

SMART MIRROR-AN ARTIFICIALLY INTELLIGENT PERSONAL ASSISTANT

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ABSTRACT: *This paper describes 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 Smart Mirror implemented as a personal assistant equipped with peripherals such as Raspberry PI, microphone, speakers, LED Monitor covered with two 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.*

Keyword: *Smart Mirror, Raspberry PI, Artificial Intelligence, Weather, Time, News*

I. INTRODUCTION

This project has been developed within the context of a time where every day we see more and more connected devices. The Internet transformed our lives by connecting us more to easily information and other people in the virtual world. Mobile phones then became smartphones and since then this concept has erupted and morphed into the Internet of Things, things Which connect us to everyday objects. There are 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 homes Other concept of a smart mirror that you can interact with is attractive and has been fantasized in many futuristic movies.

Smart mirrors, such as Magic Mirror and Home Mirror have recently started to be developed by people in the Maker community, with varying degrees of interactivity. However, so far, the features of these mirrors have been limited. This final year project describes how a smart mirror was built from scratch using a Raspberry Pi for The hardware and custom software built The goal of the project was to create a Smart Mirror device that people could interact with but also to further develop the technology so that it would let you install and develop your own applications for it.

II. LITERATURE SURVEY

[1] Every morning our day begins by watching ourselves at least once in mirror before leaving our homes. We interact with it psychologically to find out how we look and how our attire is. Smart Mirror or Magic Mirror is one of the applications of Raspberry Pi. A computer screen embedded in mirror looks very futuristic. While looking at mirror you

can look at various notifications from social sites as well news, weather forecast and more things. Such mirrors can be programmed to work as AI and control home appliances by voice input or touch screen. They are part of an optimistic vision of the future that imagines a world where screens and data are everywhere, ready to feed you whatever information you need at a moment's notice. Basically, the mirror is looks like normal mirror but when someone stand in front of it the scene changes. The mirror provides a functional, user friendly and interactive UI to its user for accessing their social sites, messengers, etc. It has widgets for displaying the current whether conditions, Time, Events, Latest news headlines The Smart Mirror would help in developing smart houses with embedded artificial intelligence, as well as finding its applications in industries.

[2] The following features stand out in this paper that we intend to implement:

Clock: Displays clock for set time zone and set hour format.

Calendar: Displays the calendar of the current month.

Current weather: Display the current weather of the set location using OpenWeather API.

Facial recognition: Facial recognition and module swapping based on the current user.

[3] The vision of Ambient Artificial Intelligence (AmI) has brought a new twist to the decade old research and industry initiatives in realizing Smart Environments. The AmI vision, as proposed by the European Consortium, promotes a paradigm where humans are surrounded by intelligent and natural interfaces offered by the interconnected heterogeneous computing devices embedded into everyday objects. The environment thus created is capable of recognizing and responding to the actions and presence of individuals. The application of AmI in the home environment may provide quality, convenience, efficiency, security, and safety to its residents. AmI for assisted living, especially for the elderly and the people with disabilities has already received much attention.

III. DESCRIPTION OF EQUIPMENTS

3.1 One-way mirror

A one-way mirror, sometimes called two-way mirror, is a mirror that is partially reflective and partially transparent. When one side of the mirror is brightly lit and the other is dark, it allows viewing from the darkened side but not vice versa. This is probably the most important part of the hardware because it's responsible for creating the futuristic effect and is the biggest part of the smart mirror

3.2 Raspberry pi

The Raspberry Pi is a single board computer developed by the Raspberry Pi foundation in the UK. It has become the most popular computer of its kind thanks to great support and a big community behind it as well as an inexpensive price. The Pi does not work out of the box. It lacks a hard drive and it does not come with a preinstalled operating system. To install an OS you need a micro SD card prepared with an OS image. And because the software that will be running on the mirror will be coded on the same device at least a screen, a keyboard and a mouse are required.

3.3 Display

For the display a monitor, which also has built-in speakers and comes with a remote control which is useful to easily turn off the device's screen. The monitor is much smaller than the mirror so a black sticker is used to cover the parts of the glass which are not covered by the display. An HDMI cable is used to connect the display to the Raspberry Pi for video and audio.

