

**COMPREHENSIVE PREDICTIVE SYSTEM USING FUSION BASED APPROACH FOR
PROFILING BEHAVIOUR OF USERS FOR TARGETED PUBLISHING OF
ADVERTISEMENT/PROMOTIONAL CONTENT ON A DISPLAY UNIT IN REAL TIME**

TECHNICAL FIELD

1. The present disclosure relates to the field of targeting advertisements or promotional messaging to a particular user. More particularly, the present disclosure relates to a comprehensive predictive system using fusion based approach for profiling behaviour of users for targeted publishing of advertisement/promotional content on a display unit in real time.

BACKGROUND

2. In general, digital signage has been expected to play an important role in advertising, navigation, entertainment in public and private environments, such as that at retail stores, hotels, restaurants and corporate buildings amongst other locations. The digital signage systems are a form of electronic displays (LCD, LED, Plasma etc) that shows television programming, menus, information, advertising and other messages. The digital signage displays uses a simple media loop in which a number of still images or dynamic media segments would be displayed in series, each for a period of time and the cycle would be continuously repeated throughout the day. In this mode, the advertising medium took on the same basic characteristics as traditional static poster advertising.
3. In response to this problem, there have been using special software integrated with additional technologies such as Global Positioning Systems, movement detection sensors, image capture devices, RFID/NFC readers etc. So they can capture additional details of the users viewing the signage systems with the goal of delivering targeted messages to specific locations and/or consumers at specific times. By doing so, the display provides dynamic multimedia digital content so that advertisers have more flexibility and scalability to adapt different contexts.
4. Early implementations of digital signage could profile a user by obtaining various physical attributes such as age, gender, height, weight etc which is typically achieved by analysing the video captured by the image capturing devices connected to then digital signage systems. However such profiling is insufficient for modeling and predicting/understanding user's behaviour, interests and affinity.

5. In the light of aforementioned discussion there exists a need of a more robust and comprehensive predictive system using fusion based approach for profiling behaviour of users for targeted publishing of advertisement/promotional content on a display unit in real time.

BRIEF SUMMARY

6. 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 or delineate the scope. 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.
7. Exemplary embodiment of the present disclosure is related to a predictive system using fusion based approach for profiling behaviour of users for targeted publishing of advertisement/promotional content on a display unit in real time. According to a first aspect, the system includes a plurality of user presence detecting and communication units positioned in a locality surrounding the electronic display unit for identifying the presence of the users in the locality surrounding the electronic display unit.
8. According to a first aspect, the system includes a user detection and tracking unit in communication with the plurality of user presence detecting and communication units for receiving metadata of the plurality of users present in the locality surrounding the electronic display unit and to further process the metadata of plurality of users present in the locality surrounding the electronic display unit.
9. According to a first aspect, the system includes, an analysis engine configured to extract and further analyse physical attributes corresponding to the plurality of users, meta data of wearable devices corresponding to the plurality of users, meta data of handheld devices corresponding to the plurality of users and metadata of apparels corresponding to the plurality of users for determining personal preferences of the users.

10. According to a first aspect, the system includes a contextual data analysis engine for tracking: spatial and temporal attributes associated to the plurality of users based on a context and locality of the corresponding users and also to track a multitude of actions performed by the plurality of users in the locality surrounding the electronic display unit.
11. According to a first aspect, the system includes user identification and tagging unit for identifying the plurality of users and tags the plurality of users with a unique label for dynamically understanding behavioural characteristics, needs and objectives corresponding to the plurality of users.
12. According to a first aspect, the system includes a historical data repository unit for storing historical behavioural data of the plurality of users.
13. According to a first aspect, the system includes a user profile data repository unit for storing profile of the plurality of users. The reverse image mapping method employed for obtaining historical behavioural data and profile of the plurality of users from one or more personalised social and professional network profiles corresponding to the plurality of users, metadata of one or more wearable's corresponding to the plurality of users from the analysis engine and also to group the plurality of users into at least one category based on the metadata collected from the plurality of users for dynamically understanding behavioural characteristics, needs and objectives corresponding to the plurality of users.
14. According to a first aspect, the system includes a predictive engine in communication with the historical data repository unit and the user profile data repository unit for predicting behavioural characteristics, needs and objectives corresponding to the plurality of users.
15. According to a first aspect, the system includes a point of sale terminal for processing a plurality of financial transactions performed by the plurality of users in locality surrounding the electronic display unit for identifying the purchases made by the plurality of users at various merchant terminals in a locality surrounding the electronic display unit.
16. According to a first aspect, the system includes a fusion based profiling unit for receiving and aggregating data transmitted by the: the plurality of user presence detecting and communication

unit, the user detection and tracking unit, the analysis engine, the contextual data analysis engine, the user identification and tagging unit, the historical data repository unit, the user profile data repository unit, the predictive engine and the point of sale terminal for building a composite profile of the plurality of users.

