

SMART MIRROR

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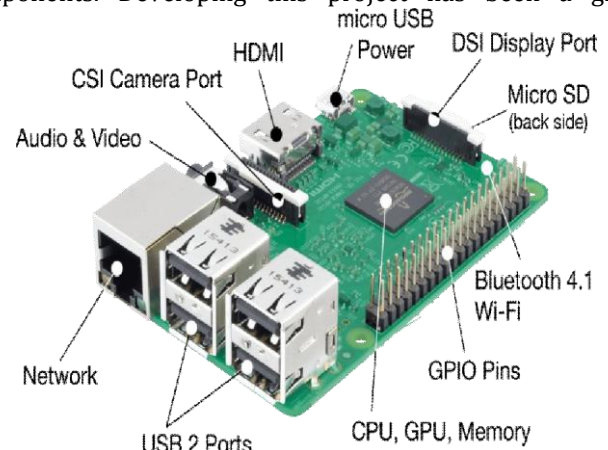
Abstract- Smart mirrors, which continue the works today and will take its place in the future technology, provide both mirror and computer aided information services to its users. In the scope of the study, the developed Smart mirror system includes the weather information, time and location information, user information using Raspberry Pi 3 microcontroller card. A smart mirror displays applications so that you can check the weather, local news, etc. while you are getting ready in the morning. This smart mirror aims to reduce and possibly eliminate the need for the user to make time in their daily morning or nightly routine to check their PC, tablet, or smartphone for the information they need. The making of this smart mirror includes a micro-controller called Raspberry Pi which will act as a brain of the interactive system. The micro-controller will be powered using python scripts for mirror software keyword.

Keywords: (CSI), Computer Vision (CV), Detection And Tracking Of Moving Object (DTMO), (USB), Operating System (OS), (RAM), (NOOBS)

I. INTRODUCTION

Mirror 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? from the reference book [1] What possibilities are there and how smart could a mirror be? These are some of the questions that inspired my choice of final year project, a project which aimed to develop a smart mirror and a small operating system to power it. The device was to go beyond an ordinary mirror, to have a screen inside that you would be able to interact with by using voice commands, hand gestures and smartphones or other devices. The smart mirror is a popular project among DIY enthusiasts and it usually consists of a one-way mirror with a screen attached to it that displays a static web page. However what I wanted to achieve was something you could interact with. My goal was to learn how a Raspberry Pi worked and to understand how to combine the software and the hardware components to create a multimedia project. I started by obtaining a Raspberry Pi and creating the software. At the same time I began documenting everything and I also searched for a suitable one-way mirror and a computer screen, as well as some sensors to physically interact with the device. I then spent a long time calibrating the sensors to work with the software. Once the software was almost finished I started designing the frame and

finally I built the smart mirror and attached all the components. Developing this project has been a great



experience.

Figure 1: Raspberry pi kit structure

II. REVIEW OF LITERATURE

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 project which would collect real world machine data and the data would be transmitted from the machine and would be managed by the Raspberry Pi. The Smart Mirror implemented as a personalised digital device equipped with peripherals such as Raspberry PI, microphone, speakers, LED Monitor covered with a sheet of reflective one 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. [1]

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. International Journal of Electrical, Electronics and Data Communication, ISSN. The authors believe that the introduction of this digital information technology will have wide-ranging implications, which will for the most part be beneficial and valuable. The paper describes the design and development of a futuristic smart mirror that represents an un-obtrusive interface for the ambient home environment. (October 2007) 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.[2]

III. DRAWBACKS

The limitation is that the app ecosystem is currently very small, the glass could be more reflective but it can be easily changed swipe gestures are sometimes unreliable.

The hardware and software more decoupled because current the sensors and microphones are tied to the software and it can be difficult to make the OS work with different hardware.

IV. PROPOSED SYSTEM

The mirror will do the thinking for the user with the help of an in-built personal assistant. It will update with the user's calendar schedule, to do lists, news and weather etc. The information would be displayed on the edge of the mirror to still allow to use of the actual mirror. The mirror provide common information most people check their smartphone. This allow the users to read think and plan their day while getting ready in the morning night.

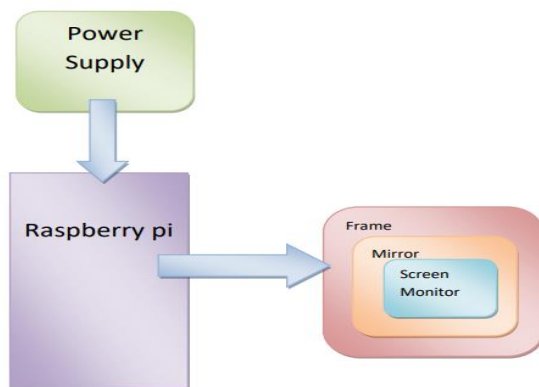


Figure 2: Blok Diagram

V. WORKING

This system called SMART MIRROR is proposed to integrate different devices. In 2014, Toshiba developed a TV on this very concept which includes touch functionalities as well, but all in all it was a TV acting as a bathroom mirror. This concept has been materialized by quite a few people around the world but until now a casting stick and a TV has been used for the display, the concept of mirroring one screen another onto another wireless on a wi-fi network hasn't resulted in a final product. The objective is to provide a natural interface in the home environment for accessing various services such as location based weather, time, calendar etc. It includes downloading the Raspbian operating system based on Debian and extracting the image on SD card, inserting the card in the Raspberry Pi SD slot and then performing the required steps.

