

IoT based Smart Mirror

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Abstract - The future of Home Automation depends on IoT, i.e., Internet of things. Even though the applications of IoT are diverse, the one that concerns the common man is how it can be used to make day-to-day life easier and faster. This is where Home Automation using IoT comes into the scenario. In this paper, we demonstrate the functioning and working of a smart mirror. The mirror will possess the ability to display the calendar, current weather condition, date and time, and outside temperature. These features of the mirror will be gathered from the Internet and implemented using the raspberry pi 3. The raspberry pi board is programmed with the Raspbian OS which is part of Linux. The mirror will also be adjustable, aesthetic, durable and lightweight. This paper presents the application and implementation of the smart mirror and how it is an integral part of home automation.

Key Words: Internet of Things, Raspberry Pi, Home Automation, Mirror, Python

1. INTRODUCTION

In this world everyone needs a comfortable life. Modern man has invented various different technologies for his purpose. In today's world, people need to stay connected and they are willing to access the information very easily. Whether it is through TV or internet, people need to be informed and kept in touch with the current affairs happening around the world. The Internet of Things means interrelation via the internet of computing devices embedded in day-to-day objects, enabling them to receive and send data. The Internet of Things with its enormous growth widens its applications to the living environment and surrounding of the people by changing a home to smart home. Smart home is a connected home that connects all type of digital devices to communicate with each other through the internet. Man's 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 smarter. A common approach for building a smart mirror is to use a display, a frame to hold the glass, good quality one-way glass, and a web browser with python to provide the features of software and drive the display.

The purpose of mirror in our day-to-day lives is to observe and interact with ourselves. The smart mirror is a development effort to augment the mirror with proper information for offering better features that provide personalized data such as date, news, regional time corresponding to the location, and weather. As per the survey, we waste almost 30 minutes on washing, makeup, and wearing after getting up, and these 30 minutes are also the time for us to observe in the mirror. In order to acquire full use of this time, in the mirror at same time, can completely access the relative information of the day, this project indicates a kind of smart mirror can be used in the home. The mirror will resolve the problems that many people experience in their day-to-day lives, getting information without distraction. Before going to bed, the user may want to know whether it will rain the next morning so that they can plan their next day's schedule.

This project has been developed with the idea of making smart home to save more time. The Internet drastically changed our lives by connecting us more easily to information and other people in the virtual world. The current state of innovation is to provide more information with less interaction to get it. The device that has been designed is called "Smart Mirror". It is a wall mounted mirror which displays relevant items to the user such as date, time, news, temperature, weather and other fields of interest. IoT emerged the idea of remotely keeping track of objects through the Internet.

1.1 Problem Statement

The main aim of the smart mirror is to provide an access point for a person to receive all the information that could affect how well they plan for their day. For getting news and weather updates, a person will always have to switch on the TV which is time consuming. To get rid of such problems, the smart mirror concept is introduced. All the necessary information like news and weather can be accessed from one location. With the use of display and a mirror, calendar, date, time, news, weather, and other useful

information programmable through the smart mirror would be available at a glance.

2. LITERATURE REVIEW

During the implementation a smart mirror, the first question which arises is “What is the need of a Smart Mirror?” In the recent years, technology has become an important part in day-to-day lives. Technology has been integrated in many electronic devices. But the main motive of designing a ‘Smart Mirror’ is to bring technology in a traditional household mirror and making it smart. This gave rise to a new definition of a smart mirror: “a smart mirror is a mirror with additional features and functions, with the aim of introducing abilities for human interactivities”.

There was always a need of introducing or designing a device which would help in planning for a day’s activities by doing other household activities. A mirror is one such common place where we visit often and therefore can get basic details such as time, daily news and weather, etc.

Internet of Things (IoT): The concept of smart mirror rotates around the development of Internet of Things (IoT). IoT is a grid of physical devices, having electronic or software functions connected together to exchange data. The main aim of IoT is to create a computational path for connecting all the devices connected to it. It provides a means of communication between people and things and between the objects itself.

Home automated smart mirror is another domain which has IoT implementations and applications. Even though applications of IoT are diverse, this research paper helps in using IoT for making life more easier and simpler. The mirror has the ability to display date and time, weather conditions, news updates, etc. With the help of IoT, a mirror can be enhanced to perform as browsers. We can get access to news instantly. The machine required for computing is a raspberry pi 3 which does not require large space.

