Smart Mirror For Ambient Home Environment

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Abstract- *This paper describes the design and development of futuristic smart mirror that represent interface for the ambient home environment .The mirror provides natural means of interaction through which the home can control. . It is device which have capabilities of displaying media such as texts ,images, maps and videos. A multipurpose user-friendly functionalities of the mirror interface provides users with versatility needed for better management and it uses in daily tasks. For example: If we want map of some particular city or area then we can view that map on mirror. Another example is Face Recognition and Voice Recognition. This smart mirror includes speech recognition, LED & basic text on it's screen. This is nothing but interface between hardware & software. The functionalities of smart mirror describes home automation which is extensible and various customized information system.*

Keywords- Home automation, Ambient home environment, smart appliances, user interaction, voice recognition, web services communication.

I. INTRODUCTION

Emerging digital and communication technologies will increase our life in smat way. Ubiquitous compting is that technology which belongs to software engineering and whenever we want to compute the devices we can easily done that by using Ubiquitous computing.

It can occur in any devices ,in any location and in any format. To used Ubiquitous computing in our daily life is everyone's need now a days. To use embedded devices and various technologies which belongs to embeded system is very interesting part in our daily life. Thus, such a networked environment, often called "Internet of Things (IOT)", is capable of understanding its surroundings, which consequently leads to improve our quality of life. Traditionally, ubiquitous computing involves wireless communication and networking technologies, mobile devices, wearable computers, cameras, gaming consoles, radio-frequency identification (RFID) tags, etc.

Pervacive computing is that term which emerging with embeded system and it uses in communication. Pervacive computing is also used in our daily life. By combining Ubiquitous computing and Pervacive computing we can convert our home to smart home or our devices to smart one. If we want to convert our homes to smart home then by using the combination of Ubiquitous computing and Pervacive computing we can easily convet that Pervacive computing uses networking technologies, mobile devices, wearable computers, cameras, gaming consoles, radio-frequency identification (RFID) tags, etc. Recently, ubiquitous and pervasive computing has expanded to further include smart furniture, walls, doors, as well as specialised rooms, equipped with sensors and computing devices to recognize human activity. It providde a variety of automated services.

II. PURPOSED SYSTEM OF SMART MIRROR

The proposed smart mirror system aims to provide users with an interactive interface for simplified and personalised services in the comfort of the user's home. Since we know that smart mirror is two-way mirror and the main objective of this is to provide basic iformation. On it's screen.Hence, the proposed system allows users access to customisable services, all while they are performing other tasks (i.e. grooming). As such, it serves as a convenient time-saver. Consequently, the proposed system performs the following functionalities:

(i) Mirror interface
(ii) Provide customised services
(iii) Allow for custom user profile management where the user creates his/her own profile that is to be stored on the database server.
(iv) Basic information like time,date,day,weather report and daily news.
(v) Voice recognition
(vi) Voice generation
(vii) It provide interaction between human and computers (HCI).
(viii) Detection of human's movement.

The proposed smart mirror system has a server-client architecture, where it mainly constitutes of a web server and a database server. The database server stores the preferences of each user as well as the user's unique identification number, allowing them access to their personalised services, which will be consequently retrieved from the web server. whenever client need some data it request to server when server get request from client then it will check availability of data if requested data is available then it will give response to the server.this concept is very usefull in Smart Mirror.

III. PROPOSED SYSTEM DESIGN

The system design provide some functionalities which is based on reflections. Mirror provide reflection so whenever user want uses this mirror he can see himself due to reflection technologies and he can start further activities. That's why this mirror is smart mirror because it shows reflection as weel as it can perform various activities used in our daily life. This is a very big achievment for user because it saves human's time. User can see themselves and also getchance to use other functionalities which were built in smart mirror.

Following figure shows the reflection phenomenon The box also has small holes in its back to provide access to the various connectors needed such as the power chord of the television screen, as well as for the ventilation purposes to prevent overheating.

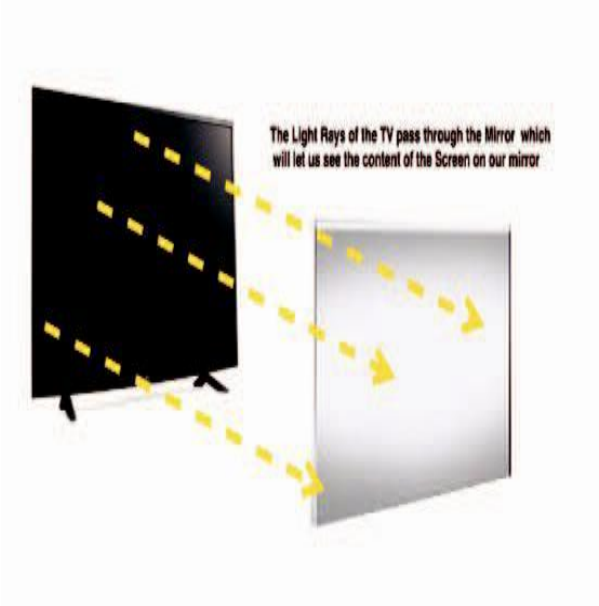

Figure:1 Screen And Purposed System Display

The design of the shdow box consists of a wide base for maximum stability, and wheels for ease of setup regardless of the location. This further adds to the customisability and interactivity features that our proposed system fosters. More importantly, the design addreses to safety measures in terms of protection of the mirror and the complete proposed system interface.