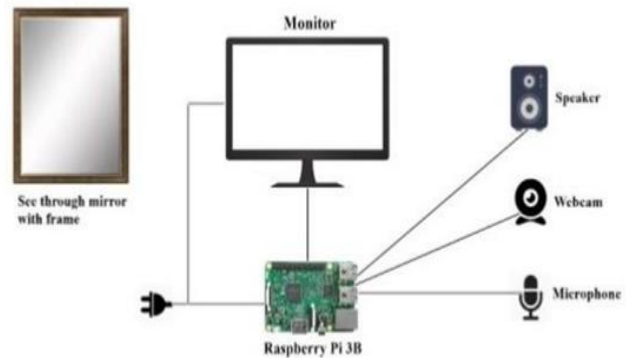


Figure 3 : Block Diagram of Working Model

VI. ADVANTAGES

Attractive Light Box: Ordinary light box is simply a board. Magic mirror motion display light box is not just a board for propaganda. Images are dynamic and, it is also a mirror. Almost all people are attracted by mirror. When mirrors suddenly converts to images, it draws more attention.

Adjustable Images Switching Time: Display duration between sequential display images is adjusted according to requirement. It could be shortened or lengthened. For example, if the image is full of information, duration between images is lengthened to allow more time for attention.

Fast & Easy Images Replacement: It takes just few minutes to replace images. It is fast and easy. Time consuming between this device and other devices is very less. Very Low Power Consumption: Digital electronic rectifier controls energy saving light source. It consumes very low power.

Easy to communicate: It allows the user to interact using different means.

VII. SYSTEM ARCHITECTURE

VII.I. TWO WAY MIRROR

A special mirror known as a two way mirror or observation mirror is used in this project. A two mirror is special as compared to an ordinary household mirror. Unlike a household mirror, the two way mirror is not painted with an opaque color on the back instead its left untouched. This gives the property of the mirror being reflective on side and transparent/translucent from the other. Hence the two way mirror acts as mirror as long as there is no light send from the back of mirror.

VII.II. WEBCAM

The term webcam is a combination of "Web" and "video camera." The purpose of a webcam is, not surprisingly, to broadcast video on the Web. Webcams are typically small cameras that either attach to a user's monitor or sit on a desk. Webcams can also be used for video chat sessions with other

people. Instead of broadcasting the video on the Web, users can set up a video chat session with one or more friends and have a conversation with live audio and video.

VII.III. SCREEN MONITER

A computer monitor is an output device that displays information in pictorial form. A monitor usually comprises the display device, circuitry, casing, and power supply. Modern computer monitors are easily interchangeable with conventional television sets. However, as computer monitors do not necessarily include components such as a television tuner and speakers, it may not be possible to use a computer monitor as a television without external components.

VII.IV. 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.

VII.V. MICROPHONE

One mode of interaction with the smart mirror is through microphones. Two microphones were used to power the voice recognition capabilities of the device. USB microphones had to be used because the Raspberry Pi does not have a regular microphone input. The first microphone is a cheap simple one connected through a USB sound card to the Pi. The second microphone is actually a PS3 Eye camera that I had at home and that connects directly through the USB. However, only the microphone part of the PS3 Eye is being used.

VII.VI. RELAY

Smart mode waits for the next communication cycle to report the status of the relay. Relay status information will be available to the sender device within 3 seconds. This mode consumes less power and generates far less radio traffic. Smart mode is recommended for most applications if you can tolerate a 3 second delay. In smart mode, the relay will turn itself off automatically if communications is lost between the relay controller and the sender.

VIII. INITIALIZATION

The mirror uses a camera as its input source and it is the users face that provides the region of interest. The first step in the pipeline given (see figure 3.1) is to detect new moving objects - objects that was not there

before. The most basic way to differentiate moving objects in a video feed is to use a single image as a reference frame. Moving objects are then detecting by doing a pixel by pixel subtraction proceeded by applying a threshold to create a binary image where black pixels indicates no change and white pixels indicates a change or movement. This technique does however have a few shortcomings. Because the reference frame is never updated, any newly added items to the scene will trigger as motion - even though they are just stationary objects meant to stay where they are. Likewise different illumination settings will result in different pixel values, even though the scene is the same. The simple background detection algorithm would also see this motion. A solution to this is to transform the reference frame into a running average of a given number of previous frame. This way motion will decay and stationary objects added to the scene will after a short while be considered as part of the background.

CONCLUSION

The Smart Mirror provides the user with an enhanced mirror experience. By making use of multiple displays, the user can stay updated on the time, weather, and news headlines while preparing for the day in with the fully functional Smart Mirror. Hence 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.

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