Smart Mirror

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Abstract : Implementation of an interactive multimedia mirror system is called "Magic Mirror". The Magic Mirror can be implemented in existing personal computers or hand-held device with normal peripherals and regular reflective glass by integrating image/speech processing, Internet connectivity, and 3D and multimedia. In this era of evolving technology, the human life is becoming simpler and time efficient. This paper depicts the design and development of smart mirror which will make our everyday life easier and time efficient. Smart Mirror is a simple mirror which has been enhanced by the help of technology. The aim of the smart mirror is to provide an easy way to information service such as news feeds, weather, clock etc. It also provides some basic AI features like real time interaction with users and so on. The Smart Mirror CPU is the Raspberry Pi 3 computer and the framework that retrieves data from the web through the Wi-Fi connectivity. Through facial recognition and speech recognition model, Smart Mirror can identify the user. In today's society information is available to our phones, our laptops, our desktop and more. The one that concerns the common man is now it can be used to make day to day life easier and faster. This project which would collect real world machine data and data would be transmitted from the machine and managed by the Raspberry Pi Board. This Smart Mirror is latest version of Raspberry Pi .The mirror provides most basic common features such as Weather of city, Updates of news and Headlines corresponding to Location. The future is here! Imagine yourself reading news feed or checking today's weather while dressing or shaving in front of the mirror. The aim of the project is to achieve such a device, and incorporate cutting edge features. The Pi will connect with the internet to retrieve real-time information to display on a monitor. By hacking the monitor open, a one-way mirror can be placed on top to achieve a smart mirror!

Keyword : Airtificial Intelligence,Raspberry Pi, ICT.

1. INTRODUCTION

Time is what we want most, but, what we use worst - William Penn. Time management is an important aspect in our life. Multitasking along with technology helps us to maintain an efficient schedule. Recent advancements in technology has paved way to automate things around us. Smart phones, tablets, Personal Computer's provide us, up-to-date information with respect to current news, social media, personal appointments but still they all are a means of distraction as they interrupt one's routine. They cannot be carried everywhere as there is a risk of damage. Our solution to the problem is to turn the mirror Smart. Usually the sole purpose of the mirror is for personal grooming / admiring oneself, decoration and architecture. This odd time can be managed efficiently. Smart Mirror is embedded with various electronic features. Smart Mirror as a personal assistant plays an important role for people with tight schedule providing quick updates of current trending news, day-to-day appointments as well as local time and weather reports of the day. Further it can be extended with features controlling the electrical things of bathroom environment.

2. EASE OF USE

A. *Magic Mirror*

Magic Mirror aims at augmenting the basic reflective mirror with embedded intelligence to combine daily routine tasks like reading newspaper, getting stock updates, weather updates etc. and providing all that data to the user while he/she gets ready.

B. *Interactive communication Technology (ICT)*

The world around is constantly changing. Interactive computing with wirelessly connected device that are being used in various day to day Activities that are changing and Improving the standard of the Quality Life. Based on this Interactive computing and communication technologies, Many Devices/ Products are now emerging and with this Multimedia Intelligence it is providing comfortable, secure And convenient personal services and making a lot of users comfortable. We have Smart cities, Smart phones, Smart cars and more. This fast way of Life requires the developments of home automation projects. Smart home designs to improve the comfort, convenience, and security of homes are becoming increasingly important in information communication technology (ICT) to enable new user-friendly services. Smart Mirror is developed to provide convenience for users in managing things and control the usage of electrical appliances in the house with network connection between the lamp and the device.

