SMART MIRROR

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ABSTRACT

Security is one of the major issues now-a-days. When it comes to home security we can use some security system to keep ourself safe. But the biggest issue in these security measures is cost. These surveillance devices are pricy and not everyone can afford these devices. Other issue is that anyone can notice them and can trick them. Our aim here is to develop a system which will cost much less than these surveillance systems and will provide more security also. Everytime we notice any mirror nearby we can't resist ourself to look into that mirror. We will be taking advantage of this normal human tendency and will be developing a Smart Mirror which will report the house owner if anything suspicious happens. This mirror will anonymously scan the person who is looking in the mirror and will report to the house owner if it doesn't recognize the person. For designing this system some technologies such as Artificial intelligence , Android and Raspberry-pi are used. The main goal of this project is to develop a cost efficient and low profile security system for which targeted users will be middle class people.

Keyword : *- IoT, Raspberry-pi, Face Detection, Raspbian OS, PI- Camera.*

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1. INTRODUCTION

In this era of fast and busy lifestyle security has become one of the biggest concern for each and every person no matter what he/she is doing. We often tend to ignore proper security measures which are necessary to keep our house and family safe from harmful people. We need to understand that security is as important as our day-to-day tasks. If we can't feel safe at some place then we won't be able to concentrate on anything. This will reduce our brain's processing power which may result into various types of losses. We often tend to ignore security systems because they are costlier and not everyone can afford them.

In this paper we implement portable IoT based Surveillance system which will not only be cost efficient but it will be smarter than the systems which are available in market right now. Raspberry-pi will be used as the main processing unit for this system which will do all the calculations required for the system. This system is supposed to serve multiple functions such as controlling other smart devices in our house.

All the image processing will be done with the help of Open-CV (Open Computing Vision) which is an Open Sourced Library used for processing images. As the raspberry- pi is an embedded device and not that much resourceful face detection can't be achieved that much easily on it because of low computing power.

Python virtual environment will be used to run all the code necessary for the system to work. As we can't use traditional operating system a modified version of Linux i.e. Raspbian OS will be used a main operating system for the raspberry-pi. The operating system is optimized to run on Raspberry-pi and is much more resource friendly than the traditional operating systems and is much more lighter too.

2. LITERATURE SURVEY

Vamsikrishna Patchava , Hari Babu Kandala , P Ravi Babu [1] they have presented a proposed system for Smart Home Automation technique with Raspberry Pi using IoT and it is done by integrating cameras and motion sensors into a web application. To design this system, they are using a Raspberry Pi module with Computer Vision technique.

Suchitra , Suja P. , Shikha Tripathi [2] have proposed a method for real time emotion recognition from facial image. In the proposed method they use three steps face detection using Haar cascade, features extraction using Active shape Model(ASM), (26 facial points extracted) and Adaboost classifier for classification of five emotions anger, disgust, happiness, neutral and surprise.

M. Anwar Hossain, Pradeep K. Atrey and Abdulmotaleb El Saddik [3] described the design and development of a futuristic smart mirror that represents an unobtrusive interface for the ambient home environment. The mirror provides a natural means of interaction through which the residents can control the household smart appliances and access personalized services.

Ishita Gupta , Varsha Patil , Chaitali Kadam , Shreya Dumbre [4] have proposed a method for face recognition using Raspberry-pi. All the computations required for this face recognition are done on Raspberry-pi board itself.

Ayman Ben Thabet , Nidhal Ben Amor [5] have proposed a system with the ability to detect and recognize faces has many potential applications including crowd and airport surveillance, private security and improved human-computer interaction. An automatic face recognition system is perfectly suited to fix security issues and offer flexibility to smart house control .

3. METHODOLOGY

In this paper, we have used raspberry-pi camera (5MP) which captures images and sends them to raspberry-pi for for further processing.

As shown in fig.1, when a person approaches to the door of our house pi-camera will detect that person. When a person is detected an event is triggered which is captured by our program. After the event being captured owner of the house will receive an e-mail regarding this with the image of the person who has approached to the door. In this way the owner house will always remain aware about what's happening around their house.

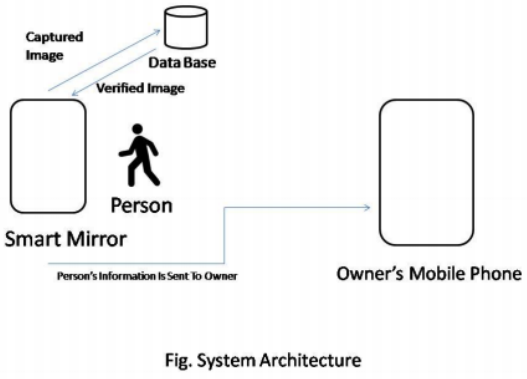

Fig. 1 : Block Diagram Of Smart Mirror

By using a computer or mobile owner is able to access live feed of the camera which is being uploaded over the network to which raspberry-pi is connected. In this way the user can know if the person is causing any damage or not and he/she will be able to decide whether to call the police or not.

Here we used MIME web service for sending emails to owners of the house. It is freely available service stands for Multipurpose Internet Mail Extensions. When a person approaches on the door an e-mail is automatically sent to the owner of the house.

In this paper we have raspberry-pi for doing all the necessary computations. The model which we have used is Raspbery-pi 3 model B which has a quad core CPU clocked at 1.2 Ghz and has 1 GB of ram. This specification is enough for what we are trying to achieve right now.

Fig. 2 : Raspberry-pi 3 model B

Fig. 3 : Raspberry-pi Camera

The camera which is used here is a camera specifically made for raspberry-pi. The camera which we have used in our system is of 5 Mega-pixels which is not only sufficient for our need but cost efficient too. It captures the images and sends them to Raspberry-pi.

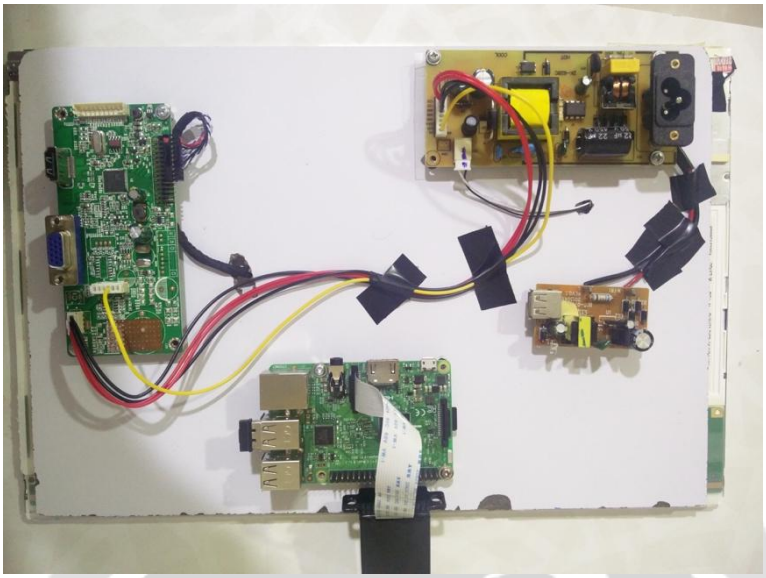

Fig. 4 : Hardware Connection Setup

The only reason behind making a mirror is to take advantage of normal human tendency of looking in a mirror when any is there nearby.

4. CONCLUSIONS

The proposed system offers much more cost efficient survelliance system which is more smarter than the most of the systems which are available in the market. It will not only keep our house safe but it will do that at much cheaper cost.

Face recognition feature can be implemented in this mirror so that the user will know exactly who has come near the house.

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