine by a content display engine in communication with the adaptive representation decision engine.

[0074]Figure 6 is a flow diagram 600 illustrating a method of providing an enhanced adaptive representation of multimedia content over the electronic display unit. According to a non limiting exemplary embodiment of the present disclosure, the method starts at 602 by capturing an adaptively represented multimedia content displayed over the electronic display unit and the physical objects positioned behind the electronic display unit through an external image capturing unit in a predetermined periodic time intervals. Next at 604 the captured multimedia content or the physical objects positioned behind the electronic display unit are transmitted to a learning and training engine to compare the captured data with the multimedia content stored in the content management and serving unit for providing an enhancement in the attributes associated with the multimedia content in conjunction with the content management and serving unit to improve the visual experience of the user viewing the electronic display unit.

[0075]As shown in Figure 6, at step 606 the adaptively represented multimedia content is displayed over the electronic display unit or not is verified. If the adaptively represented multimedia content is found to be displayed over the electronic display unit, the method continues with 608 by

transmitting the enhanced attributes associated with multimedia content provided at step 604 to the adaptive representation decision engine for analyzing the received enhanced attributes associated with multimedia content and to provide protocols or set of instructions to the electronic display unit. Next at step 610, the content adapter is used to adapt the enhanced attributes associated with the multimedia content received from the step 608 by the adaptive representation decision engine and display the enhanced attributes associated with the adaptively represented multimedia content over the electronic display unit.

[0076]Further as shown in Figure 6, if the adaptively represented multimedia content is not displayed over the electronic display unit at step 606, the method continues with 612 by transmitting the image of the physical objects positioned behind the electronic display unit captured by the external image capturing unit at step 602 and compared at step 604 to the content analyzer for analyzing the shape, color, text, placement of the physical objects and the like positioned behind the electronic display unit based on the data related to the physical objects stored in the content management and serving unit. The data analyzed by the content analyzing unit at step 612 provides the data related to the physical objects positioned behind the electronic display unit to be displayed over the electronic display unit at step 614. Further at step 616 the data related to the physical objects provided by the content analyzing unit at step 614 are transmitted to an adaptive representation decision engine for analyzing and providing an enhanced attributes associated with the adaptive representation of the data to be displayed over the electronic display unit.

[0077]While specific embodiments of the invention have been shown and described in detail to illustrate the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

CLAIMS:

What is claimed is

1. A system integrated with an electronic display unit for adaptive representation of content, the system comprising:

a content management and serving unit to store and serve multimedia content to be displayed over one or more electronic display units and to regularly modify the stored multimedia content for enhancing one or more attributes associated with the stored multimedia content;

a content analyzing unit for analyzing the multimedia content served by the content management and serving unit for providing a metadata corresponding to the multimedia content; and data related to one or more physical objects positioned behind the one or more electronic display units;

one or more sensors externally positioned around the one or more electronic display units to detect and collect ambient data and store the collected ambient data in an ambient data repository unit;

an adaptive representation decision engine in communication with the content analyzing unit and the ambient data repository unit for analyzing the metadata corresponding to the multimedia content and the stored ambient data for providing one or more protocol to the one or more electronic display units, whereby the one or more protocols enables an enhancement of one or more attributes associated with the multimedia content for adaptive representation of the multimedia content over the one or more electronic display units;

an external image capturing unit configured to capture adaptively represented multimedia content displayed over the one or more electronic display units, whereby the captured adaptively represented multimedia content transmitted to the content analyzing unit; and the adaptive representation decision engine;

learning and training engine in communication with the external image capturing unit configured to receive the adaptively represented multimedia content and

compare the adaptively represented multimedia content with the multimedia content stored in the content management and serving unit for enhancing the one or more attributes associated with the multimedia content in conjunction with the content management and serving unit, whereby one or more enhanced attributes associated with the multimedia content transmitted to the content analyzing unit; and the adaptive representation decision engine through the learning and training engine for adaptive representation of multimedia content over the one or more electronic display units; and

a content adaptor in communication with the adaptive representation decision engine for adapting the one or more enhanced attributes associated with the multimedia content transmitted by the learning and training engine; and adaptively represents the enhanced attributes associated with the multimedia content over the one or more electronic display units.

