IoT Based Digital Smart Mirror

Deepa Athawale[1], Niyaz Khan[2], Neha Jambhale[2], Aarti Shigavan[2], Rohit Baikar[2]

[1]Asst Prof Department of Computer Engineering & IETE'S Bharat College of Engineering
[2]BE Department of Computer Science & Engineering (AI/ML) & IETE'S Bharat College of Engineering
[2]BE Department of Computer Science & Engineering (AI/ML) & IETE'S Bharat College of Engineering
[2]BE Department of Computer Science & Engineering (AI/ML) & IETE'S Bharat College of Engineering
[2]BE Department of Computer Science & Engineering (AI/ML) & IETE'S Bharat College of Engineering

---

Abstract:

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. Here smart mirror comes in picture. This project has been developed with the idea of making home smart to save time and make your mirror more productive. The device that has been researched and designed is called Smart Mirror. It is a wall mounted mirror which displays relevant items to the user such as weather, time, date, temperature, humidity and news and other fields of interest. Smart Mirror emerged the idea of remotely monitoring objects through the Internet.

This mirror is intended to collect this information during the preparation of a morning routine in order to do so more efficiently and easily. As technology advances, smart mirrors will eventually replace traditional mirrors, providing users with both mirror and computer-assisted information services.

Introduction:

In this world everyone needs a comfort life. Modern man has invented different technology for his purpose. In today's world, people need to be connected and they are willing to access the information easily. Whether it is through the television or internet, people need to be informed and in touch with the current affairs happening around the world.

The Internet of Things means interconnection via the internet of computing devices embedded in everyday objects, enabling them to send and receive data. The Internet of Things with its enormous growth widens its applications to the living environment 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 each other through the internet. Nowadays, IoT is the major concept regarding all the devices and projects. The use of internet can be seen everywhere. It is estimated that by the year 2021, there will be up to 22 billion devices across the globe connected with 'Internet of Things' means every man can carry 7-8 IoT devices which will be continuously connected to the Internet. Our lifestyle is all connected to the Internet in other words Internet has become the essential need of human life.

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. A common approach for building a smart mirror is to use a high-quality one-way glass, an LCD monitor, a frame to hold the glass and monitor. With the continuous development of Internet of Things various household application have gradually become smart but the mirror, one of the most common things in life, is still in a relatively primitive state.

The basic goal of this project is to create a product called smart mirror that meets the needs of common person and receive the general information like news, time, weather and also other needy information. This mirror is designed with the ability to collect this information during the preparation of a morning daily life in order to more efficiently and easily. In future we hope that the project based on smart glass will enhance innovative and modern way of life.

Literature Review:

1. IoT Based Voice Controlled Raspberry PI Smart Mirror

The Alexa mirror looks like a regular mirror but, it has a screen inside it and the user immediately senses the sensor inside the mirror. Create and build a sophisticated Alexa display which is a perfect interface for displaying your details everywhere, such as schools, companies, etc. Without using a sim card, screen your mobile.

2. Smart Mirror using Raspberry Pi as a Security and Vigilance System

With the help of camera, touch and voice Smart mirror is given security for our house and the places it installs this product is as a cctv which helps to secure the install place.

3. Smart Mirror- Digital Magazine for University Implemented Using Raspberry Pi

The design of smart mirror using Raspberry Pi. This may look like the regular mirror but the difference is it displays weather, temperature, time, and web application for collage. The smart mirror is implemented using peripherals like raspberry pi, LED monitor covered with a two-way acrylic sheet. The microcontroller can connect to the Internet and can retrieve data from the internet which displays weather report of the particular location. This describes how smart mirror is built using the raspberry pi as hardware.

4. Smart Mirror using Raspberry Pi:

In this survey they are discussing about the idea behind the smart mirror how the technology has taken the world in different world as it saves time by its keep updating us by the latest news while doing our work.

