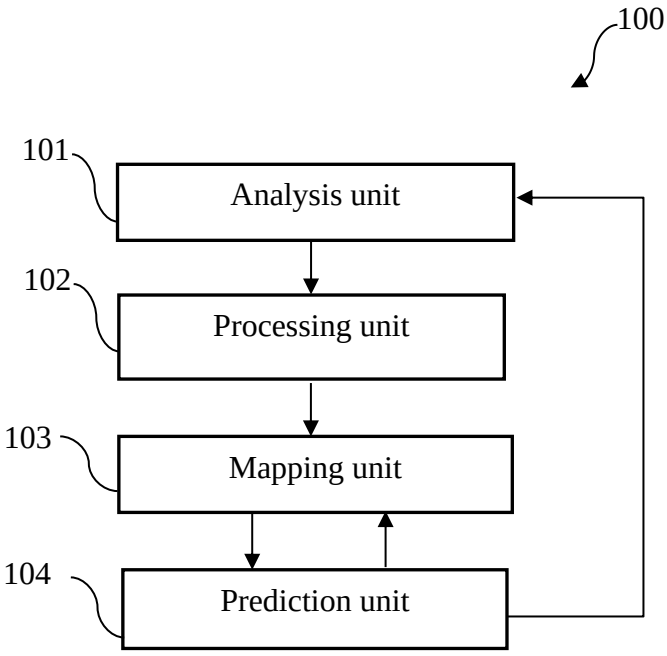


Figure 1

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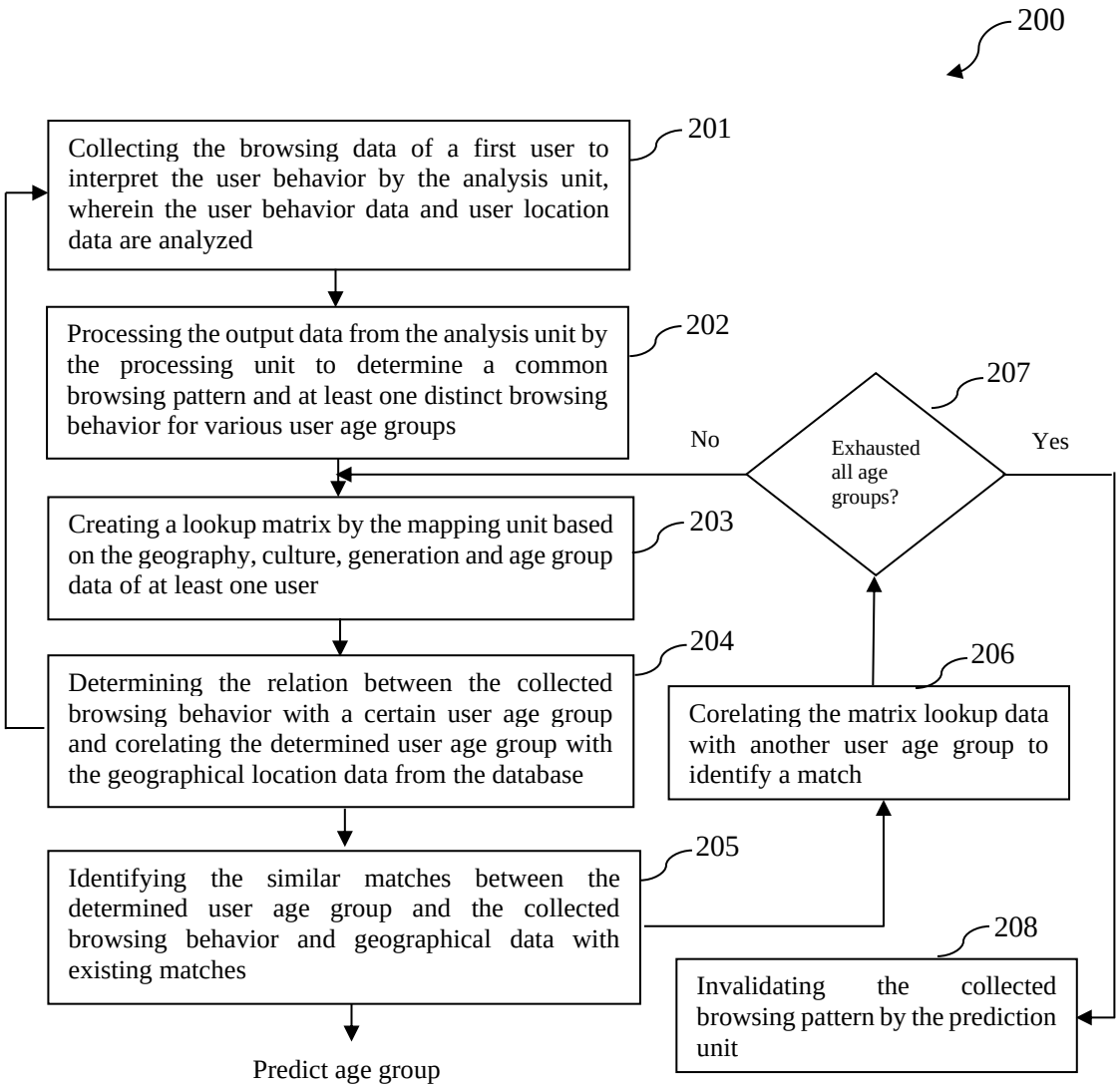