2. The system of claim 1, further comprising a backlight illumination controlling unit configured to control transparency parameters by adjusting backlight illumination levels of the one or more electronic display units based on type of the content displayed; and the illumination levels detected from the ambiance.
3. The system of claim 1, further comprising a display setting controlling unit configured to control audio and visual parameters of the one or more electronic display units for adaptive representation of multimedia content.
4. The system of claim 1, further comprising a content display engine configured to provide adaptive representation of the multimedia content at a specified location over the one or more electronic display units based on at least one of the dimensions of the one or more electronic display units; and the enhanced attributes of the multimedia content provided by the learning and training engine.
5. The system of claim 1, wherein the learning and training engine configured to determine one or more attributes of adaptively represented multimedia content based on the interference of transparency parameters experienced by the adaptively represented multimedia content.
6. The system of claim 1, wherein the one or more electronic display units employs an augmented reality display for providing adaptive representation of content based on

ambiance.

7. A system integrated with an electronic display unit for adaptive representation of content, the system comprising:

a content management and serving unit to store and serve multimedia content to be displayed over one or more electronic display units and to regularly modify the stored multimedia content for enhancing one or more attributes associated with the stored multimedia content;

a content analyzing unit for analyzing the multimedia content served by the content management and serving unit for providing a metadata corresponding to the multimedia content; and data related to one or more physical objects positioned behind the one or more electronic display units;

one or more sensors externally positioned around the one or more electronic display units to detect and collect ambient data and store the collected ambient data in an ambient data repository unit;

an adaptive representation decision engine in communication with the content analyzing unit and the ambient data repository unit for analyzing the metadata corresponding to the multimedia content and the stored ambient data for providing one or more protocols to the one or more electronic display units, whereby the one or more protocols enable an enhancement of one or more attributes associated with the multimedia content for adaptive representation of the multimedia content over the one or more electronic display units;

a backlight illumination controlling unit in communication with the adaptive representation decision engine to control transparency parameters by adjusting backlight illumination levels of the one or more electronic display units based on type of the content displayed; and the illumination levels detected from the ambiance; and the ambient data stored in the ambient data repository unit for providing the adaptive representation of the multimedia content over the one or more electronic display units;

a display setting controlling unit in communication with the adaptive representation decision engine to control audio and visual parameters of the one or more electronic display units for adaptive representation of multimedia content; and

a content display engine in communication with the adaptive representation decision engine for adaptively representing the multimedia content at a specified location over the one or more electronic display units based on at least one of the dimensions of the one or more electronic display units; and the enhanced attributes of the multimedia content to be displayed over the one or more electronic display units.

8. The system of claim 7, further comprising an external image capturing unit configured to capture adaptively represented multimedia content displayed over the one or more electronic display units.
9. The system of claim 7, further comprising a learning and training engine in communication with the external image capturing unit to receive the adaptively represented multimedia content and compare the adaptively represented multimedia content with the multimedia content stored in the content management and serving unit for enhancing the one or more attributes associated with the multimedia content in conjunction with the content management and serving unit.
10. The system of claim 7, further comprising a content adaptor in communication with the adaptive representation decision engine for adapting the one or more enhanced attributes associated with the multimedia content transmitted by the learning and training engine and to further adaptively represent the enhanced attributes associated with the multimedia content over the one or more electronic display units.
11. A method for adaptive representation of content over an electronic display unit, the method comprising:

analyzing the multimedia content served by a content management and serving unit in a content analyzing unit to provide a metadata corresponding to the multimedia content; and data related to one or more physical objects positioned behind one or more electronic display units;

detecting and collecting ambient data by one or more sensors externally positioned

around the one or more electronic display units; and store the collected ambient data in an ambient data repository unit;

analyzing the metadata corresponding to the multimedia content and the stored ambient data by an adaptive representation decision engine in communication with the content analyzing unit and the ambient data repository unit for providing one or more protocol to the one or more electronic display units, whereby the one or more protocols enables an enhancement of one or more attributes associated with the multimedia content for adaptive representation of the multimedia content over the one or more electronic display units;