5. Internet of Things Based Smart Mirrors: A Literature Review

Fashion Field

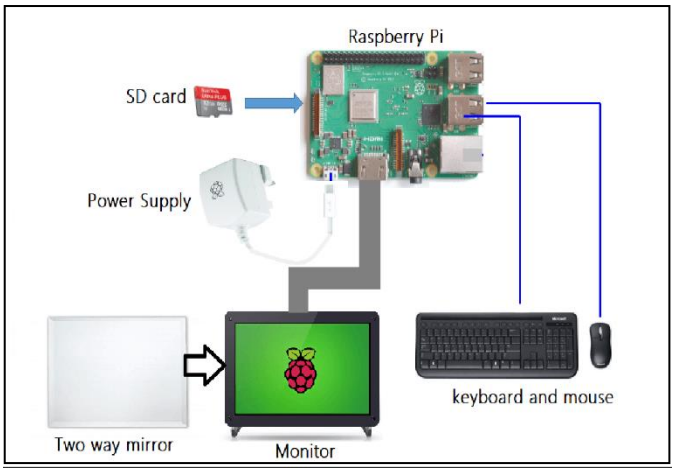
The authors have made a smart mirror as a virtual fashion consultant, which can analyze, estimate and recommend the appropriate wearing and outfits. Under fashion directions, the users have been guided to find out what to wear to make their own decisions by providing AR and gestures recognition. In addition, there are icons to choose the clothes in 2d visualization. In the authors have produced a Kinect based Virtual Reality (VR) system. It provides the possibility for the users to virtually try multiple handbags in front of a simulated mirror (TV screen) at home. In addition, the possibility of teleportation, which allows the users to see the handbags with different background environments. In the authors have designed a virtual fitting room through a smart mirror allowing people to design and try fashionable t-shirts virtually. Furthermore, a projector and a printer were connected to print the produced user-created designs through textile printers or on needlework machines. Generally, this system combined between AR and body pose tracking. In the authors have designed an automatic personal makeup system. The system implemented through a smart mirror, to determine makeup features that mostly fits for user's face by applying it on the facial images. In addition, the system was built during analytical users' faces with Machine Learning (ML) and AI techniques. In and, the authors have proposed a smart mirror, which aims to provide a system for the smart makeup mirror and lets the users to be able to apply different makeup styles on their faces in a natural way and enjoy this experience. The mirror helps to decide which makeup is right for the face. It provides convenience, efficiency and usefulness to users. In the system connected with a web page that allows friends to vote on makeup results that suits the user, whereas in users use 3D to apply the makeup virtually on their faces.

Sport Field

Sport Field In the main goal of this study is to interactively support fitness and wellness exercises for the visitors of the touristic resort. Moreover, it can evaluate the current physical state of the user by a technology-reinforced mirror. It consists of interactive home controller, AR and multimedia player. In general, it clarifies the scale of well-being by used some simple and compact indicators through provided mobile application. In the smart mirror, FitMirror, was created as an interactive device that aims to improve the user mood and increase motivation having a positive effect on the user's feelings. Moreover, FitMirror motivates the users to wake them up in the morning and to do their exercises at this time. In addition, the mirror was 15 associated with the Android Fit application to display the user's data of what they have done during a week of exercise, the user's pressure and stress. The user can connect with the system through touch or voice.

Proposed Work:

Smart Mirror is the latest advancement, where a mirror becomes interactive by providing the user with required information displaying on the mirror. An individual in his/her daily life finds it difficult to find time for news-updates or any other information. Hence Smart Mirror makes it way for making a conventional mirror to work "Smart".