Figure 2

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Internal Ref: OR22S17C062

F O R M 2

THE PATENTS ACT, 1970

(39 of 1970)

The Patent Rule, 2003

COMPLETE SPECIFICATION

(See section 10 and rule 13)

TITLE OF THE INVENTION

A system for determination of age group based on browsing pattern and method thereof

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Internal Ref: OR22S17C062

PREAMBLE TO THE DESCRIPTION:

[0001] The following specification particularly describes the invention, and the manner in which it has to be performed:

DESCRIPTION OF THE INVENTION

Technical field of the invention

[0002] The present invention relates to a system for determination of user age group based on browsing pattern and method thereof. The present invention particularly relates to the determination of age group of a user based on their browsing cognitive context.

Background of the invention

[0003] The increase in use of internet in the past decade has allowed the researchers to develop services to improve user experience. The internet users have different attributes like age, browsing pattern, gender, location, etc., that are used to determine the user browsing behavior, wherein the user browsing behavior is highly related to their basic attributes. The age group of the user is determined based on their browsing pattern with the help of data mining methods known in the present state of the art.

[0004] The user age group is determined from their browsing behaviors, wherein the webpage view information is considered and demographic information between different users is propagated using machine learning. In this approach, the click-through data from the webpage is gathered and the webpages are associated with the probable age of the user through reinforced discriminative and predictive modelling techniques, wherein the age of the user is near accurately known. From this data, the unknown age of the other user groups is predicted from the demographic information of the associated webpages through machine learning and based on the fact that webpages visited by similar users may be associated with similar demographic tendency, and users with similar demographic information would visit similar webpages, the age group is predicted.

[0005] The big data platforms are highly used in prediction of age group of the users based on their browsing behavior, but most of the big data platforms do not have a clear understanding of the age of the users' profile based on their search activity and there are no focused methods available to correlate the age differences between the users to understand the distinctive change in the user of the family and their relationship.

[0006] In order to overcome the drawbacks of the existing systems, several technologies have been developed over the decades to predict the age of the user based on their browsing pattern.

[0007] The Patent Application No. **US20100082360A1** entitled "*Age-targeted online marketing using inferred age range information*" discloses a system and method for generating marketing-based age range products based at least on inferred data regarding the age of various network users. The age range products may be used for age-targeted online marketing. The method for generating an age range product for online marketing includes accessing age-identifying data identifying an age for each of a first group of network users; accessing user-activity data for a second group of network users, the user-activity data including data regarding the second group of network users' actions on the network; determining inferred age data for each of the second group of network users based at least on the user-activity data for each of the second group of network users; and generating a marketing-related age range product for a particular age range.