3.4 Frame and support

The frame is made of wood and it provides the support for the mirror and all the other components. It frames the glass and provides a way for hanging the mirror on a wall. It has two parts: the front is painted white and has four holes for the ultrasonic sensors. The back has two wooden bars on the sides that are used to hang the front part. In the center there is a support for the display and at the bottom there is the Raspberry Pi.

3.5 Microphone:

One mode of interaction with the smart mirror is through microphone. USB microphone had to be used because the Raspberry Pi does not have a regular microphone input. The microphone is a simple one connected through a USB sound card to the Pi.

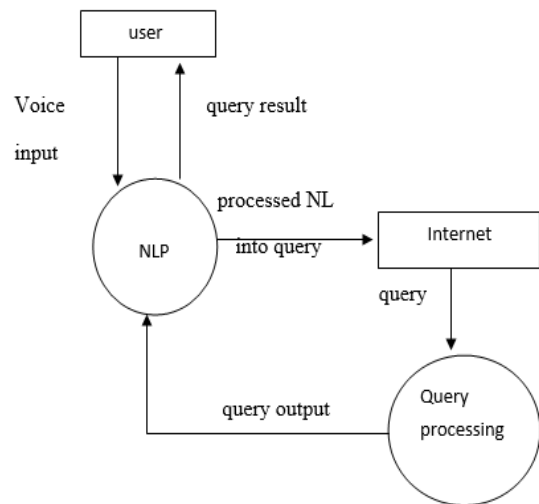


Fig: Data flow diagram

Hardware

For the hardware we used 24" LG computer monitor, a 50x90x0.5cm one way mirror, a Raspberry Pi 2, two USB microphones and two ultrasonic sensors. Everything is put together in a wooden frame.

Software

All the software runs on the Raspberry Pi 2. We chose to use Raspbian which is the official Linux distribution from the Raspberry Pi Foundation because it has a lot of support and documentation. It was downloaded from the official Raspberry Pi website and we copied it on a microSD card. Then we inserted the card on the Raspberry Pi, started it and followed the setup instructions, which are quite simple. Once Raspbian was installed, the distribution was updated with the latest packages and then we configured the basics of the OS and everything was ready to go.

The proposed mirror is designed to perform several functionalities that can be summarized as follows:

- Mimic a natural mirror interface:
- A flat monitor is used 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.
- Personalised Information services: Users will be able to obtain minute updates of latest news and public headlines, weather reports as well as get reports of our interests.

V. CONCLUSION

- The main strengths of this project are that this is a new kind of smart device that people don't see every day and it looks very spectacular. The platform has a very simple API that makes it very easy for developers to make apps
- The smart mirror idea was created to give instant access to information in a convenient and time-saving environment, the bathroom. All other aspects of the mirror's design developed from these ideas

IV. WORKING

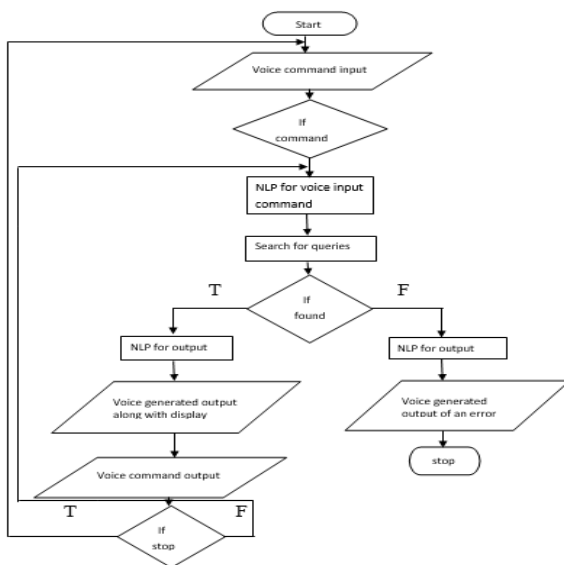


Fig: Flow chart

and inspirations.

- The goals of the smart mirror were to aim to reduce time needed in a user's daily routine and provide a merger of user and technology that becomes an enhancement, not a new burden. The functionality must meet these descriptions in the design. The smart mirror did the thinking for the user with intelligent, commonly used applications. Modules like their calendar, news, mail and weather will be available. These modules are unobtrusively displayed on the screen, hidden by the two-way mirror, as to look like a seamless experience. Smart Mirror can be great example of how AI can be integrated into home appliances to make our life easier, efficient and more enjoyable

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