17. According to a first aspect, the system includes an advertisement/promotional content repository unit in communication with the fusion based profiling unit for providing advertisement/promotional content to be published over the electronic display unit. The fusion based profiling unit selectively drives the advertisement/promotional content based on the built composite profile of the plurality of users.
18. According to a second aspect, a predictive and fusion method for profiling behaviour of users used for targeted publishing of advertisement/promotional content on a display unit in real time is disclosed. According to the second aspect, the method includes identifying the presence of users in a locality surrounding the electronic display unit by positioning a plurality of user detecting and communication units in the locality surrounding the electronic display unit.
19. According to the second aspect, the method includes receiving and processing metadata of the plurality of the users present in the locality surrounding the electronic display unit by a user detection and tracking unit in communication with the plurality of user presence detecting and communication units.
20. According to the second aspect, the method includes extracting and analysing physical attributes corresponding to the plurality of users, metadata of wearable devices corresponding to the plurality of users, metadata of handheld devices corresponding to the plurality of users and metadata of apparels corresponding to the plurality of users by an analysis engine for determining personal preferences of the users.
21. According to the second aspect, the method includes tracking spatial and temporal attributes associated to the plurality of users based on context and locality of the corresponding users and also to track multitude of actions performed by the plurality of users in the locality surrounding the electronic display unit by a contextual data analysis engine.

22. According to the second aspect, the method includes identifying the plurality of users and tagging the plurality of users with a unique label by a user identification and tagging unit for dynamically understanding behavioural characteristics, needs and objectives corresponding to the plurality of users.
23. According to the second aspect, the method includes storing historical behavioural data of the plurality of users in a historical data repository unit.
24. According to the second aspect, the method includes storing profile of the plurality of users in a user profile data repository unit. The reverse image mapping method employed for obtaining historical behavioural data and profile of the plurality of users from one or more personalized social and professional network profiles corresponding to the plurality of users, metadata of one or more wearable's corresponding to the plurality of users from the analysis engine and also to group the plurality of users into at least one category based on the metadata collected from the plurality of users for dynamically understanding behavioural characteristics, needs and objectives corresponding to the plurality of users.
25. According to the second aspect, the method includes predicting behavioural characteristics, needs and objectives corresponding to the plurality of users by a predictive engine in communication with the historical data repository unit and the user profile data repository unit.
26. According to the second aspect, the method includes processing a plurality of financial transactions performed by the plurality of users in the locality surrounding the electronic display unit by a point of sale terminal for identifying the purchases made by the plurality of users at various merchant terminals in the locality surrounding the electronic display unit.
27. According to the second aspect, the method includes receiving and aggregating data transmitted by the: the plurality of user presence detecting and communication unit, the user detection and tracking unit, the analysis engine, the contextual data analysis engine, the user identification and tagging unit, the historical data repository unit, the user profile data repository unit, the predictive engine and the point of sale terminal by a fusion based profiling unit for building a composite profile of the plurality of users.

28. According to the second aspect, the method includes providing advertisement/promotional content to be published over the electronic display unit by an advertisement/promotional content repository unit in communication with the fusion based profiling unit. The fusion based profiling unit selectively drives the advertisement/promotional content based on the built composite profile of the plurality of users.
29. According to a third aspect, a predictive and fusion method for profiling behaviour of users used for targeted publishing of advertisement/promotional content on a display unit in real time is disclosed. According to the third aspect, the method includes identifying the presence of users in a locality surrounding the electronic display unit by positioning a plurality of user detecting and communication units in the locality surrounding the electronic display unit.
30. According to the third aspect, the method includes receiving and processing metadata of the plurality of the users present in the locality surrounding the electronic display unit by a user detection and tracking unit in communication with the plurality of user presence detecting and communication units.
31. According to the third aspect, the method includes extracting and analysing physical attributes corresponding to the plurality of users by a physical attribute analysis unit of an analysis engine for determining personal preferences to the users.
32. According to the third aspect, the method includes extracting and analysing metadata of wearable devices corresponding to the plurality of users, metadata of handheld devices corresponding to the plurality of users and metadata of apparels corresponding to the plurality of users by a deeper analysis unit of an analysis engine for determining personal preferences of the users.
33. According to the third aspect, the method includes tracking spatial and temporal attributes associated to the plurality of users based on context and locality of the corresponding users and also to track multitude of actions performed by the plurality of users in the locality surrounding the electronic display unit by a contextual data analysis engine.