[0008] The Patent Application No. **US2019378171A1** entitled "*Targeted advertising system*" discloses systems, methods, and machine-readable media used for targeted advertising, wherein one or more images of individuals in a location in a facility are captured with an imaging device. Face detection is performed on the one or mojure images. Based on a face detection result, Convolutional Neural Network models are used to determine a gender and estimate an age of each detected face. A targeted audience is determined, based on pre-determined criteria using the age estimation and gender identification of each detected face. A relevant advertisement is selected for the targeted audience for display on a display device.

The relevant advertisement may be selected based at least in part on a footfall score (f_{score}) indicative of customer traffic in the facility.

[0009] The Patent Application No. **US20100790979** entitled "*Systems and methods for determining personal characteristics*" discloses systems and methods for determining personal characteristics from images by generating a baseline gender model and an age estimation model using one or more convolutional neural networks (CNNs); capturing correspondences of faces by face tracking, and applying incremental learning to the CNNs and enforcing correspondence constraint such that CNN outputs are consistent and stable for one person.

[0010] Hence, there is a need for a method to predict the age group of the user based on their browsing behavior and detect the change in the user based on the contextual change in the browsing behavior. Further, there is a need to predict the physiological age, biological age, psychological age, functional age, and social age of a user and arrive at a holistic correlation of the social, cognitive, psychological, functional and physiological behavior patterns with the age groups and thus extend it to a community or a group of common interests.

Summary of the invention

[0011] The present invention discloses a system and a method for predicting the age group of a user from their browsing behavior wherein, the system facilitates identification and categorization of different user age groups based on their browsing behavior. The system comprises an analysis unit for analyzing the browsing interests of plurality of users of different age groups, different geographies and cultures and different generations. The system further comprises a processing unit to process the data received from the analysis unit and determine a common browsing pattern across all the user age groups and distinct browsing behavior of different user age groups.

[0012] The system further comprises a mapping unit for creating a browsing behavior matrix lookup based on the geographical, cultural, generational and user age group data. Further, a prediction unit uses the data from the mapping unit to

predict the age group of the user and further determine the change in the user based on their browsing behavior.

[0013] The present invention discloses a method for predicting the user age group based on the browsing behavior of the users, wherein the method comprises the steps of collecting the browsing data of a first user to determine the user behavior by the analysis unit, wherein the user behavior data along with the user location data are processed by the processing unit. The processed data is used by the mapping unit to create a browsing behavior matrix lookup based on geography, culture, generation and user age group. The prediction unit further determines if the browsing behavior is related to a certain user age group, wherein the determined user age group is corelated with the data related to a geographical location from a database. The prediction unit further matches the determined age group and the collected browsing data to identify the similar matches and based on the matches, the user age group is predicted.

[0014] The present invention is advantageous as it facilitates understanding the first user and other users related to the first user in a family and the differences in their age, personalities, interests and browsing patterns. Further, the system provides an understanding of the user profile based on the age determination.

[0015] Additionally, the system facilitates the creation of user profiles (personas) based on the age-related browsing pattern and the user profiles are used for A/B/N multivariate Analysis for targeted campaigns.

Brief description of the drawings

[0016] The foregoing and other features of embodiments will become more apparent from the following detailed description of embodiments when read in conjunction with the accompanying drawings. In the drawings, like reference numerals refer to like elements.

[0017] Figure 1 illustrates a block diagram representation of the system for determination of user age group based on their browsing pattern.

[0018] Figure 2 illustrates a flow diagram for the method for determination of the user age group based on their browsing pattern.

Detailed description of the invention

[0019] Reference will now be made in detail to the description of the present subject matter, which is shown in the illustrations. Various changes and modifications obvious to one skilled in the art to which the invention pertains are deemed to be within the spirit, scope, and contemplation of the invention.

[0020] The present invention discloses a system for prediction of user age group based on the browsing behavior of the user, wherein the system identifies and categorizes different user age groups based on their browsing behavior and facilitates predicting the age group of the user and further predicting the change in the user based on the contextual change in their browsing behavior.

[0021] Figure 1 is the block diagram representation of the system for determination of user age group, wherein the system (**100**) comprises an analysis unit (**101**) for analyzing the browsing interests of at least one user of different age group, geography, culture and generation. The system (**100**) further comprises a processing unit (**102**) to process the analyzed browsing interests of at least one user for determining a common browsing pattern across all the user age groups and at least one distinct browsing behavior of different user age groups.

