Personalized Smart Mirror

Aparna Thampi K¹, Liz John², Aarsha A S³, Eldo P Elias⁴

1,2,3 Dept. of Computer Science and Engineering Engineering, MACE, Kerala, India
4 Assistant Professor, Dept. of Computer Science and Engineering Engineering, MACE, Kerala, India

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Abstract - *Smart mirror is a device which serves the purpose of a mirror and has functionalities beyond the normal mirror's capabilities. It is designed for people who are in short of time to get done with various tasks while getting ready in front of the mirror, thus saving a lot of time. Smart mirror equipped with eye-gaze tracking technique is of paramount relevance in the present day busy world. This mirror acts as an aid to people who do not get time to spend over daily news and events. It displays various widgets like daily categorized newsfeed, weather, time, events, reminders, etc. The eye-gaze tracking technique is used to measure the user's attention and spontaneous responses to the content of the smart mirror. The main focus is on a content based news retrieval which avoids the need of cost effective specialized devices. This is carried out by capturing user's gaze using a high end retina camera. The significance of the system is to help the user get real-time filtered news based on his/her interests as well notifies the user about the day's events and informs about the traffic details too.*

Key Words: **Smart Mirror, Artificial Intelligence, Keyword Ranking, Keyword Extraction, News filtering**

1. INTRODUCTION

In this busy world, people barely get time to keep themselves updated. Mirror is an object which every human faces daily in their lives to find out how they look. Therefore an interactive mirror can help in letting people know what is happening around them. Smart mirror is no ordinary mirror. It can display various widgets like news, weather, music, etc. Such mirrors with a variety of functionalities are available in the market. They can be operated using touch, voice commands, etc. The basic construction of smart mirror is as follows: A screen is placed behind a two-way mirror. By using a black and white graphical user interface (GUI) only the white colors will penetrate the mirror, resulting in an effect that makes it appear as if the mirror itself is a screen[1]. The idea of an intelligent mirror is to further this enhancement to include artificial intelligence as well. In the proposed system, the smart mirror can be accessed using eye-gaze[2].The news headlines are displayed on the four corners of the mirror. The user's eye gaze is extracted and that news item will be projected on the mirror. The keywords in this news are identified and using this technique the system personalizes the news items based on user's interest.

The rest of the paper is organized as follows. Detailed plan of proposed system is included in section 2. Experimental results are presented in section 3. Concluding remarks are given in section 4.

2. PROPOSED SYSTEM

User starts the system. The news from newsapi.org is fetched. The fetched news will be stored into news_reader.db. The top news from news_reader.db is forwarded to smart mirror. The news is displayed on the user interface. The user's eye gaze is fetched. The eye faze for 10 continuous frame is considered. The eye gaze will be stored into the eye_status.db. The news corresponding to the eye gaze is identified. Once the corresponding news is identified, it will be forwarded to extract the keywords. The news will be forwarded to the system's UI. The correct news is displayed. Extracted keywords are stored in data_keyword.db and are used for personalization. The personalized keywords are searched for in the incoming news while fetching from newsapi in the next iteration.

2.1 Keyword Extraction Algorithm

The extraction algorithm process is used to filter the news items based on user's interest. Each news item which the user has interest in is stored in the database. The news item is taken into consideration for keyword extraction. Preprocessing is the first step towards identifying the keywords. The process of converting data to something a computer can understand is referred to as pre-processing. One of the major forms of pre-processing is to filter out useless data. In natural language processing, useless words (data), are referred to as stop words. A stop word is a commonly used word (such as "the", "a", "an", "in") that has least importance in a sentence while extracting keywords. The stop words need to be eliminated as a part of pre-processing[3].

Initially the sentences are tokenized in order to identify the keywords. The keywords are ranked based on the number of times it appears in the news document. These keywords are also stored in a database. And in an incoming news item, these keywords are searched for. The ones with these keywords are identified to be of user's interest and is given higher priority.

text = "South Africa lost their first wicket in the 30th over, their second in the 48th and their third in the 63rd and partnerships of 85, 63 and 51 underlined how infrequently Indias bowlers struck in the first two sessions of play on day one of the second Test at Centurion. But then, during the last half hour, India removed three batsmen in the span of 14 deliveries, one of them being the mighty Hashim Amla for 82."

