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Smart Mirror

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Abstract- The paper describes the design, construction and working of the smart mirror. 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 Pie. A computer screen embedded in mirror looks very futuristic. The Raspberry Pie stays at back scenes and controls the data displayed on mirror. 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. The Raspberry Pie is connected to monitor via HDMI as well as it also has inbuilt Wi-Fi and Bluetooth interfaces so we can just swipe music and videos to mirror.

Keywords- Smart Mirror, Magic Mirror, Home Automation, Artificial Intelligence, Virtual Dressing, Raspberry Pi.

I. INTRODUCTION

Smart mirrors are straight from science fiction. 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 stands 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 weather 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. Switching home appliances becomes easy with mirror. Virtual dressing, a smart way of having trials with your fashion sense makes things quite easy in malls.

Having such intellectual mirror will only surge the beauty of home. The raspberry pi is programmed using python and connects to a monitor with inbuilt speaker so as to provide an onscreen interface and

Section 2 focuses on Design of mirror. The working while making Smart Mirror is covered under Section 3. Section 4 comments on the Functional Overview of mirror. Section 5 covers problems and issues that may occur while development

II. ALGORITHM AND DESIGN

Step 1: Switch on the power supply.
Step 2: Get the date, time, and weather details from predefined from URL.
Step 3: Get the news from.
Step 4: In code section write down all the compliments to be displayed on mirror.
Step 5: Display it on mirror via LCD monitor.
Step 6: Check for user in front of mirror, If Yes, display user profile, if No, GOTO step 5.
Step 7: Switch off the power supply when it is of no use.

Table shows basic required objects for building mirror and their functionality. Power connection, microphone for voice input, camera for image processing forms the basic input devices for the mirror. The monitor and speakers form the output devices of the mirror.

Fig 1 depicts the basic structure of the smart mirror.

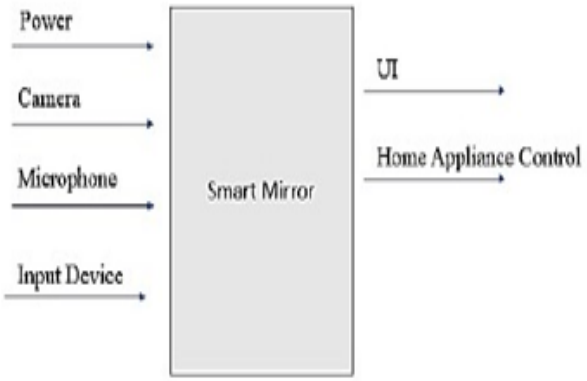

Fig 1. Basic Structure of mart Mirror.

III. WORKING

The working of each component in smart mirror is explained in this section. Let us talk about them one by one:

1. Two-Way Glass Mirror:
The two-way mirror is what gives the mirror its real identity. It is magic mirror as it has reflective surface at one side and its transparent for light with good intensity. The mirror stays at the front where the user can watch himself/herself in the mirror at the same time the allows the light from monitor to pass through it and make available the UI.

2. Monitor:
The monitor is directly connected to Raspberry Pi via HDMI interface thus providing display as well as voice output. For providing touch ability to monitor IR frames are used which are explained further in next sub-section.

3. IR- Frames:
While research on internet we did not found any sign of how to give the mirror touch ability, so we found a way ourselves to do so. The IR-frames provides the touch interface to the smart mirror. The IR - Frames has IR sensors on its siding and connect to Pi via USB interface. Thus, making smart mirror touchable.

4. Raspberry Pi:
The raspberry pi is the most vital part of the mirror; it forms the processing unit of the mirror. The Pi is like motherboard having all the required constituents which forms a great CPU. Its size of a credit card and still it can perform like a full-fledged computer. The programming of Pi is done using Python language. The programs can be first developed and compiled on windows or any other platform and then can run on Pi. The Pi also has its own inbuilt IDE to program in languages like C++, Python, C, Java, etc. Installation of OS on Raspberry Pi is quite a simple process. First you must download NOOBS along with Raspbian which is great OS of Raspberry Pi for beginners. The Raspbian is just a flavor of Debian OS.

There are many IDEs available to do programming for Python but what we found was PyCharm Community is free and good among them who serve our requirements. Qt Designer is amazing tool to make UI of Python. Figure 3 shows a fully functional calculator wrote in Python script. The GPIO pins on Raspberry Pi controls the 8- Channel relay which is explained in next sub-section 3.4. The Raspberry Pi has inbuilt Wi-fi and Bluetooth for connectivity purpose as well as it allows 4 USB devices to be plugged in. Figure 3: Functional Calculator wrote in Python script.

5. 8-Channel Relay:
The 8-Channel relay connects directly to high voltage input source of power and low power GPIO pins on Raspberry Pi. The GPIO pins cannot control the Home appliances directly as they have very less output power that is about 5V, so we require 8-Channel relay circuit board which close the circuit of home appliances when given a high of 5V.

IV. ADVANTAGES

- Easy to communicate
- User friendly
- Voice input
- Fast and easy images replacement
- Adjustable images switches times
- Low power consumption
- 10mm acrylic frame is available when thin and light magic mirror light box display are major concerned
- Installation of magic mirror light box is as simple as any other ordinary light box.

V. APPLICATIONS

- Industries
- Home automation
- Hospitals

VI. CONCLUSION

While starting the project we cannot contribute all money that's required for buying a monitor and a Pi at same time so solution was to connect the Pi to laptop using LAN or WLAN.

When we tried to connect the Raspberry Pi over network using SSH on putty software it continuously gave error for not able to connect to Pi. We solved that error by manually creating assh file on boot drive of the pi. A problem with Two-way mirror was that it crashed whenever we tried to cut it, but after surfing over internet we found solution to that problem that sticking a tape before cutting it helps.

The next big issue was providing a touch interface to mirror, there isn't a sign of how to give the smart mirror touch ability, and we found solution to that problem after looking at IR Frames on the internet.

REFERENCES

[1] Jane Jose, Raghu Chakravarthy, "Home Automated Smart Mirror As An Internet Of Things (Iot)", Issu3, Vol. 6, Issue 2, February 2017

[2] Daniel Bessemer, Johannes Burley, "Fit Mirror: A Smart Mirror for Positive Affect In Everyday User Mornings Routines", November 12-16-2016.

[3] Derrickgold, Davidsollinger, And Indorman, "Smart Reflect: A Modular Smart Mirror Application Platform", 2016 IEEE.

[4] G. Demireps, B.K. Hansel, Et Al. Technologies Foran Aging Society: A Systematic Review of "Smart Home" Applications. Yearn Med Inform, 3.33-40, 2008.

[5] Carlos Hitoshi Marmot "Interactive Digital Mirror," Ieee Proceeding On Computer Graphics And Image Processing, 2001, Pp. 232- 236.

[6] R.S. Ferris, T.E. De Compos, And R.M. Cesar Junior, "Detection And Tracking Of Face Features In Video Sequence," Lecture Note In Artificial Intelligence, 2000, 1793(4), Pp.129-137.

[7] Ding, Y.S.; Jin, Y.L.; Ren, L.H.; Hao, K.R. An intelligent self-organization scheme for the internet of things. IEEE Comput. Intell. Mag. 2013, 8, 41–53 Choi, S.J.; Kim, T.H. Symmetric current-balancing circuit for LED backlight with dimming. IEEE Trans. Ind. Electron. 2012, 59