34. According to the third aspect, the method includes identifying the plurality of users and tagging the plurality of users with a unique label by user identification and tagging unit for dynamically understanding behavioural characteristics needs and objectives corresponding to the plurality of users.
35. According to the third aspect, the method includes storing historical behavioural data of the plurality of users in a historical data repository unit.
36. According to the third aspect, the method includes storing profile of the plurality of users in a user profile data repository unit. The reverse image mapping method employed for obtaining historical behavioural data and profile of the plurality of users from one or more personalized social and professional network profiles corresponding to the plurality of users, metadata of one or more wearable's corresponding to the plurality of users from the analysis engine and also to group the plurality of users into at least one category based on the metadata collected from the plurality of users for dynamically understanding behavioural characteristics, needs and objectives corresponding to the plurality of users.
37. According to the third aspect, the method includes receiving and aggregating data transmitted by the: the plurality of user presence detecting and communication unit, the user detection and tracking unit, the physical attributes analysis unit, the deeper analysis unit, the contextual data analysis engine, the user identification and tagging unit, the historical data repository unit and the user profile data repository unit by a fusion based profiling unit for building a composite profile of the plurality of users.
38. According to the third aspect, the method includes providing advertisement/promotional content to be published over the electronic display unit by an advertisement/promotional content repository unit in communication with the fusion based profiling unit. The fusion based profiling unit selectively drives the advertisement/promotional content based on the built composite profile of the plurality of users.

BRIEF DESCRIPTION OF DRAWINGS

39. 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:
40. FIG. 1 is a block diagram illustrating a predictive system using fusion based approach for profiling behaviour of users for targeted publishing of advertisement/promotional content on an electronic display unit in real time.
41. FIG. 2 is a flow diagram illustrating a predictive method using fusion based approach for profiling behaviour of users for targeted publishing of advertisement/promotional content on an electronic display unit in real time.
42. FIG. 3 is a flow diagram illustrating a predictive method using fusion based approach for profiling behaviour of users by using a reverse image mapping method for publishing targeted advertisement/promotional content over an electronic display unit in real time.
43. FIG. 4 is a flow diagram illustrating a deeper analysis unit used for analysing metadata of users to build a composite profile of users.
44. FIG. 5 is a flow diagram illustrating a contextual analysis engine for tracking spatial and temporal attributes of users to build a composite profile of users.
45. FIG. 6 is a flow diagram illustrating user detection and tracking unit for detecting and tracking metadata of users to build a composite profile of users.
46. FIG. 7 is a flow diagram illustrating user identification and tagging unit for identifying and tagging multiple users in the locality surrounding the electronic display unit to build a composite profile of users.
47. FIG. 8 is a flow diagram illustrating a method of point of sale terminal used to update data stored in data repository corresponding to users for building a composite profile of users.

DETAIL DESCRIPTION

48. 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.
49. 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.
50. Figure 1 is a block diagram 100 illustrating a predictive system using fusion based approach for profiling behaviour of users for targeted publishing of advertisement/promotional content on a electronic display unit in real time. According to a non limiting exemplary embodiment of the present disclosure, the predictive and fusion system is a software or a hardware or a combination of both and thereof. The predictive and fusion system includes multiple user presence detecting and communication units 102a, 102b and 102c positioned in a locality surrounding the electronic display unit for identifying the presence of the users in the locality surrounding the electronic display unit. The multiple user presence detecting and communication units 102a, 102b and 102c may include but not limited to motion detecting and communication unit, wireless receivers such as wifi, bluetooth, near field communication and the like, any other short range communication networks, heat detecting units, video capturing unit and the like. The locality surrounding the electronic display unit also may include but not limited to shopping malls, public places, retail stores and the like. However it should be understood that in practice there may be any number of user presence detecting and communication units as similar as the user presence detecting and communication units 102a, 102b and 102c and it could be positioned in the locality surrounding the electronic display unit,

which can be included in the system. Therefore the present disclosure is not limited in the number of user presence detecting and communication units 102a, 102b and 102c that may be included and/or supported by a predictive and fusion system consistent with the disclosed embodiments.

51. As shown in Figure 1, the predictive system using fusion based approach 100 includes a user detection and tracking unit 104 in communication with the multiple user presence detecting and communication units 102a, 102b and 102c for receiving metadata of the multiple users present in the locality surrounding the electronic display unit and to process the received metadata of the multiple users present in the locality surrounding the electronic display unit. The metadata corresponding to the multiple users may include but not limited to dress type, colors, brand watches, handheld communication devices, accessories worn, apparels and the like. The predictive and fusion system 100 also includes a user analysis engine 106 comprising a physical attributes analysis unit 106a and a deeper analysis unit 106b. The physical attributes analysis unit 106a in communication with the user analysis engine 106 is used to extract and analyse the physical attributes corresponding to the multiple users which may include but not limited to gender, age, height, facial mode and the like. The deeper analysis engine 106b in communication with the user analysis engine 106 is used to extract and analyse the metadata of wearable devices, handheld devices, apparels, accessories and other signals such as wifi, bluetooth and the like emanating from the handheld devices associated with the user and the like corresponding to the multiple users in the locality surrounding the electronic display unit for determining personal preferences of the users.
52. Also as shown in Figure 1, the predictive and fusion system 100 includes a contextual data analysis engine 108 for tracking spatial and temporal attributes associated to the multiple users based on a context, locality of the corresponding users and a multitude of actions performed by the multiple users in the locality surrounding the electronic display unit. The spatial and temporal attributes associated to the multiple users may include but not limited to determine whether the user is alone or in a group, time of the day, logical labeling, location within the region, proximity objects within the region, weather in the region, special events happening in that locality, inventory levels of relevant items and the like. Also the predictive and fusion system 100 includes a user identification and tagging unit 110 for identifying the multiple users and tags the identified users with a unique label and groups the multiple users into at least one

