

Home Automation Using Augmented Reality

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Abstract— Augmented Reality is a technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view. This paper presents the use of augmented reality in the field of home automation. Augmented reality helps to interact with the appliances in a smart way. Augmented reality technique includes capturing the real time image of the appliances to be controlled and generation of virtual switches which are clickable and action oriented. In this paper we will see AR technique for home automation.

Index Terms— Augmented Reality, MATLAB, GUI, Regionprops, Virtual Switch.

I. INTRODUCTION

Augmented Reality is a technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view. This paper presents the use of augmented reality in the field of home automation. Augmented reality helps to interact with the appliances in a smart way. Augmented reality technique includes capturing the real time image of the appliances to be controlled and generation of virtual switches which are clickable and action oriented. In this paper we will see AR technique for home automation. systems. With the advent of IOT technique it has become possible to control devices anywhere around the world. Automation can be achieved by various other techniques such as VR, AR, GSM, etc.

Augmented reality in the field of automation is a relatively new idea and it is used in various industries like pharmacy, packaging, switch control, etc. One of the applications of AR technique is in home automation. In home automation using augmented reality a camera is needed to synchronize the external world with the processing system. The camera captures the image of the real world and it is send to the processor. After the image is processed virtual switches with some values is generated on the screen and this generated switches are clickable. Option is given to the user to operate the appliances and accordingly the devices are handled by the user by using the AR technique.

II. Proposed System

A. Introduction

Many handicap people find it difficult to operate the home appliances manually. Home automation has eased out the problem of manually operating the appliances. Home automation using augmented reality has been a more efficient technique in the recent past.

Augmented reality technique includes capturing the real time image of the appliances to be controlled and generation of virtual switches which are clickable and action oriented. In this paper we will see AR technique for home automation. As augmented reality is used, it will help the users with easy navigation and interactive control of electrical appliances. Thus this system is believed to control and monitor the electrical usage and switch off appliances with ease.

In This System MATLAB software is used along with the FRDM board as the processor. GUI has been made on MATLAB and different color craft papers which are placed on the cardboard are used as the virtual switches. The camera is faced towards the switches and the image of the board is captured and digital switches can be seen on the screen. When the user keeps his/her finger on the paper, the load connected to the switch is turned on. Thus, the appliances are controlled using the AR technique.

B. System Architecture

In the proposed system augmented reality is used to control the home appliances. In this we are using camera, MATLAB, FRDM, triacs and optocouplers, Loads and a cardboard over which craft paper has been placed. 4 different color craft paper is used (red, blue, green, white).

When this craft paper is placed in front of the camera, the camera will capture the image and the user will have to keep his/her finger on any one of the craft paper. Every craft paper will be assigned a load. When the user keeps his/her finger on red colored craft paper the input is taken and it is send to the processor. After processing, average value of all the colors are displayed and a virtual switch is generated on the screen. As the finger was placed on red colored craft paper, load connected to it is turned ON. Accordingly user will choose the option. Similarly if finger is placed on blue paper, switch for load 2 will be generated, for paper 3 switch for load 3 will be generated and for paper 4 switch for load 4 will be generated. The average values of all the colors are displayed on the screen.

Triacs and optocouplers are used for the isolation of the ac and dc part. The hardware includes the processor along with the triacs and optocouplers and load connected. Without using the triacs and optocouplers proper isolation is not possible and this might damage the dc components that are used in the system. Once proper isolation is done and proper processing is done, the load is triggered.

C. Expected Output

GUI is build using MATLAB. Camera is interfaced with MATLAB. Cardboard is placed in front of the camera after the program is compiled and image is captured. The Matlab GUI can be seen in the Fig.1.