[0022] Further, the system (**100**) comprises a mapping unit (**103**) for creating a browsing behavior matrix lookup based on the geographical, cultural and generational data of at least one user and the user age group data, wherein the output data from the mapping unit (**103**) is used by a prediction unit (**104**) to predict the age group of the user. The prediction unit (**104**) further predicts the change in the user based on the contextual change in their browsing behavior.

[0023] In one embodiment of the invention, the system (**100**) uses deep learning techniques, reinforced machine learning and predictive analytics of the user profile data and the browsing behavior to identify and categorize different user age groups

based on their browsing behavior. Further, the system (**100**) uses statistical analysis, semantic correlation and sentimental analysis for analyzing the browsing behavior of the user and mapping the data in a matrix lookup. The system (**100**) collects the browsing pattern data from at least one non-intrusive data capturing applications and devices, according to one embodiment.

[0024] Figure 2 illustrates a flow diagram of the method for determination of the user age group from the browsing pattern, wherein the method (**200**) comprises of the steps of collecting the browsing data of a first user to interpret the user behavior by the analysis unit (**101**), wherein the user behavior data and user location data are analyzed, in step (**201**). Further, in step (**202**), the output data from the analysis unit (**101**) is processed by the processing unit (**102**).

[0025] Further, the processed data from the processing unit (**102**) is used by the mapping unit (**103**) for creating a browsing behavior matrix lookup based on the geography, culture, generation and age group of the plurality of users, in step (**203**). The prediction unit (**104**) uses the browsing behavior matrix lookup to determine if the collected browsing behavior is related to a certain user age group and further the determined user age group is corelated with the geographical location data from the database, as disclosed in step (**204**). The prediction unit (**104**) further identifies the similar matches between the determined user age group and the collected browsing behavior and geographical data with existing matches, in step (**205**). Based on the data similarity with the existing matches, the prediction unit (**104**) predicts the user age group for the browsing pattern.

[0026] Subsequently, in the step (**206**), in case the user age group does not corelate with the data from the matrix lookup of the mapping unit (**103**), the prediction unit (**104**) corelates the data from the mapping unit (**103**) with another user age group to identify a match. In the step (**207**), the prediction unit (**104**) correlates the data from the mapping unit (**103**) with all the possible age groups. Further, the prediction unit (**104**) further invalidates the determined user behavior from the analysis unit (**101**) in case the determined user behavior data does not match with any user age group, in the step (**208**).

[0027] Further, the prediction unit (**104**) detects the change in the user through contextual change in the browsing behavior, facilitating the analysis and understanding of the relationship between the first user and the other users in a family. Subsequently, in case of mismatch between the determined user age group and the browsing behavior, the prediction unit (**104**) deduces that the collected browsing pattern is not related to the first user.

[0028] The present invention provides a system (**100**) and method (**200**) for predicting the user age group based on the browsing behavior of the user. The system (**100**) facilitates understanding the first user and understanding the relationship between the first user and other users in a family and subsequently determining the age difference between the first user and other users. Further, the system (**100**) enables correlating the first user with other users in the family and determining the distinctive differences in their personalities, interests and browsing patterns.

[0029] Further, the system (**100**) creates an understanding of the user profile of the first user based on the age determination, without disruption from the browsing behavior of a different user. The system (**100**) facilitates creation of user profile for the first user and other users of the family based on the age-related browsing behavior. Further, the system (**100**) facilitates targeted advertising based on age-related user interests, according to an embodiment of the invention. According to one embodiment of the present invention, the system (**100**) is used for predicting the physical age, mental age, and social age of the users depending on their browsing behavior.