capturing adaptively represented multimedia content displayed over the one or more electronic display units by an external image capturing unit, whereby the captured adaptively represented multimedia content transmitted to the content analyzing unit; and the adaptive representation decision engine;

comparing the adaptively represented multimedia content received from the external image capturing unit with the multimedia content stored in the content management and serving unit for enhancing the one or more attributes associated with the multimedia content in conjunction with the content management and serving unit, whereby one or more enhanced attributes associated with the multimedia content transmitted to the content analyzing unit; and the adaptive representation decision engine through the learning and training engine for adaptive representation of multimedia content over the one or more electronic display units; and

adapting the one or more enhanced attributes associated with the multimedia content transmitted by the learning and training engine in a content adaptor communicating with the adaptive representation decision engine; and adaptively represents the enhanced attributes associated with the multimedia content over the one or more electronic display units.

12. A method for adaptive representation of content over an electronic display unit, the method comprising:

analyzing the multimedia content served by a content management and serving unit

in a content analyzing unit to provide a metadata corresponding to the multimedia content; and data related to one or more physical objects positioned behind one or more electronic display units;

detecting and collecting ambient data by one or more sensors externally positioned around the one or more electronic display unit; and store the collected ambient data in an ambient data repository unit;

analyzing the metadata corresponding to the multimedia content and the stored ambient data by an adaptive representation decision engine in communication with the content analyzing unit and the ambient data repository unit for providing one or more protocol to the one or more electronic display units, whereby the one or more protocols enables an enhancement of one or more attributes associated with the multimedia content for adaptive representation of the multimedia content over the one or more electronic display units;

controlling transparency parameters by adjusting backlight illumination levels of the electronic display unit based on type of the content displayed; the illumination levels detected from the ambience; and the ambient data stored in the ambient data repository unit by a backlight illumination controlling unit in communication with the adaptive representation decision engine for providing the adaptive representation of the multimedia content over the one or more electronic display units;

controlling audio and visual parameters of the one or more electronic display units by a display setting controlling unit in communication with the adaptive representation decision engine for adaptive representation of multimedia content; and

adaptively representing the multimedia content at a specified location over the one or more electronic display units based on at least one of the dimensions of the one or more electronic display units; and the enhanced attributes of the multimedia content to be displayed over the one or more electronic display units by a content display engine in communication with the adaptive representation decision engine.

13. A method for providing enhanced adaptive representation over electronic display unit, the

method comprising:

capturing adaptively represented multimedia content displayed over one or more electronic display unit by an external image capturing unit;

comparing the adaptively represented multimedia content received from the external image capturing unit with the multimedia content stored in a content management and serving unit for enhancing the one or more attributes associated with the multimedia content in conjunction with the content management and serving unit, whereby one or more enhanced attributes associated with the multimedia content transmitted to the one or more electronic display units for adaptively representation multimedia content;

analyzing the one or more enhanced attributes associated with the multimedia content transmitted by the learning and training engine in an adaptive representation decision engine for adaptively representing the enhanced attributes associated with the multimedia content over the one or more electronic display units;

adapting the one or more enhanced attributes associated with the multimedia content transmitted by the learning and training engine in a content adaptor communicating with the adaptive representation decision engine; and adaptively represent the enhanced attributes associated with the multimedia content over the one or more electronic display units;

controlling transparency parameters by adjusting backlight illumination levels of the one or more electronic display units based on type of the content displayed; and the illumination levels detected from the ambient by a backlight illumination controlling unit in communication with the adaptive representation decision engine and the one or more electronic display units for providing the adaptive representation of the multimedia content over the one or more electronic display units;

controlling audio and visual parameters of the one or more electronic display units by a display setting controlling unit in communication with the adaptive representation decision engine and the one or more electronic display units for adaptive representation of multimedia content; and

adaptively representing the multimedia content at a specified location over the one or more electronic display units based on at least one of the dimensions of the one or more electronic display units; and the enhanced attributes of the multimedia content provided by the learning and training engine by a content display engine in communication with the adaptive representation decision engine and the one or more electronic display units.