With the Government of India setting an objective of creating an IoT industry of USD 15 billion, the entire country is soon going to get connected to the internet regardless of their location. In the near future, regular homes will be equipped with plentiful devices with an Network Interface Controller that lets them connect to the internet and interact with each other to cater to the user.

The origin of the idea lies in designing a commercially viable device (viz. in this case, a mirror), to provide basic available open source information to the customer. In an age of information, the user requires necessary data to be delivered as an integral part of daily activities. A mirror being an excessively common appliance used in most middle class homes, we choose it as an initial starting point for a broader implementation in the future for the delivery of customize able information.

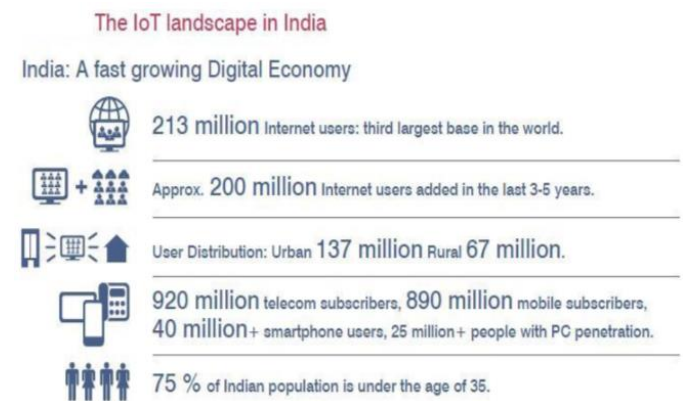


Fig -1: IoT Landscape In India

The ideal Serviceable Available Market (SAM) would, in this case, equal the Total Available Market (TAM) only when this project is taken up as a full-fledged implementation. However, in the current state, the ideal SAM covers the upper middle class households interested in and aware of the benefits of integrating automation in their home. Those interested in implementing the said project in their homes will generally be a consumer base involved in the building of a new home, which further narrows the current market. However, the feasibility and simplicity of the final product can bind undecided potential customers.

In 2014, the smart home industry generated a revenue of USD 79.4 billion, making one of the fastest growing and most favorable industries under the IoT domain. It is no wonder that Alphabet’s Nest, Apple’s HomeKit, and Samsung’s SmartThings are already exploiting the market. With the numbers expected to rise each year, it wouldn’t be too distant in the future when a smart mirror is integrated into the regular human’s day-to-day life as his ‘unsmart’ mirror is today. When that happens, it would be adorable to be placed at the helm of it all.

VanityVision and Microsoft’s MagicMirror are the two most primary competitions to the current project. With both products having achieved unique implementations of the idea in themselves, both fall short in one aspect

or another. Both products require the users to implement a DIY which implies that users have a basic knowledge and understanding in coding and connection. Also, the products use a relatively expensive motion-sensing device.

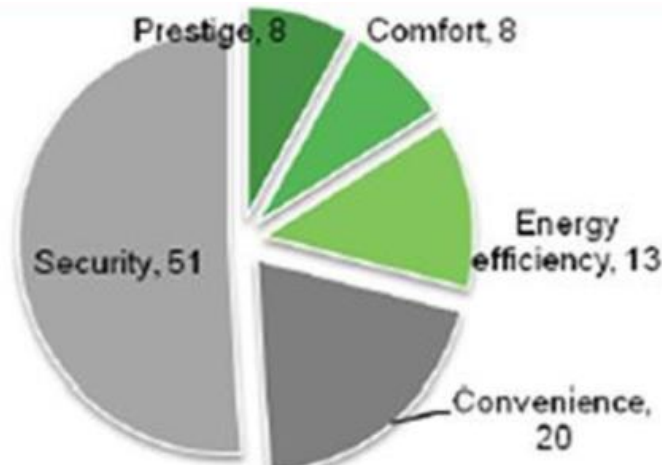


Chart -1: Primary Motivator For Smart Homes (%mentions)

What the project in question attempts to design is a finished basic interface piece that can be installed in a home or in a commercial space that renders basic data to its users which can be expanded upon later. The idea is assisted by the understanding that the consumer does not necessarily grasp the programming of the devices used, and is therefore, merely an end user.