[0030] For example, consider a user of age 32 years is browsing through webpages related to healthcare, wherein the browsing data of the user is collected to interpret the user behavior by the analysis unit (**101**). The system (**100**) analyses the user's behavior data and user's location data, wherein the analyzed data is further processed by the processing unit (**102**) and the processed data is used by the mapping unit (**103**) to create a browsing behavior matrix lookup. The mapping unit

studies the geography, culture, generation and age group data to create a matrix and prediction unit (**104**) determines if the browsing behavior is related to a certain age group, i.e., 20-30 years. In case the browsing behavior does not conclude the user's age group, the prediction unit (**104**) determines if the next age group 30-40 years corelates with the browsing behavior and identifies a match. Upon finding the match for user's age group, the prediction unit (**104**) determines if the user's age group matches with any geographical location data from the database. Further, the prediction unit (**104**) determines if the user's age group correlates with the collected browsing behavior and geographical data with existing matches, and based on the data similarity with the existing matches, the prediction unit (**104**) concludes the user's age group for the collected browsing data as 30-40 years.

Reference numbers

Components	**Reference Numbers**
System	**100**
Analysis unit	**101**
Processing unit	**102**
Mapping unit	**103**
Prediction unit	**104**

Internal Ref: OR22S17C062

Claims

We Claim:

1. A system for determination of the user age group from the browsing pattern, the system (**100**) comprising:
    a. an analysis unit (**101**) for analyzing the browsing interests of at least one user;
    b. a processing unit (**102**) for processing the analyzed browsing interests of the user for determining a common browsing pattern and at least one distinct browsing behavior for a user age group;
    c. a mapping unit (**103**) for creating a lookup matrix based on the geographical, cultural, generational and user age group data;
    d. a prediction unit (**104**) for corelating the browsing behavior and determined user age group to predict the age group of the user.

2. The system (**100**) as claimed in claim 1, wherein the prediction unit (**104**) facilitates correlation of the first user with other users and determination of the distinctive differences in the personality, interest and browsing pattern.

3. The method for determination of user age group from browsing pattern, the method (**200**) comprising the steps of:
    a. collecting the browsing data of at least one user to interpret the user behavior by the analysis unit (**101**), wherein the user behavior data and user location data are analyzed;
    b. processing the output data from the analysis unit (**101**) by the processing unit (**102**) to determine a common browsing pattern and at least one distinct browsing behavior for various user age groups;
    c. creating a lookup matrix by the mapping unit (**103**) based on the geography, culture, generation and age group data of at least one user;
    d. determining the relation between the collected browsing behavior with a certain user age group and corelating the determined user age group

with the geographical location data from the database by the prediction unit (**104**);

e. identifying for similar matches between the determined user age group and the collected browsing behavior and geographical data with existing matches by the prediction unit (**104**);

f. predicting the user age group by a prediction unit (**104**) by determining and corelating the relation between the browsing behavior and the user age group to identify a match;

g. corelating the matrix lookup data with another user age group to identify a match, in case there is a mismatch between the browsing behavior and the user age group by the prediction unit (**104**);

h. invalidating the collected browsing pattern by the prediction unit (**104**) if the browsing behavior does not match with any of the user age group.

4. The method (**200**) as claimed in claim 3, wherein the prediction unit (**104**) identifies for similar matches between the determined user age group and the browsing behavior of the first user and geographical data with existing matches, and the mismatch between the determined user age group and the browsing behavior indicates that the collected browsing pattern is not related to the first user.

5. The method (**200**) as claimed in claim 3, wherein the prediction unit (**104**) detects the change in the user through contextual change in their browsing behavior.

6. The method (**200**) as claimed in claim 3, wherein the prediction unit (**104**) invalidates the user behavior determined by the analysis unit (**101**) in case the user behavior data does not match with any user age group.



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Abstract

A system for determination of age group based on browsing pattern and method thereof

[0031] The present invention discloses a system (**100**) for determination of user age group based on browsing behavior, wherein the system (**100**) comprises an analysis unit (**101**) for analyzing the browsing interests of at least one user of different age group, different geography and culture and different generation, and a processing unit (**102**) for processing the analyzed browsing interests of at least one user to determine a common browsing pattern and a distinct browsing behavior for different user age groups. The system (**100**) further comprises a mapping unit (**203**) for creating a lookup matrix based on the geographical, cultural and generational data and user age group data, and a prediction unit (**104**) for predicting the age group of the user by corelating the determined age of the user with the browsing behavior.

(**Figure 2)**



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