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Raspberry Pi Powered Magic Mirror

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ABSTRACT: The Internet transformed our lives by connecting us more easily to information and other people in the virtual world. Mobile phones then became smart-phones and since then this concept has erupted and morphed into the Internet of Things, things which connect us to everyday objects. There is no end of objects that could be made “smarter”, some being more suited to this than others. Mirrors, for example, provide a large surface ideal for displaying information and interacting with. Most people have mirrors at home so the concept of a smart mirror that we can interact with is attractive. The device was to go beyond an ordinary mirror. The device was to look like a regular mirror but would have a screen inside and you would be able to interact with it. The main features would be showing basic weather, location based time information, reminders etc.

KEYWORDS: Smart Mirror, Raspberry PI

I. INTRODUCTION

Everyone knows what a mirror is. It is an object found in most people's homes. In mirrors we see our reflections. But what happens when you combine the idea of a mirror with technology? What possibilities are there and how smart could a mirror be? An idea which aimed to develop a smart mirror and a small operating system to power it. The main goal of this project was to develop a smart mirror device as well as an operating system to run on similar devices. The main features the Smart Mirror would have would be showing basic weather and time information, being able to add alarms, reminders or notes in a similar way we stick notes on a fridge. To overcome all this issues a system called SMART MIRROR is proposed.

The world we live in today has become a place of the fiercest competition, whether it is in sports, entertainment, or the job market. In order to be the best, one needs to allocate an extraordinary amount of time to their goals with little distraction. However, the advent of information technology tends to act like a dual-edged sword when it comes to work productivity; sometimes one can use the ease of information to help them complete a task, but it can also provide significant distraction. Ultimately one strives to be their best, but the interruption of keeping up with the daily news, or preparing for incoming weather can hinder one's progress. Taking time throughout the day for these various activities can be extremely distracting and greatly cut into performance. Along with information, people greatly value their appearance, spending approximately an hour a day in front of the mirror during their morning and night routines. This is a significant amount of time where important things are taking place, but the mind is not working. It would be extremely useful to spend that time on the phone or computer completing any of the tasks mentioned above, but unfortunately it is difficult to do so while preparing for the day. A product is needed that can allow a person to efficiently complete everything they need to do to prepare for the day, all in one place and at the same time. The goal of the Smart Mirror is to provide a single easy to access location for a person to receive all the information that could affect how they prepare for the day. Through the use of LCD displays and a two way mirror, weather, time and date, and news are available at a glance. Additionally, a user friendly interface, accessible from any WiFi enabled device, allows the user to easily setup the connection to their home WiFi, change the location from which they receive the weather, and select a source from which to receive the day's headlines. By building these features into a mirror, which most people will already be using in their morning routine, it is possible to present this information in such a way that it will seamlessly blend together with the task of morning grooming.

II. LITERATURE REVIEW

The design and the development of an interactive multimedia futuristic Smart Mirror with artificial intelligence for the ambient home environment as well as for commercial uses in various industries. The project which would collect real



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world machine data and the data would be transmitted from the machine and would be managed by the Raspberry Pi. The Smart Mirror implemented as a personalised digital device equipped with peripherals such as Raspberry Pi, microphone, speakers, LED Monitor covered with a sheet of reflective one way mirror provides one of the most basic common amenities such as weather of the city, latest updates of news and headlines and local time corresponding to the location. Using speech processing techniques the Smart Mirror therefore interacts with the user through verbal commands, functions and listens to the user's question and responds them adequately. International Journal of Electrical, Electronics and Data Communication, ISSN: 2320-2084 (Volume-5, Issue-1, Jan.-2017).

The authors believe that the introduction of this digital information technology will have wide-ranging implications, which will for the most part be beneficial and valuable. The pa-per describes the design and development of a futuristic smart mirror that represents an un-obtrusive interface for the ambient home environment. (October 2007) the design and the development of an interactive multimedia futuristic Smart Mirror with artificial intelligence for the ambient home environment as well as for commercial uses in various industries. Pa-per: Ambient Intelligence Vole 5, No 4 (2004).

III.METHODOLOGY

The device is look like a regular mirror but would have a screen inside. A smart mirror is basically a mirror with a screen behind it. That screen can be an Android tablet or a computer monitor. The project which would collect real world machine data such as location based latest news and headlines, weather reports, and as well as show us the local time. The data would be transmitted from the machine and would be managed in a central database and would be managed by the Raspberry Pi. The Smart Mirror implemented as a personalised digital device equipped with peripherals such as Raspberry Pi, microphone, speakers, LED Monitor covered with a sheet of reflective one way mirror provides one of the most basic common amenities such as weather of the city, latest updates of news and headlines and local time corresponding to the location. The mirror display is provided by a flat LED display monitor which displays all the necessary information which are useful for the user. The mirror also provides a picture-in-picture sub-display to facilitate the display of services.

A one way mirror is used to provide real time display of what is located in front of the Smart Mirror using Raspberry Pi thereby mimicking the function of a regular mirror The mirror is eventually a technologically augmented interaction device. The objective of designing the mirror is to provide a natural interface in the ambient home environment for accessing various services such as location based weather, time, calendar etc The project includes downloading the Raspbian operating system based on Debi an and extracting the image on SD card, inserting the card in the Raspberry PiSD slot an then performing the required steps.