-: Smart Mirror Architecture: -

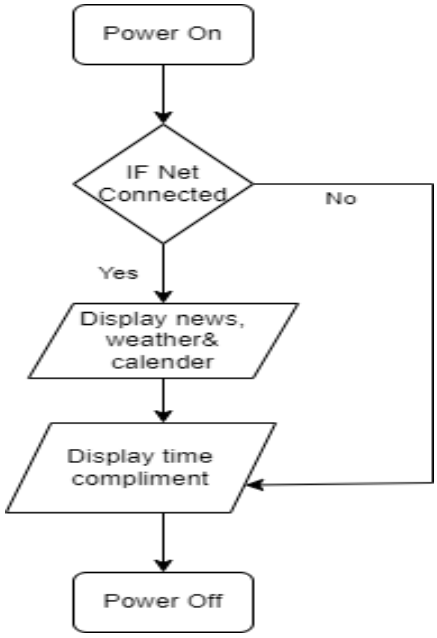
The architecture of Smart Mirror, where a two-way mirror, LED monitor, Raspberry Pi 3B+ is used. Raspberry-Pi 3B+ has built in wi-fi access such that the information which is displayed on the monitor is accessed via Wi-Fi. A two-way mirror with wooden frame is attached to the LED monitor, such that the information displayed on the mirror is appeared on the mirror.

Design & Methodology:

The Smart mirror is a device which displays the information required by the user as well works as conventional mirror. We have used an LED screen as an interface between the user and mirror. The monitor is connected to the Raspberry Pi-3B+, then the required information by the user is retrieved through Wi-fi access. The information which is to be displayed is pre-requisitely set by the user.

The LED screen is used to display the required information for the user. In this, time and date, weather updates, calendar, reminders and news-updates are displayed on the mirror.

- Time and Date: Time and Date are displayed on the mirror.
- News-Updates: News updates are retrieved from Google News and displayed on the mirror.
- Weather Updates: Weather information is taken from OpenWeatherMap. The current weather and forecasting is displayed on the mirror.
- Reminders: The reminders are retrieved from Google Calendar and are displayed on the mirror.
- Calendar: A monthly calendar view is displayed



-: Flow Chart Representation of Smart Mirror: -

The flow chart representation of the Smart Mirror. When the mirror is switched on, then the booting of Raspberry-Pi 3B+ takes place. Once the Raspberry-Pi starts and internet is connected, then the required information is displayed on the mirror and updated timely.

Results:

Conclusion:

The principal objective of this project is to build up a shrewd mirror gadget. The gadget should resemble a standard mirror however would have a screen inside and you would have the capacity to collaborate with internet. Our Smart Mirror will give instant access to relevant information in a convenient and time saving environment. The smart mirror system is interactive system for home and reliable. The user stay updated on the time, weather and news headlines while getting ready for the day with the full functional Smart mirror.

The Smart Mirror has scope in the field of IoT and home automation. The Smart Mirror can be connected to the home appliances, mobile devices, etc. which can expand the functionality of the mirror. The facial recognition technology used can be future enhanced as a means of security. Adding security means that no one can try to access sensitive data that maybe displayed on your mirror via the use of APIs. We believe that the future of the home will be a brilliantly connected ecosystem of smart technology designed to make your life easier, more enjoyable, and efficient. Obviously, there are a ton of opportunities in the home for technology integration but a mirror is one of the best places to start.

References:

1. Sun Yong.Geng Liqing*,Dan Ke,"Design of Smart Mirror Based On Raspberry-Pi",International Conference on Intelligent Trasnsportation ,Big Data &Smart City,2018.
2. R.Akshaya,N.NiroshimaRaj.S.Gowri,"Smart Mirror-Digital Magazine for University implemented Using Raspberry Pi",International Conference on Emerging Trends and Innovation in Engineering and Technological Research,2018.
3. Ayushman Johri,Raghav Narain Wahi,Sana Jafri,Dr.Dhiraj Pandey,"Smart Mirror: A time saving and Affordable Assistant",International Conference on Computing Communication and Automation,2018.
4. Kun Jin,Xibo Deng,Zhi Huang,Shaochang Chen," Design Design of Smart Mirror based on Raspberry Pi",Advanced Information Manangement, Communicates ,Electronic and Automation Control Conference,2018.
5. Oihane Gomez-Carmona,Deigo Casado-Mansilla,"Smi-Work An interactive Smart Mirror Platform for WorkHealth Place Promotion".IEEE 2nd International Multidisciplinary Conference on Computer and Energy Science,2017