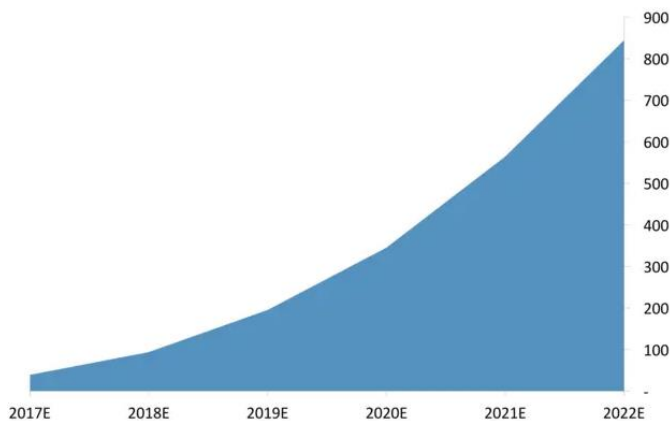


Fig -2: Smart Home Adoption Curve (Total Installed Smart Home Devices)

3. PROPOSED SYSTEM

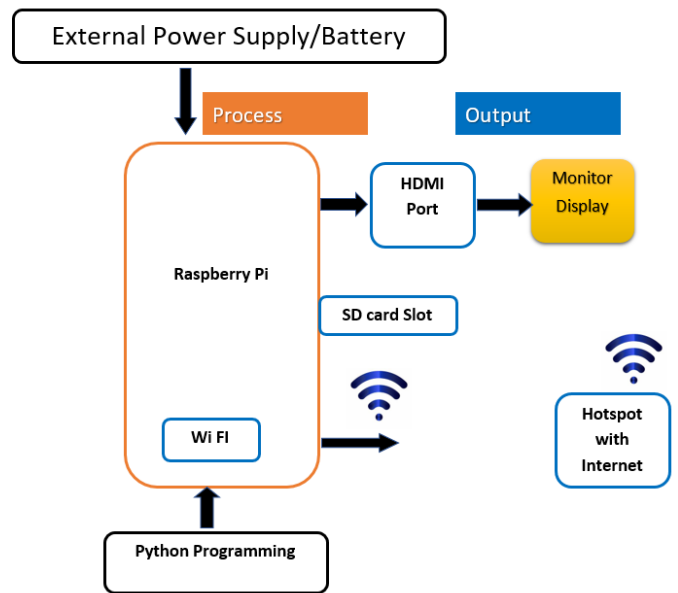


Fig -3: Block Diagram Of Smart Mirror

The proposed system is to design and implement an interactive futuristic smart mirror using Raspberry Pi 3. Interaction computing, with wireless connected embedded devices that are being used in various day-to-day activities. Based on this technology, many devices/products are now emerging in the market and with this intelligence it is providing comfortable, secure and convenient personal services everywhere. The project aims at creating a smart system for users where it displays basic details like date, time, news and weather.

4. INNOVATIVENESS OF PROPOSED SYSTEM

The normal mirror will turn into smart mirror and the peripherals such as display, mirror and Raspberry Pi will provide features such as date, time, news and weather.

5. SOCIAL IMPACT OF PROPOSED SYSTEM

5.1 Solution

It is useful to see the latest news updates, headlines in less time as there is no need to start a television. Also we get the information about date and time, calendar, and weather of the city.

5.2 Advantages

- i) Less time required to see the news
- ii) Has offering features such as calendar, date, time, news and weather of the city
- iii) It makes day-to-day lives easier and faster.

5.3 Applications

- i) In Home Automation In industries
- ii) In Schools/Colleges
- iii) In Industries

6. CONCLUSION

On the basis of this literature survey we aim at designing a smart mirror that provides an ambient environment between user and the internet. It will help the users in their day-to-day activities. The smart mirror can also be designed and implemented in various industrial and home applications. Therefore IoT proves out to be an important technology for making household appliances smart. Smart mirrors have the ability to connect to home appliances and smart phones. With the help of the emerging technologies, smart mirrors can be advanced to touch screen modes. The mirrors can be better enhanced to be utilized in beauty parlors, cloth shops, hotels, etc. with better advancements in technology, mirrors can be used in many other fields too.

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