Fig -1: A sample text

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['india removed three batsmen', 'infrequently indias bowlers struck', 'first two
sessions', 'last half hour', 'mighty hashim amla', 'south africa lost', '14 del
iveries', 'second test', '51 underlined', 'day one', 'first wicket', '30th', 'on
e', 'second', '63', '82', '85', '63rd', '48th', 'centurion', 'play', 'span', 'th
ird', 'partnerships']
>>> |
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Fig -2: Extracted based on the sample text

3. EXPERIMENTS AND RESULTS

The news items are displayed on the four coordinate positions of the system. They are of different news from different fields. The fetched news will be stored into news_reader.db. The top news from news_reader.db is forwarded to smart mirror. The news is displayed on the user interface. Then news is extracted as per user's interest. Here extraction of news is done by using eye gaze tracking. The eye gaze for 10 continuous frames are considered. The eye gaze will be stored into the eye_status.db. The news corresponding to the eye gaze is identified and then it is popped up on the screen. Hence the correct news is displayed on the screen.
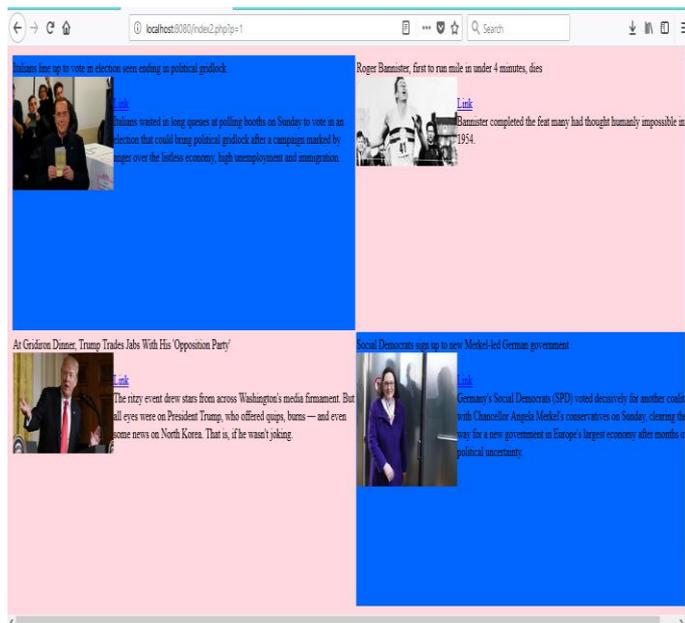

Fig -4: The welcome page of the mirror

The news headlines that are directly fetched from the API will be displayed on the four corners of the screen. The order of news items are irrespective of any priority.
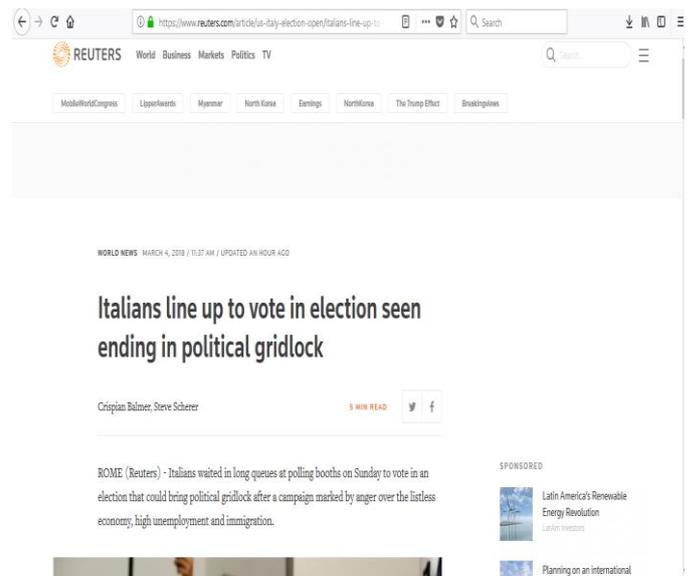

Fig -4: The projected news based on user's eye-gaze

4. CONCLUSION

The smart mirror can display dynamic data such as real-time news, weather, date and time, etc. With the help of various tables in the database and extracted eye-gaze stored in it, the keywords of the news can be identified and thus stored as the news item that is of user's interest. This news item will be popped up on the screen. System can only be controlled manually. Extension of this system can be done by controlling the entire system using voice.

REFERENCES

[1] Magic Mirror Retrieved 20 April 2016. https://www.raspberrypi.org/blog/magic-mirror/

[2] Ami Klin, Warren Jones, Robert Schultz, Fred Volkmar, Donald Cohen. Visual Fixation Patterns during Viewing of Naturalistic Social Situations as Predictors of Social Competence in individuals with Autism. Arch Gen Psychiatry. Vol.59. pages 809-816. 2002.

[3] M. W. Berry, J. Kogan, Text Mining: Applications and Theory, Wiley, UK, 2010.