category for dynamically understanding behavioural characteristics, needs and objectives corresponding to the multiple users. Further the predictive and fusion system includes a historical behavioural data repository unit 112 for storing historical behavioural data of the multiple users and a user profile data repository unit 114 for storing profile of the multiple users. The user profile data repository unit 114 is employed to perform reverse image mapping method for obtaining historical behavioural data and profile of the multiple users from the personalized, social and professional network profiles corresponding to the multiple users by using the images of the user or other objects associated with the user. If the individual profile data is not found at user profile data repository unit 114, the categories are defined and populated with qualitative information depicting their lifestyles, interests, purchasing capabilities and the like. The categories selected by the multiple users are labeled and the similar category labels are used by the other components of the system while tagging or grouping the user so the matched information related to the grouped users is provided to the users in the locality surrounding the electronic display unit. The reverse image mapping method is also employed by using the metadata of wearable's corresponding to the multiple users from the analysis engine. The wearable's corresponding to the multiple users may include but not limited to wearable devices, handheld devices, apparels and the like.

53. Further as shown in Figure 1, the historical data repository unit 112 and the user profile data repository unit 114 in communication with a predictive engine 116 for predicting behavioural characteristics, needs and objectives corresponding to the multiple users. The predictive system using fusion based approach 100 includes a point of sale terminal 118 for processing a multiple financial transactions performed by the multiple users in locality surrounding the electronic display unit for identifying the purchases made by the users at various merchant terminals in the locality surrounding the electronic display unit. Thus the data collected by the multiple user presence detecting and communication units 102a, 102b and 102c, the user detection and tracking unit 104, the analysis engine 106, the contextual data analysis engine 108, the user identification and tagging unit 110, the historical data repository unit 112, the user profile data repository unit 114, the predictive engine 116 and the point of sale terminal 118 are transmitted to a fusion based profiling unit 120 for building a composite profile of the multiple users.
54. Moreover as shown in Figure 1, the fusion based profiling unit 120 is in communication with an advertisement/promotional content repository unit 122 to provide advertisement/promotional

content over the electronic display unit 126 based on the composite profile of the multiple users. The electronic display unit may include but not limited to liquid crystal display, light emitting diode display, plasma and the like. The fusion based profiling unit 120 selectively delivers the personalized advertisement/promotional content which may include but not limited to advertisements, notifications and the like to electronic display unit 126 through a adaptive user engagement unit 124. The adaptive user engagement unit 124 in communication with the fusion based profiling unit 120 delivers the advertisement/promotional content over the multiple handheld units on activating an external data transmission and receiving unit of the multiple handheld units which may be include but not limited to mobile communication device, cellular device, tablet, laptop, personal digital assistance and the like.

55. Figure 2 is a flow diagram 200 illustrating a predictive method using fusion based approach for profiling behaviour of users for targeted publishing of advertisement/promotional content on a electronic display unit in real time. According to a non limiting exemplary embodiment of the present disclosure, the predictive and fusion method identifies the presence of users in a locality surrounding the electronic display unit at 202 by positioning multiple user detecting and communication units in the locality surrounding the electronic display unit. Next at 204 the metadata of the multiple users in the locality surrounding the electronic display unit is received and processed by user detection and tracking unit in communication with the multiple user presence detecting and communication units. Further at 206, an analysis engine is used to extract and analyse physical attributes corresponding to the multiple users, metadata of wearable devices, handheld devices and apparels corresponding to the multiple users for determining personal preferences of the users.
56. As shown in Figure 2 at 208, a contextual data analysis engine is used to track spatial and temporal attributes associated to the multiple users based on context, locality of the corresponding users and multitude of actions performed by the multiple users in the locality surrounding the electronic display unit. Next at 210, user identification and tagging unit is used to identify the multiple users in the locality surrounding the electronic display unit and tag the identified users with a unique label and group them into category for dynamically understanding behavioural characteristics, needs and objectives corresponding to the multiple users. Further at 212, the historical behavioural data of multiple users is stored in a historical data repository unit and their corresponding profiles are stored in a user profile data repository unit. Also further at

214, the user profile data repository unit is used to employ reverse image mapping method for obtaining historical behavioural data and profile of multiple users from the personalized, social and professional network profiles corresponding to the multiple users by using the images of the user or other objects associated with the user. If the historical behavioural data and profile of multiple users are not found from the personalized networks through reverse image mapping method, the metadata collected from the wearable's corresponding to the multiple users are used to dynamically identify the behavioural characteristics, needs and objectives corresponding to the multiple users.

