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Design and Implementation of Internet of Things Based Smart Mirror Using Raspberry Pi

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***Abstract*- In this paper, we describe the design and development of a futuristic mirror that offers simplified and customizable services to the home environment. .It is a small contribution towards smart home. The mirror interface provides users with the versatility needed for better management and integration of daily tasks. On a par with the recent advances in the Internet of Things standards and applications, the mirror is designed to enable residents to control the household smart appliances and access personalized services. The proposed system is set apart from others for its provision of various customized information services for user profile generation.**

***Keywords*- Raspberry Pi, Voice Commands, Smart Mirror.**

I. INTRODUCTION

The Future of Mirrors is here. Smart mirror is basically a one-way mirror. Made "Smart" by a simple LCD display which sits behind the mirror and displays white UI elements with a black background. When the display is on, we can see both our reflection and the white elements, allowing software to present relevant information while you get ready for the day. Beyond taping our handsets to our bathroom mirror, are there any smart mirrors out there.[2]The mirror is an interactive device that functions as a mirror while it responds to human commands.

The mirror is equipped with peripherals like Raspberry Pi, Microphone, Speaker, LCD display, one-way mirror. The mirror displays Newsfeeds, Weather Updates, Upcoming Holidays and Compliments. It involves voice processing as well which allows the users to interact with the mirror with voice commands. [3]Smart mirrors arise from transformation of conventional mirror into an interactive display element with special interaction capabilities.

The mirror surface is an best example of natural surface since it takes part in our daily life.[5] Our lifestyle has evolved in such a way that optimizing time is the most important thing. Our work is based on the idea that we all look at the mirror when we go out, so why wouldn't the mirror become smart.[7]In the past few years mankind has seen a huge rise in the utilization of smart products like Smart TV, watches, Assistants like Alexa and Google home, etc., Such a system is now being incorporated into a mirror making it more user-friendly and more intelligent. These applications are just the tip of the iceberg as they can be used in households, restaurants, hospitals, airports, etc., The effective application is in a regular household. Imagine being busy in a household chore and a person wishes to play any video or listen to music, in such situations a smart mirror is useful. The user has to just command using his voice which the mirror acknowledges and acts accordingly. Performing the same action using a phone would probably take 2 minutes whereas the smart mirror can do it in less than 10 seconds. Thus it is far more effective in terms of speed and reliability. The user also has the easy access to the mirror as he needs to command using voice compared to the exhaustion caused by typing on a small screen.

II. RELATED WORK

Hossainet. Al designed a mirror with an interface which integrates both personalized data feeds and computing intelligence services for controlling home appliances. Mirror can be embedded with various electronic features such as GPS navigation, Bluetooth connectivity, wireless communication which enables voice recognition and hands-free calling. Phillips Home lab Is A test bed For Creating Perspective And Context-Aware Home Environments Intelligent Personal Care Environment Uses An Interactive Mirror In The Bathrooms To Provide Personalized Care Environment Uses An Interactive Preferences.

For Example, Children Can Watch Their Favorite Cartoon While Brushing Their Teeth. The Mirror Can Provide Live TV Feeds Monitor The Latest Weather And Soon. The Mirror Is A Combination Of One Or More LCD Flat Screen Display Specifically Combined With A Mirror Surface And Connected With A Central Processor To Provide The Intended Services. The

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Interactive Mirror Service As A Provide Ambient Feeling In The Home Environment. The Work In Propose A Magical Mirror As An Interface To Provide Basic Services. The Intended Services To Offer Are Interactive TV, Specific Weather, Date And Searches.

III. PROPOSED SYSTEM

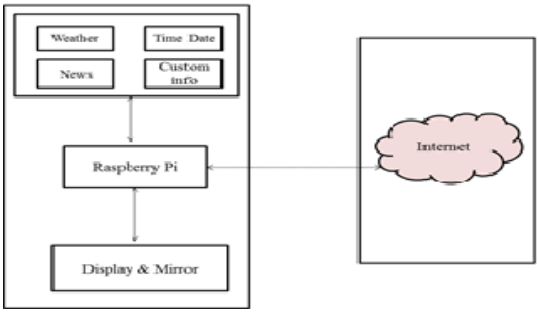

Fig.1 Proposed System Diagram.

The system consists of a LCD display screen with a one-way mirror over it. The display is attached to Raspberry Pi programmed to manage all the display functionalities of the system. The mirror will give the feature of letting any person to view themselves in the mirror and the LCD is used to show the weather, time & date, Gmail notifications, etc. This smart mirror will be taking voice commands as input, process them and give the output accordingly. The voice commands will be given such as play music and get scores.

IV. SYSTEM SETUP

The hardware integration involves using a LCD screen .Basically the screen will be placed behind the spy glass. The LCD display will be connected to the Raspberry pi, which will control the functionality of all the parameters as Weather Update, Newsfeed, Upcoming Holidays that are to be displayed on the mirror. We can also use one way mirror with acrylic sheet for transparency purpose. LCD display is to be connected with the raspberry pi with the help of HDMI cable, VGA HDMI converter.

V. RESULT

The smart mirror system we have developed implements all the features like smart phones. It is an interactive system that is reliable and easy to use. We have concentrated on an user friendly and interactive home appliance that is beneficial for the users. The mirror when powered on will show Newsfeed, Upcoming Holidays, Compliments according to the time, Weather updates.

V. FURTHER WORK

This IOT based project can be developed in a various ways not just home automation but also factory and power plants can be automated. Electricity can also and other activities can also be monitored by this setup. To certain extent this can be implied in vehicles to where the car can be controlled by voice automation.

We can connect a person's total life using this setup by linking every data to this automation setup. So in near future you can handle every work from home itself. Artificial intelligence and machine learning can also be incorporated to make the smart mirror to make it more interactive and efficient. Security can also be increased due to incorporation of artificial intelligence and machine learning. Various sensors and also augmented reality could make smart mirror more efficient in use and also maps and streets can be monitored closely using voice commands and augmented reality.

Health monitoring could also be done using smart mirror we could connect sensors from a person's body to the smart mirror which could keep a track of a person's physical conditions at all times. So in case of an emergency the smart mirror sends alert to the user and ambulance to. A baby's day-to-day activities can also be monitored. Using AI and machine learning the user can be notified when the baby is hungry or needs any other necessities.

VI. CONCLUSION

Smart mirrors have great potential to enhance user experience of accessing and interacting with information. This paper proposes a smart system which allows users to utilize a household object as an interactive interface providing customizable services. The mirror allows the user to access various notifications while on the go. Thus saves the efforts for accessing the personal device like mobile, laptops for getting the updates like news, weather, etc.

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