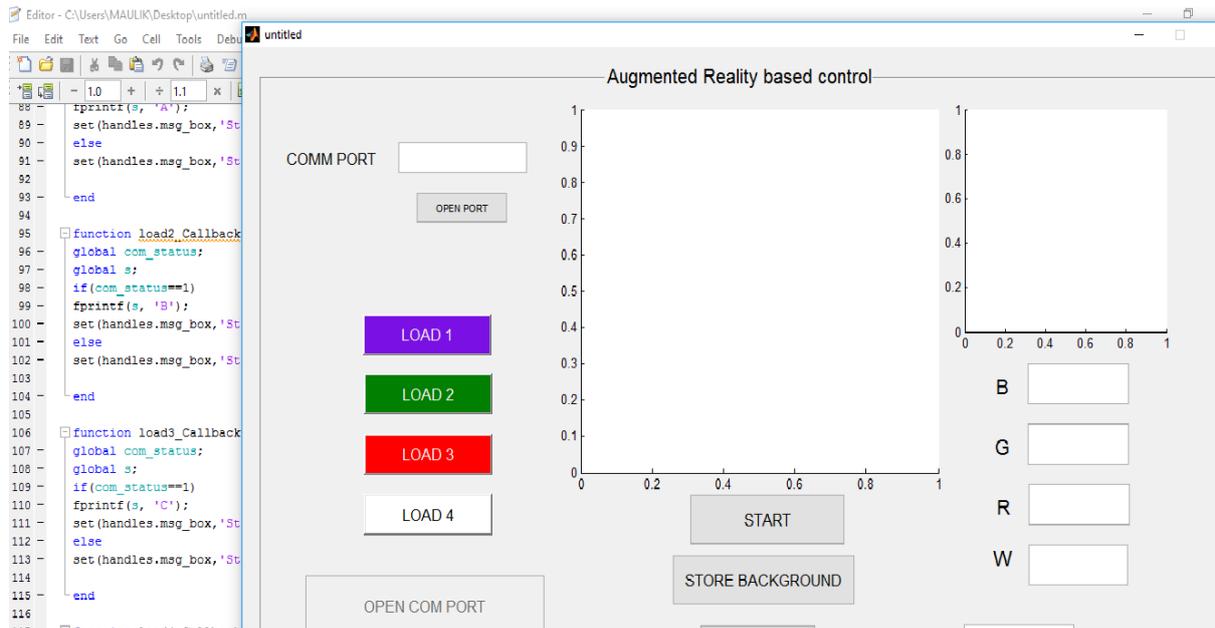


Fig. 1: MATLAB GUI Of AR Based Home Automation.

Now the screen waits for the user to keep his/her finger on the craft paper (red, blue, green, white) and after the user has kept his/her finger on the paper the values are send to the processor (FRDM KL25) and average values of all the colors are displayed on the screen as shown in the Fig.2.



Fig. 2: MATLAB GUI Displaying Average Values Of R,G,B,W Colors And Also Bounding Box.

According to the position of the finger the on the switch which is the craft paper over here, the load is triggered.

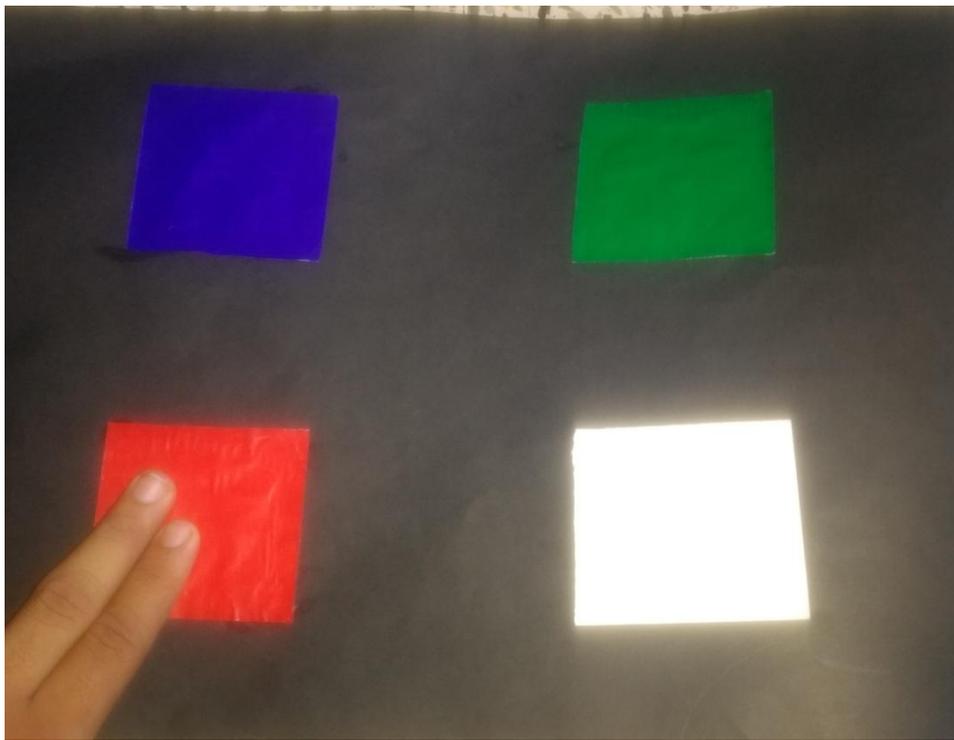


Fig. 3: Finger Placed Over The Switch To Trigger The Load.



Fig. 4: Load Switched On After The Finger Is Placed On The Switch.

When the finger is kept on blue color paper the load connected to the switch via the processor and the circuit is switched on. In this case the load connected across blue color paper is load1 as can be seen in the Fig. 3. When the finger is placed over the blue

color paper the load1 is switched on as can be seen in Fig. 4. Similarly load 2, 3, 4 and 5 is turned on and off by keeping the finger on the respective fingers.

III. Conclusion

This paper describes use of augmented reality in home automation. In augmented reality virtual switches are displayed after the real time images are captured and processed. Here the image is captured and it is processed virtual switches are generated on the screen. User depending on his/her interest will select the option and the load will be triggered accordingly. This system will mainly help the disabled and elderly people to control the appliances giving them a real world experience with the help of augmented reality.

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