57. Further as shown in Figure 2 at 216, the behavioural characteristics, needs and objectives corresponding to the multiple users are predicted by a predictive engine. Next at 218 the multiple financial transactions performed by the users in the locality surrounding the electronic display unit are processed by a point of sale terminal for identifying the purchases made by the multiple users at various merchant terminals in the locality surrounding the electronic display unit. Further at step 220 the aggregated data transmitted by the multiple user presence detecting and communication units, user detection and tracking unit, analysis engine, contextual data engine, user identification and tagging unit, historical data repository unit, user profile data repository unit, predictive engine and point of sale terminal is received by a fusion based profiling unit for building a composite profile of the multiple users. Thus based on the composite profile built by the fusion based profiling unit advertisements/promotional content are published over the electronic display unit by an advertisement/promotional content repository unit at 222.
58. Figure 3 is a flow diagram 300 illustrating a predictive method using fusion based approach for profiling behaviour of users by a reverse image mapping method for publishing targeted advertisement/promotional content over an electronic display unit in real time. According to a non limiting exemplary embodiment of the present disclosure, the predictive method identifies the presence of users in a locality surrounding the electronic display unit at 302 by positioning multiple user presence detecting and communication units in the locality surrounding the electronic display unit. Next at 304 the metadata of the multiple users in the locality surrounding the electronic display unit is received and processed by user detection and tracking unit in communication with the multiple user presence detecting and communication units. Further at 306 the physical attributes corresponding to the multiple users are extracted and

analysed by using a physical attributes analysis unit in communication with the analysis engine for determining personal preferences of the multiple users. Also further at 308, the metadata of wearable devices, handheld device and apparels and the like are extracted and analysed by using a deeper analysis unit in communication with the analysis engine for determining personal preferences of the multiple users.

59. As shown in Figure 3 at 310, a contextual data analysis engine is used to track spatial and temporal attributes associated to the multiple users based on context and locality of the corresponding users and also to track multitude of action performed by the multiple users in the locality surrounding the electronic display unit. Next at 312, user identification and tagging unit is used to identify the multiple users in the locality surrounding the electronic display unit and tag the identified users with a unique label and group them into a category for dynamically understanding behavioural characteristics, needs and objectives corresponding to the multiple users. Further at 314, the historical behavioural data of multiple users is stored in a historical data repository unit and their corresponding profiles are stored in a user profile data repository unit. Also further at 316, the user profile data repository unit is used to employ reverse image mapping method for obtaining historical behavioural data and profile of multiple users from the personalized, social and professional network profiles corresponding to the multiple users by using the images of the user or other objects associated with the user. If the historical behavioural data and profile of multiple users are not found from the personalized networks through reverse image mapping, the metadata collected from the wearable's of the multiple users are used to dynamically identify the behavioural characteristics, needs and objectives corresponding to the multiple users.
60. Further as shown in Figure 3 at 318, the data transmitted by the multiple user presence detecting and communication units, user detection and tracking unit, physical attributes analysis unit, deeper analysis unit, contextual data engine, user identification and tagging unit, historical data repository unit and user profile data repository unit is received and aggregated by a fusion based profiling unit for building a composite profile of the multiple users. Thus based on the composite profile built by the fusion based profiling unit advertisements/promotional content are published over the electronic display unit by an advertisement/promotional content repository unit at 320.

61. Figure 4 is a flow diagram 400 illustrating a deeper analysis unit used for analysing metadata of users to build a composite profile of users. According to a non limiting exemplary embodiment of the present disclosure, the method starts at 402 by extracting and analysing metadata of users by using a deeper analysis unit. If the metadata is related to accessories, the method continues with 404 or if the metadata is related to signals obtained from the handheld devices which may include but not limited to mobile devices, cellular devices, data communication devices and the like worn by the users and the devices which may include but not limited to watches and the like used by the users, then the method continues with 420.
62. As shown in Figure 4, if the method continues with 404 the images of accessories are analysed for extracting logos, texts and the like data related to images of accessories. Next at 406, the brands or information available for the analysed accessories are determined. If the related brands and information are found to be available, the method continues with 408 by transmitting the extracted brands or information related to images of accessories to the deeper analysis unit. If the related brands and information is not available at step 406 the method continues with 410 by finding the similar images based on color, type, size, pattern and the like by using the social sites and professional networks. Further at step 412, if the similar images are found to be available at 410 the available data or information is extracted and transmitted to the deeper analysis unit. At step 412, If the similar images are not determined at 410 the method continues with 416 by further finding the most probable brand or concluding the search to broader classification that are predefined and relevant to the market which can be stereotyped categories such as price range of the accessories, designer brands and the like.
63. Further as shown in Figure 4, at 420 the method verifies whether the metadata related to signals of handheld devices or any other accessories are available or not. If the signals are found to be available at step 420 the method continues with 422 by analysing the signal data to extract the data related to mobile such as MAC address, model of mobile, network used and the like. Further the data extracted at 422 is transmitted to the deeper analysis unit at 424. If the signals are not found to be available at step 420 the method continues with 404 by utilizing the metadata related to accessories for profiling behaviour of the users.
64. Figure 5 is a flow diagram 500 illustrating a contextual analysis engine for tracking spatial and temporal attributes of users to build a composite profile of users. According to a non limiting

exemplary embodiment of the present disclosure, the method starts at 502 by tracking spatial and temporal attributes associated to the users based on a context and locality of the corresponding users and also to track a multitude of actions performed by the multiple users in the locality surrounding the electronic display unit by a contextual analysis engine. The contextual analysis engine is used to track attributes in near real time analysis engine at 504 and in periodic analysis engine at 506.