Interactive computing, with wirelessly connected embedded devices that are being used in various day– to– day activities, are changing and improving the standards of the quality of life. We look at the mirror daily and interact with it psychologically to find out how we look and how our attire is. The interactive mirror is a development effort to augment the mirror with proper embedded intelligence for offering enhanced features such as weather of the city, latest updates of news and headlines. . The Smart Mirror would help in developing smart houses. The Artificially Intelligent Smart Mirror is designed to perform several functionalities that can be explained, it will mimic a natural mirror interface through a flat LED monitor used for the mirror display. A one-way mirror is used in front of the LED monitor thereby mimicking the function of a regular mirror. For personalized information services the users will be able to obtain minute updates of latest news and public headlines, weather reports as well as get reports of our interests. .Most people have mirrors at home, so the concept of a smart mirror that you can interact with is

attractive and can be fantasized by anyone. At times no one has time to read the newspaper or switch on the TV right in the morning to check the news headlines or the weather forecast. If a mirror serves to this purpose, one can imagine the amount of time it will save and be of such a great use.

Smart Mirror functions both as a mirror and an interactive display displaying multimedia content such as time, date, weather and news simultaneously. The user can interact with it using voice commands.

A smart mirror will possess the ability to display advanced details and connect with the user's smart phone by using an Android application. It will also enable teenagers to be responsible at their work. The main focus is to save the time and make the day to do life easier and faster which is an integral part of home automation as well.

3. RELATED WORK

We have referred many reference papers, journals and lab works of other colleges and of other countries for our project. Those which were proposed for publishing purposes and also implemented for projects and DIYs. Developed countries have successfully accomplished this project and it's readily available in the market. Whereas, Developing countries have their best attempts to get revolutionized by making their best efforts to compete with the Technology. Indian Technology isn't lagging behind in this field. It's encouraging every individual to be creative in their ideas.

1)In the laboratory of Tianjin University Of China they have proposed a paper on Smart Mirror Using Raspberry Pi where they have concluded well: They used Raspberry pi as host controller and used over internet and obtained many widgets like weather information, time and date using API interface designated by the extra net. They have implemented it with face and voice recognition system and home automation. Its advantage is its portable, user friendly and cost efficient. They have Mimic a natural mirror interface. They used A flat monitor for the mirror display. 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 profiles and store them in the system. According to this profile, customized services are provided to the user.

*2) We also went through a Review Paper of International Journal Of Engineering Science Invention (IJESI) proposed by SITRC of Pune :*They designed their Smart Mirror which provides a Picture-In-Picture sub-display to facilitate the display of services such as Maps and Videos via YouTube. They have displayed their model idea on LED display monitor which displays all necessary information. They attempted to contribute the model of Smart mirror like interface as well as smart environment to use for interaction. They have tried to promote the use of Ontology to personalise the services. They have used open Standard like Web services to communicate with devices and have customised various personal devices for users need.

*3)Another Journal Paper that demonstrates our Project is of International Journal Of Computer Application proposed by BRAC University of Dhaka , Bangladesh:*Their Smart Mirror supported IoT and Home Automation which is used to optimise time of doing work and that helps one to increase daily productivity.AI was their main domain to overcome the tasks performed by human resources. They preferred to Personalize Information services: By which Users will be able to obtain minute updates of latest news and public headlines, weather reports as well as get reports of our interests.Mirror applications of theirs are based on face recognition which provides data feed of various websites and services. Their Mirror has the feature of providing news and weather reports as well as providing music and video playbacks. This was done with a MacOS and the music files were fetched from the hard drive of the Mac. Excellent feature of this project was the addition of a medicine box scanner, which allowed the user to buy medicines recognizing their prescriptions. Medical Mirror combines computer vision and signal processing technique for measuring the heart rate from the optical signal reflected of the faceTheir prototype consists of LCD display with built-in camera and a two-way mirror fitted onto the frame. The smart mirror recognizes the presence of a user when he or she stands in front of it and, after about 15 seconds, it displays the heart rate below the user's reflected image. The mirror application within a smart home environment, in 2004 Philips Research incorporated the concept of health care developing an Intelligent Bathroom. This paper presents the design and implementation of a multi-user smart mirror system conceived to promote wellness and healthier lifestyles in the work environment through persuasive strategies.

4. DESIGN AND IMPLEMENTATION

MagicMirror runs some modules like clock .calender, weather forecasting, news feed, compliments, hello word and alert.

