**AI Based Smart Mirror For Home Automation**

**Abstract:** The vision of Ambient Intelligence has brought a new twist to the decade old research and industry initiatives in realizing Smart Environments like Smart homes, Smart localities leading to Smart cities. Artificial intelligence plays a major role in home automation which includes voice assistants, smart mirror, motion detector, automated doors etc makes a person’s life easier. This project is a stepping stone for the ‘Smart City’ plan taken by our PM. The focus is to develop a smart home that includes voice assistant as a prominent feature to control various electronics gadgets to carry out daily tasks. As an initiative we have developed a prototype of Smart mirror using Raspberry pi. Features such as displaying weather forecast, temperature, news feeds and calendar are included in the mirror. These mirrors can be used in Airports, Malls and residential buildings making them smart. There is scope for including many features. The objectives of this projects are to describe the design and development of a futuristic mirror that offers simplified and customizable services to the home environment, the mirror interface provides users with the versatility needed for better management of daily tasks, we can implement the same thing in Gathering places to provide a better interaction, experience which gives a smarter feel to the user in an existing world.

**Keywords:** Home automation, Ambient Intelligence, Smart Mirror, Voice assistant, Smart City, Raspberry-pi, Smart Home, Smart Environment.

* 1. **INTRODUCTION**

The world and everything around us is constantly changing. With the advancement of science and technology we are moving towards a more automated lifestyle. We have the thoughts of smart cities, smart homes, smart cars, and more. This modern way of lifestyle requires further development of home automation projects.

Home automation systems are mainly created using Internet of Things (IoT) devices. IoT is an integrated system of communicating devices in which each device has the ability to carry out tasks autonomously, using IoT for home automation has many real-world applications, for example, we can build a smart home which will automatically close or open the windows based on the weather conditions outside or even turn the lights on and off in a particular room.

This paper gives you the implementation of a Smart Mirror using IoT devices with the help of a Raspberry Pi. A mirror is an essential part of everyone’s daily routine. What if they could look into the mirror and see something more than themselves? What if your mirror could let you to know that you have an important business meeting at 4 PM today? What if the mirror could tell you that it’s cold outside and recommend you to wear a sweater? For this purpose, we introduce an interactive Smart Mirror.

A Smart Mirror is capable of displaying the time, date, calendar events weather and news feed. These features will be obtained from the internet and implemented using the Raspberry Pi. The Raspberry Pi runs on the Raspbian Operating System (OS), an easy way to building a Smart Mirror is to use a sheet of two-way acrylic mirror, a monitor and a frame to hold the glass and monitor.

There are many benefits of using a Smart Mirror. It makes life easier as the need to look at phones every time we need to check the date or weather is reduced. The Smart Mirror can also be upgraded to display social media websites etc. Adding a motion sensor to the mirror will further increase the speed, ease of use, and will provide another interface for interaction. Now we can get dressed and read news or watch YouTube videos all at the same time and from a convenient place. We can also add voice assistants to communicate with us through voice. The voice assistants are helpful for voice based searching or any other tasks to be done. The Smart Mirror can also help in developing smart houses with integrated artificial intelligence, as well as finding its applications in industries.

* 1. **THEORY**

The vision of Ambient Artificial Intelligence (AMI) has made a great impact to the decade old research and industry initiatives in realizing Smart Environments. The AMI vision, promotes an environment where humans are surrounded by intelligent and natural interfaces offered by the interconnected different computing devices embedded into everyday objects. The environment thus created is capable of recognizing and responding to the actions and presence of individuals. AmI can be seen as the driving force toward a more user-friendly and user-empowered smart environment for providing effective support to human interactions. These technologies integrate sensing, processing, reasoning, and networking capabilities in addition to various different applications, services and digital contents.

* 1. **RELATED WORK**

The Smart Mirror is designed to perform several functionalities. It will replicate the functionalities of a natural mirror interface through a flat LCD monitor used for the display. A two-way mirror is used in front of the LCD monitor thereby replicating the function of a regular mirror. For personalized information services the users will be able to obtain very minute updates of latest news and other information, weather reports as well as calendar events. Smart Mirror depicts an interactive interface that provides access to personalized information and services.

Voice assistants are a growing technological trend, used in smart phones, tablets and computers. You can control many devices using speech recognition, a voice assistant jumps into action at the mention of a keyword. This is usually a wake command or a greeting that includes the assistant’s name, like “OK Google” or simply “Alexa”. Once it’s called this keyword pricks up its virtual ears, you say a command, or ask it a question. The voice assistant actually uses a technique known as “natural language processing” to understand what you said, and then either answer your question or obey your command.

* 1. **APPLICATIONS**

It can be implemented in houses in place of a normal mirror this in turn makes the room a smart room and by using IOT based appliances the features of smart mirror can be used in full extent for complete home automation, our homes can be completely controlled by our voice with voice assistant on the mirror for example controlling lights, doors, AC, TV etc by this the house is converted to a smart home.

By implementing the smart mirror in large scale the ideology of a smart city of our PM can be achieved, that is if there are many smart houses and if the smart mirror is implemented in various public places in the locality like in malls or any other people gathering places the locality in turn becomes a smart locality and then the same can be done to other localities which leads to a city becoming a smart city and many smart cities leads to the development of India into a smart nation.

* 1. **FUTURE SCOPE**

We have designed this futuristic smart mirror to provide natural interaction between the users and the ambient home services, successful implementation of voice control was achieved. The progress can be leveraged to incorporate more variety of voice commands and touch as well. Similarly, the research, tests and development made for the face recognition aspect can be used to incorporate face recognition and the functionality such as multiuser capability into the system. It is also possible to realize the ultimate aim of the project which is to integrate the device into a smart home system, there is also a scope for using it in transportation department for displaying the schedule and also in place of helpdesk at mass gathering. In this fast growing automation loving lifestyle there will be a good demand for IoT devices in the future and there will be a great demand for our product commercially

**1.6 CONCLUTION**

This primary design is a simple piece of technology that not only integrates with quietly few hardware components into a normal household item by also providing relevant information when it’s needed. We can perfectly stack up the functionalities of room to it, making user effortless and get a smarter look of room like the same way that will get to see from the movies brought to life. Same features can be implemented irrespective of size and display of mirrors which can be used as an informative assistance device in Institutes, Hotels, Shops and gathering places also.

**1.7** **REFERENCES**

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