65. As shown in Figure 5, at 504 the near real time analysis engine is used to track the spatial and temporal attributes of users in the locality surrounding the electronic display unit in real time. Next at 508, the near real time analysis engine is used to identify the spatial and temporal attributes of users in real time for analysing the characteristic, needs and objectives of the users. The spatial and temporal attributes may determine whether the user is alone or in group, time of the day, after hours, office times and the like. Also at 510, the near real time analysis is also used to track the proximity details or information of the users in current location.
66. Further as shown in Figure 5, at 506 the periodic analysis engine is used to track spatial and temporal attributes of users in a predefined periodic time intervals by a periodic analysis engine. At 512, the periodic analysis engine is used to track relevant product sentiments in the locality by analysing the personalized social sites and professional networks which may include but not limited to twitter, web, facebook and the like. Next at 514, the periodic analysis engine is used to track the external factors of the locality such as weather, season, events, festivals and the like. Further at 516, the periodic analysis engine is used to store the tracked multitude actions performed by the users in a promotion activity data repository unit.
67. Figure 6 is a flow diagram 600 illustrating a user detection and tracking unit for detecting and tracking metadata of users to build a composite profile of users. According to a non limiting exemplary embodiment of the present disclosure, the method starts at 602 by identifying presence of users in a locality surrounding the electronic display unit by positioning multiple user detection and communication units in the locality surrounding the electronic display unit. Next at 604, the metadata of the multiple users in the locality surrounding the electronic display unit is received and processed by a user detection and tracking unit in communication with the multiple user presence detecting and communication units.

68. As shown in Figure 6, the image of user is available or not is verified at step 606. If the image of the user is found to be available the method continues with 608 by analysing the metadata of image available in the personalized social sites and professional networks by a visual analysis engine and further continues with step 610. If the image of the user is not found to be available the method continues with 610 by verifying the availability of handheld devices signals or other accessory signals. If the handheld device signals or other accessory signals are found to be available the method continues with 612 by finding the location and other data related to handheld device and accessory devices such as model, MAC address, brand and the like. If the handheld device signals or other accessory signals are not found to be available the method continues with 614 by transmitting the extracted metadata of images by visual analysis engine to fusion based profiling engine to build a composite profile of the users.
69. Figure 7 is a flow diagram 700 illustrating user identification and tagging unit for identifying and tagging multiple users in the locality surrounding the electronic display unit to build a composite profile of users. According to a non limiting exemplary embodiment of the present disclosure, the method of identifying the presence of multiple users starts at 702 by using user identification and tagging unit. Next at 704, the existence of user is verified in the data repository unit. If the identified user is found in the data repository unit, the method continues with 706 by searching the software platform integrated with the predictive system using fusion based approach to gather the further details of the users by using the details provided by the user such as name, location, purchase details and the like.
70. As shown in Figure 7, at step 710 the further details gathered at 706 which may include but not limited to profile data of user, category, identification details, interests and the like are returned to the user identification and tagging unit. Thus based on the details returned at 710, the identified user is tagged with a unique label at 712 by the user identification and tagging unit. If the user is not found in the data repository unit at 704, the method continues with 708 by searching the software platform by using the image of the user to match the personalized social networking site or personalized web pages or accounts or blogs and the like found relevant to the image and extract the profile data from the matched personalized social networking site or personalized web page and the like. Next at 714 the relevant matches found at 708 are verified that whether they are relevant or not. If the relevant matches obtained at step 714 are found to be relevant the method continues with 710 by returning user details and tagging the user with a

unique label at 712 by user identification and tagging unit. If the relevant matches obtained at step 714 are not found to be relevant, then the method continues with 716 by analysing the output obtained from analysis engine and identifying the category of user. Further, based on the brands and further details collected by the analysis engine at 716, the profile of the user is mapped and returned to user identification and tagging unit at 710 and further the returned data is transmitted to 712 for tagging the user with a unique label.