In order to assemble the proposed system and set it up, we designed and built a shadow box, or a wooden box container. The shadow box has enough depth allowing it to hold the television screen, with the front facing side of the box being hollow to fix the mirror in it.

Figure:2 Basic Screen Of The Mirror

Figure:2 shows basic screen havin black color on it's screen and some messages and information on it .This shows the information which is required for users. It shows all basic information like time,date some news updates and some messages as well as temperature. To shows temperature and news updates it fetches the data from cloud.This is the basic screen of mirror which shows our daily notifications. Whenever user start that operations he will get first this information.

Purposed System Working

The work-flow of the model is shown as figure:3 whenever we start our system then it will scan near by Bluetooth devices. Bluetooth-enabled devices when found then it can fetch data from cloud.. The device with the highest value of the signal strength is automatically served by the smart mirror, given that the devices have previously been paired. When paired with a particular device, the mobile application retrieves the preallocated, customised profile of the user and displays the chosen services on the smart mirror. While the display is enabled, the mobile application is constantly updating the list of nearby devices. When any strongest devices is find out then the connection with the previous device is automatically dropped. This ensures automatisation, ease-of-use, and seamless integration, thus fulfilling one of the most important objectives of the AmI paradigm.

Services customized by the user using our dedicated mobile application can be seen displayed on the smart-mirror. These can be placed anywhere on the mirror layout, allowing

for adaptability, personalisation, and real-time updates. With dedicated mobile applications that automate the complete process of syncing with the smart mirror, as well as updating all services, users have an easy access to all the latest updates, ranging from social media accounts to news outlets. Thus, our proposed solution can smoothly integrate with other widgets and mobile applications installed on the user's smart-phone, as well as allow multi-modal user interfaces, personalised as per the user's desires. Moreover, our system does not require any additional devices, such as sensors; making it simple, but at the same time computationally efficient.If any user wantto sart voice recognition then usermust have to say any word in front of mike and then m ike will automatically start there process ofrecognition.

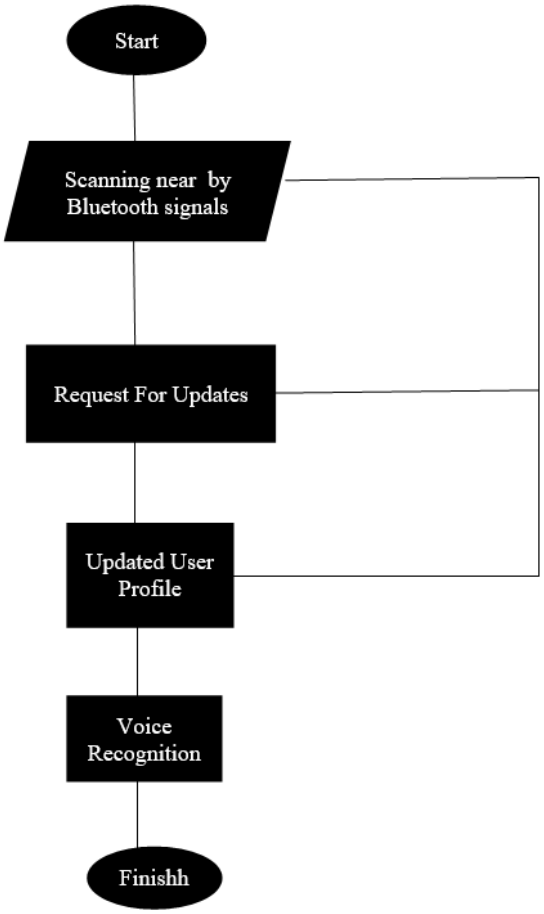

Figure 3: Flowchart Of The Mirror

Architecture Of Purposed System

To built smart mirror we ned raspberry pi and monitor screen.This project is from domain IOT(Internet Of Things).we need Raspberry Pi 3 model-B. Raspberry Pi is that devicewhich work like an operating system.Raspberry Pi is a series of small single-board computers developed in UK by Raspberry Pi Foundation.Raspberry Pi hardware has evolved through several versions and it variation in memory capacity and have peripheral devices supporter,Model-B have following features-

1. 1.2GHz 64-bit quad-core processor
2. USB ports:4
3. Bluetooth 4.0
4. 802.1n Wireless LAN
5. External SD card slot

When we sarted our system then it will scanning near by Bluetooth devices and then it will connect through enabled data to give new update and temperature it require hotspot of connected devices. Then by fetching that cloud data it will update that information. When user want to say something they can say in front of mike and then mike will recognize that word and according to that it will starts working. It will give that word again on terminal. Example: If any user said "Turn On Light" then system match that keywords and then it will recognize that words .This is very big advantage and this is upcoming technology where we can manage anything from phone. This is a part of "Home Automation". This system have bright future scope.