Figure : Outlook

Raspberry Pi

The **Raspberry Pi** is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in developing countries. It does multiple tasks. It act as main centre for our proposed model. It is Tiny and affordable.

LCD Module

The **LCD module** used in our project is a 16-characters, 2 lines Microtivity IM161 (with back light). Considering its small size, ease of use and its yellow back, we think it is the best candidate for our project. We found the yellow back light make it easier for the user to see the characters displayed on it, even in the dark environment. Currently, we didn't have the back light adjustment feature in our circuit. In the future, we will add this feature to our device so that the user can dim the backlight during certain circumstances.

Pin 1 of the LCD module is connected to the ground. Pin2 is connected to the power supply of the MCU. Pin 3 connects to the wiper of the 10k trim pot. Pin 4 is the register select, which is connected to the C.0. Pin 5 is the data read/write, which is connected to C.1. Pin 6 is the enable signal, which is connected to C.2. Pin 11 to pin 14 are the data bus, which are connected to C.3-C.7. Pin15 and pin16 are the LED power and ground for the backlight. The optimal power and current for the led backlight is 4.2V and 20mA.

Acrylic Mirror

For purpose of dual functionality a two way glass mirror called acrylic mirror is used. It is cheaper than normal mirror. It is brighter in vision , light in weight.

Monitor with HDMI-in

Monitor is used to display information. It act as a peripheral device. From Raspberry pi the monitor will be getting input through HDMI cable.
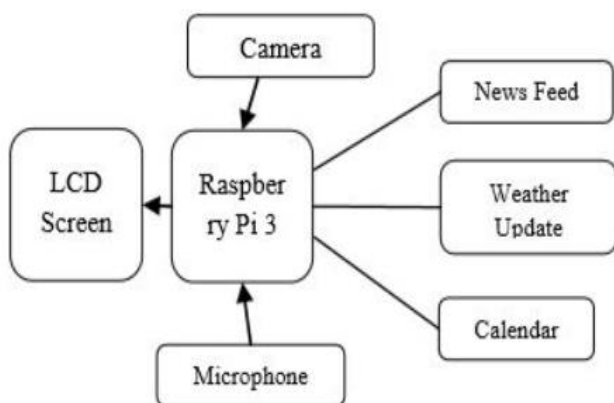

Figure : schematic of Smart Mirror

Software Used :

Rasbian OS: Free OS based on debian optimized for Pi hardware.Ease of installation.

5. CONCLUSION

As a conclusion, the application is the new technology for smart life. We have 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 mirror also provides a picture-in-picture sub-display to facilitate the display. Overall, the prototype provides an easily extendable framework that can be utilized to provide even more functionality to the user. The system can be made much more useful to the users by adding more functionality like integrating light settings, speech processing, etc.

We have designed an intelligent mirror keeping in mind the up-coming future advancement in the field of home automation environment. The prototype of the magic mirror is powered and controlled by the Raspberry Pi 3 and all the final output in form of real time data feeds are displayed on LED screen fixed with a two way mirror. We have built a working model to demonstrate various functionalities of the mirror using voice commands. It gives a layout that can be extended in future to accommodate even more functionalities. In our future work we will try to add advanced gesture controls, automated salutation using face recognition of the end user and also understand that how advanced artificial intelligence can be implemented to the mirror so that it can automatically take care of all the requirements of the end user. Efforts have been made to build an efficient and intelligent smart mirror that optimizes our time of doing works and increases our daily productivity. The Smart Mirror will play an important role in the field of IoT and home automation. Not only this can function as a normal mirror but can also provide other functionalities like weather forecast, calendar, time, etc. which makes it more desirable. The functionality of the mirror can be expanded by connecting it to other home appliances, mobile devices, etc. Smart Mirror can be a great example of how AI can be integrated into home appliances to make our life easier, efficient and more enjoyable. In future, Smart Mirror can be made smarter by upgrading the AI. There is still a great scope to improve the AI. Soon, normal mirrors will be replaced by smart mirrors if they can be made affordable.

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