71. Figure 8 is a flow diagram 800 illustrating a method of point of sale terminal used to update data stored in data repository unit corresponding to users for profiling behaviour of users. According to a non limiting exemplary embodiment of the present disclosure, the method of updating data starts at 802 by processing the financial transactions performed by the multiple users in the locality surrounding the electronic display unit for identifying the purchases made by the multiple users at various merchant terminals in the locality surrounding the electronic display unit. Next at 804 the method verifies whether the point of sale terminal identified the user or not. If the user is identified, the method continuous with 806 by updating the data collected by the point of sale terminal in a historical data repository unit. If the user is not identified at 804, the method continues with 808 by receiving and aggregating the data transmitted by the user presence detecting and communication unit, user detection and tracking unit, analysis engine, contextual data analysis engine and user identification and tagging unit by the fusion based profiling unit and transmitting the aggregated data to the 806 for updating the data repository unit.
72. Also, those skilled in the art can appreciate from the foregoing description that the present disclosure can be implemented in the variety of forms. Therefore, while the embodiments of this disclosure have been described in connection with particular examples thereof, the true scope of the embodiments of the disclosure should not be so limited since other modifications will be apparent to the skilled practitioner upon a study of the drawings and following claims.

CLAIMS

What is claimed is

1. A predictive system using fusion based approach for profiling behaviour of users for targeted publishing of advertisement/promotional content on a display unit in real time, the system comprising:

a plurality of user presence detecting and communication units positioned in a locality surrounding the electronic display unit for identifying the presence of the users in the corresponding locality surrounding the electronic display unit;

a user detection and tracking unit in communication with the plurality of user presence detecting and communication units for receiving metadata of the plurality of users present in the locality surrounding the electronic display unit and to further process the metadata of plurality of users present in the locality surrounding the electronic display unit;

a analysis engine configured to extract and further analyse physical attributes corresponding to the plurality of users; meta data of wearable devices corresponding to the plurality of users; meta data of handheld devices corresponding to the plurality of users; and metadata of apparels corresponding to the plurality of users for determining personal preferences of the users;

a contextual data analysis engine for tracking: spatial and temporal attributes associated to the plurality of users based on a context and locality of the corresponding users; and a multitude of actions performed by the plurality of users in the locality surrounding the electronic display unit;

an user identification and tagging unit for identifying the plurality of users and tag the plurality of users with a unique label for dynamically understanding behavioural characteristics, needs and objectives corresponding to the plurality of users;

a historical data repository unit for storing historical behavioural data of the plurality of users;

a user profile data repository unit for storing profile of the plurality of users, whereby the reverse image mapping method employed for obtaining historical behavioural data and profile of the plurality of users from one or more personalized social and professional network profiles corresponding to the plurality of users; metadata of one or more wearable's corresponding to the plurality of users from the analysis engine; and also to group the plurality of users into at least one category based on the metadata collected from the plurality of users for dynamically understanding behavioural characteristics, needs and objectives corresponding to the plurality of users;

a predictive engine in communication with the historical data repository unit and the user profile data repository unit for predicting behavioural characteristics; needs; and objectives corresponding to the plurality of users;

a point of sale terminal for processing a plurality of financial transactions performed by the plurality of users in the locality surrounding the electronic display unit for identifying the purchases made by the users at various merchant terminals in the locality surrounding the electronic display unit;

a fusion based profiling unit for receiving and aggregating data transmitted by the: the plurality of user presence detecting and communication unit; the user detection and tracking unit; the analysis engine; the contextual data analysis engine; the user identification and tagging unit; the historical data repository unit; the user profile data repository unit; the predictive engine; and the point of sale terminal for building a composite profile of the plurality of users; and

an advertisement/promotional content repository unit in communication with the fusion based profiling unit for providing advertisement/promotional content to be published over the electronic display unit, whereby the fusion based profiling unit selectively drives the advertisement/promotional content based on the built composite profile of the plurality of users.

2. The system of claim 1 further comprising an adaptive user engagement unit in communication with the fusion based profiling unit for delivering personalized advertisement/promotional content over an external electronic display unit.
3. The system of claim 2, wherein the adaptive user engagement unit in communication with the predictive engine delivers the advertisement/promotional content over the plurality of handheld units on activating an external data transmission and receiving unit of the plurality of handheld units.
4. The system of claim 1, wherein the analysis engine comprising an at least one of physical attributes analysis unit; and a deeper analysis unit.
5. The system of claim 4, wherein the physical attributes analysis unit configured to extract and analyse the physical attributes corresponding to the plurality of users in the locality surrounding the electronic display unit for determining personal preferences of the users.
6. The system of claim 4, wherein the deeper analysis unit configured to extract and analyse the metadata of wearable devices corresponding to the plurality of users; metadata of handheld devices corresponding to the plurality of users; and metadata of apparels corresponding to the plurality of users for determining personal preferences of the users.
7. A predictive and fusion method for profiling behaviour of users used for targeted publishing of advertisement/promotional content on a display unit in real time, the method comprising:

identifying the presence of users in a locality surrounding the electronic display unit by positioning a plurality of user detecting and communication units in the locality surrounding the electronic display unit;

receiving and processing metadata of the plurality of the users present in the locality surrounding the electronic display unit by a user detection and tracking unit in communication with the plurality of user presence detecting and communication units;