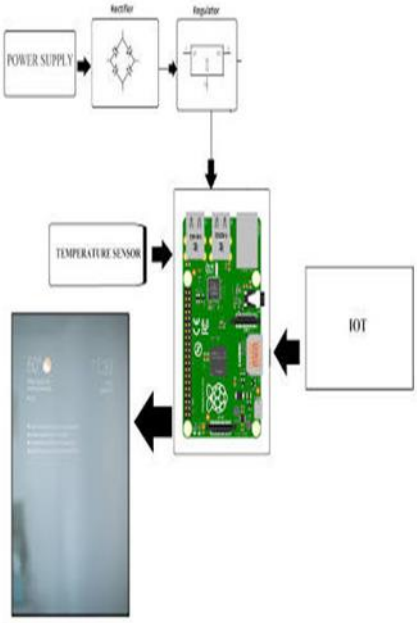

Figure:2 Architecture Of Mirror

IV. RESULT

Our proposed system utilises the versatility and functional-ity of smart-phones to integrate them with everyday objects, thus forming a smart-ambient object in an interactive, adaptive, and unobtrusive manner.

It stores information in the database with the remaining information, forming a unique identifier for

information retrieval and display on the smart mirror. Upon successful log-in/registration, the user is presented with a user-friendly navigation menu. First, the user can view all of the services (or widgets) available to display on the smart mirror. These services are comprised from installed widgets or applications on the mobile phone itself. Moreover, users can add services to any existing profiles, where each profile represents a specific smart mirror that user has previously paired his device to. To pair with any smart mirror in the close proximity of the user, the user mobile application automatically syncs with the mirror-based mobile application over the Bluetooth network. Once the two devices are successfully paired, , then user can view information on screen.. The device with the highest value of the signal strength is automatically paired.

Future work involves testing the system on a variety of users and in diverse settings. As such, based on user perception, the design of the system can be improved to be more user-centered, especially considering the choice of customisable services and personalisation of profiles. Furthermore, with the current framework, we have the ability to address the need for efficient and automated health plans, by integrating our system with existing mobile health and medicine tracking applications. Having a user-friendly widget, displaying the latest changes in the user's biometric and fitness data, would significantly improve health awareness and allow for early risk detection. As such, we plan to expand and test the current sys-tem in the light of health management and awareness services, especially when it comes to medicine reminder services, such placed on the mirror display.

This figure shows the over all architecture working of mirror. When we want to built mirror then it will look like this.This is final representation ofsystem..This is a user-friendly system and it will have great future scope

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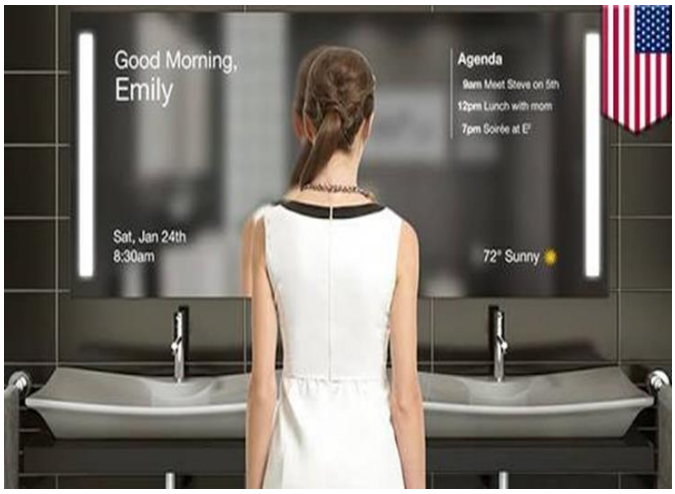

CONCLUSION

This paper proposes a futuristic smart mirror system that provides users with an easy-to-use mirror interface, allowing users access to customisable services and provide interaction between human and computers. This facilitates the vision of ubiquitous and pervasive computing, as well as Ambient Intelligence and smart environment concepts in our everyday lives.

The proposed system allows users to utilise this object as an interactive interface for displaying a variety of information services and regular updates from different domains of social media and news outlets. These can be customised by utilizing mirror as well as basic informations on mirror and home automation services. This is a screen within the two-way mirror and it gives basic informations as well asrecognition of voice. This happens in an automated manner as soon as voice is detected . For example if we want to turn on fan or ligh we need to say "Turn On Light" in front of mike and it will recognize that voice. This is very big advantage and better feature in Home Automation system. Due to this wecan add many things which comes under future scope. This system have very large future scope. Overall, the proposed smart mirror system incorporates various functionalities to grant users access to personalised information services and a control smart appliances and it is very usefull for human.

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