The key features of design are:

- Facial Recognition: A webcam placed behind the mirror is used to recognize the user standing in front of the mirror. By recognizing the person , the mirror then knows how to interact or behave next
- Customized user profiles: The output of user recognition then triggers the display of the interface. The interface is designed as per the user. The interface allows a user to view Rich Site Summary (RSS) feeds of social media and email, have access to maps, calendar, weather and time.

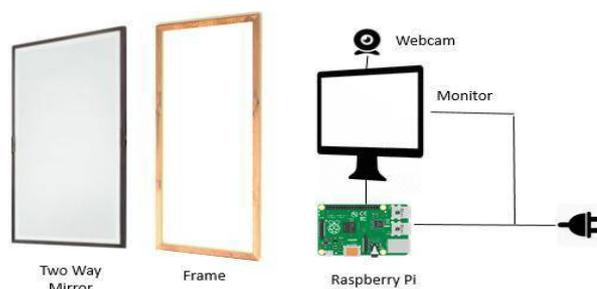


Fig.1:Overview of Smart Mirror



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Vol. 6, Issue 12, December 2017

IV. WORKING AND REQUIREMENTS

This system called SMART MIRROR is proposed to integrate different devices.

• In 2014, Toshiba developed a TV on this very concept which includes touch functionalities as well, but all in all it was a TV acting as a bathroom mirror.

This concept has been materialized by quite a few people around the world but until now a casting stick and a TV has been used for the display, the concept of mirroring one screen another onto another wireless on a wifi network hasn't resulted in a final product.

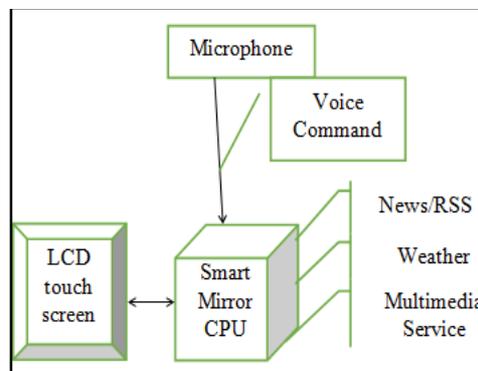


Fig 2: Block Diagram

The objective is to provide a natural interface in the home environment for accessing various services such as location based weather, time, calendar etc. It includes downloading the Raspbian operating system based on Debian and extracting the image on SD card, inserting the card in the Raspberry Pi SD slot and then performing the required steps.

- The working is based on raspberry-pi.
- That screen can be an Android tablet or a computer monitor.
- The project which would collect real world machine data.
- Use of speech processing techniques and speech recognition.

Use of image detection.

- Displays all the necessary information which is useful for the user.
- Flat monitor is used for display.
- Two way mirror is used
- The mirror is eventually a technologically augmented interaction device.
- Provide a natural interface

Location based weather, time; calendar etc can be accessed with ease.

Working:

- Preparing the monitor: The monitor is unmounted and the necessary taping is done.
- Preparing the Cabinet: The wooden cabinet is prepared which holds the complete mechanism inside it.
- Mounting: The mirror and the monitor are then mounted on this wooden cabinet.
- Configure the Pi : The raspberry pi 3 is configured
- Configuring Sound
- Configuring Voice
- Configure the smart-mirror
- Setting up Smart-Mirror to Run on Boot
- Commands Used to Run Smart Mirror



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Requirements:

- Two-way mirror

A special mirror known as a two way mirror or observation mirror is used in this project. A two mirror is special as compared to an ordinary household mirror. Unlike a household mirror, the two way mirror is not painted with an opaque color on the back, instead its left untouched. This gives the property of the mirror being reflective one side and transparent/translucent from the other. Hence the two way mirror acts as mirror as long as there is no light send from the back of mirror.

- Raspberry Pi

Raspberry Pi is a credit-card sized computer by the Raspberry Pi foundation. The Raspberry Pi has a Broadcom BCM2837 system on a chip (SoC), which includes 4 ARM Cortex-A53 1.2 GHz cores as the processpr, VideoCore IV GPU and with 1 gigabyte of RAM. It does not include a built-in hard disk or solid-state drive, but it uses a microSD card for booting and persistent storage. It also includes Bluetooth 4.1 Low energy and a 2.4 Ghz 802.11n Wifi [12]. The Raspberry Pi is the back bone of this project and is used to fulfill all computational requirements. The Raspberry Pi computer has come out with various versions over the years. Our project employs the use of Raspberry Pi 3 Model B. A microSD card is used to store the operating system and all the software related code for the project.

- Display
- Microphone
- Sensors.
- Wooden Frame

V. CONCLUSION

The Smart Mirror provides the user with an enhanced mirror experience. By making use of multiple displays, the user can stay updated on the time, weather, and news headlines while preparing for the day in with the fully functional Smart Mirror. Hence designed a futuristic smart mirror that provides natural interaction between users and the ambient home services. The mirror display is provided by a flat LED display monitor which displays all the necessary information which are useful for the user.

The system can be made much more useful to the users by adding more functionality like integrating light settings, speech processing, etc. The user didn't even have to worry about turning on and off the system because the mirror will detect motion and do the work for them.

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