extracting and analysing physical attributes corresponding to the plurality of users; metadata of wearable devices corresponding to the plurality of users; metadata of handheld devices corresponding to the plurality of users; and metadata of apparels corresponding to the plurality of users by an analysis engine for determining personal preferences of the users;

tracking spatial and temporal attributes associated to the plurality of users based on context and locality of the corresponding users; and multitude of actions performed by the plurality of users in the locality surrounding the electronic display unit by a contextual data analysis engine;

identifying the plurality of users and tagging the plurality of users with a unique label by a user identification and tagging unit for dynamically understanding behavioural characteristics, needs and objectives corresponding to the plurality of users;

storing historical behavioural data of the plurality of users in a historical data repository unit;

storing profile of the plurality of users in a user profile data repository unit, whereby the reverse image mapping method employed for obtaining historical behavioural data and profile of the plurality of users from one or more personalized social and professional network profiles corresponding to the plurality of users; metadata of one or more wearable's corresponding to the plurality of users from the analysis engine; and also to group the plurality of users into at least one category based on the metadata collected from the plurality of users for dynamically understanding behavioural characteristics, needs and objectives corresponding to the plurality of users;

predicting behavioural characteristics; needs; and objectives corresponding to the plurality of users by a predictive engine in communication with the historical data repository unit and the user profile data repository unit;

processing a plurality of financial transactions performed by the plurality of users in locality surrounding the electronic display unit by a point of sale terminal for identifying

the purchases made by the plurality of users at various merchant terminals in the locality surrounding the electronic display unit;

receiving and aggregating data transmitted by the: the plurality of user presence detecting and communication unit; the user detection and tracking unit; the analysis engine; the contextual data analysis engine; the user identification and tagging unit; the historical data repository unit; the user profile data repository unit; the predictive engine; and the point of sale terminal by a fusion based profiling unit for building a composite profile of the plurality of users; and

providing advertisement/promotional content to be published over the electronic display unit by an advertisement/promotional content repository unit in communication with the fusion based profiling unit, whereby the fusion based profiling unit selectively drives the advertisement/promotional content based on the built composite profile of the plurality of users.

8. A predictive and fusion method for profiling behaviour of users used for targeted publishing of advertisement/promotional content on a display unit in real time, the method comprising:

identifying the presence of users in a locality surrounding the electronic display unit by positioning a plurality of user detecting and communication units in the locality surrounding the electronic display unit;

receiving and processing metadata of the plurality of the users present in the locality surrounding the electronic display unit by a user detection and tracking unit in communication with the plurality of user presence detecting and communication units;

extracting and analysing physical attributes corresponding to the plurality of users by a physical attribute analysis unit of an analysis engine for determining personal preferences to the users;

extracting and analysing metadata of wearable devices corresponding to the plurality of users; metadata of handheld devices corresponding to the plurality of users; and

metadata of apparels corresponding to the plurality of users by a deeper analysis unit of an analysis engine for determining personal preferences of the users;

tracking spatial and temporal attributes associated to the plurality of users based on context; and locality of the corresponding users; and multitude of actions performed by the plurality of users in the locality surrounding the electronic display unit by a contextual data analysis engine;

identifying the plurality of users and tagging the plurality of users with a unique label by a user identification and tagging unit for dynamically understanding behavioural characteristics, needs and objectives corresponding to the plurality of users;

storing historical behavioural data of the plurality of users in a historical data repository unit;

storing profile of the plurality of users in a user profile data repository unit, whereby the reverse image mapping method employed for obtaining historical behavioural data and profile of the plurality of users from one or more personalized social and professional network profiles corresponding to the plurality of users; metadata of one or more wearable's corresponding to the plurality of users from the analysis engine; and also to group the plurality of users into at least one category based on the metadata collected from the plurality of users for dynamically understanding behavioural characteristics, needs and objectives corresponding to the plurality of users;

receiving and aggregating data transmitted by the: the plurality of user presence detecting and communication unit; the user detection and tracking unit; the physical attributes analysis unit; the deeper analysis unit; the contextual data analysis engine; the user identification and tagging unit; the historical data repository unit; and the user profile data repository unit by a fusion based profiling unit for building a composite profile of the plurality of users; and

providing advertisement/promotional content to be published over the electronic display unit by an advertisement/promotional content repository unit in communication with the

fusion based profiling unit, whereby the fusion based profiling unit selectively drives the advertisement/promotional content based on the built composite profile of the plurality of users.

9. The method of claim 8, further comprising a step of predicting behavioural characteristic; needs; and objectives corresponding to the plurality of users by a predictive engine in communication with the historical data repository unit and the user profile data repository unit.
10. The method of claim 8, further comprising a step of processing a plurality of financial transactions performed by the plurality of users in locality surrounding the electronic display unit by a point of sale terminal for identifying the purchases made by the plurality of users at various merchant terminals in the locality surrounding the electronic display unit.