

# Two Dimensional Augmented Reality

## A Prototype Demonstrating Two Dimensional Augmentation

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**Abstract**— Augmented reality is the new way of digitizing information. Augmented Reality involves visual perception of real world entities. With augmented reality it has become possible to implement new innovations virtually to study them. In this project we aim to provide a comprehensive way to control electrical loads using two dimensional augmented reality concepts. We intend to demonstrate the above concept by controlling actual electrical load in real world by using an image.

**Keywords**— Digitizing, visual perception, virtual, control electrical load

### I. Introduction

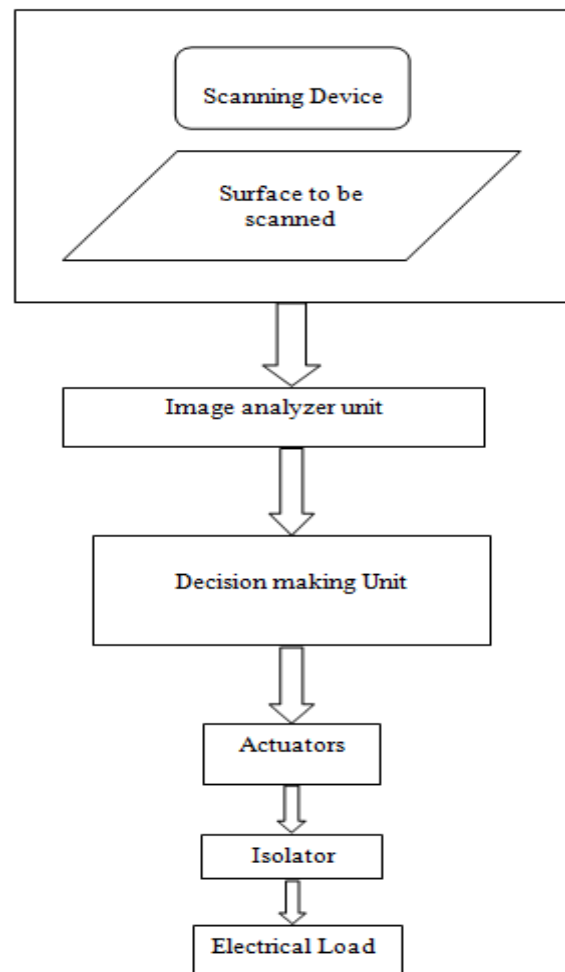
Augment means to expand, escalate or intensify. Augmented Reality in simple terms means to take the reality a step ahead and expand its application in various fields. We have designed a prototype to demonstrate the same. Our thought behind this project is to use an image to control the functioning of the electrical load connected to the system.

In the project we intend to show that we are using an image which is a two dimensional object to function like a three dimensional physical switch to control the three dimensional load. Basically it involves processing and analyzing of the image and then toggling load by using a micro controller. Thus, the project can be seen as an alternative to the physical switch that we use in our switch boards. Applications of this can be found in various places like schools, homes, offices and industries. Augmented reality can be seen as future technology.

### II. WORKING PRINCIPLE

The two dimensional image is augmented to control the three dimension entity. The image will be continuously scanned using a web camera. With the help of this continuously scanned image in real time we consider few frames of it. These captured frames will be compared with the standard input provided to the system and we note the changes in the corresponding frames. On the basis of this we provide the control signal to the micro-controller which acts as a decision making device which in turn controls the electrical load.

### III. BLOCK DIAGRAM



#### IV. BLOCK DIAGRAM DESCRIPTION

The above block diagram explains the overall operations of the 'Two Dimensional Augmented Reality'.

##### A. Scanning Device and Surface to be scanned

The scanning device used is basically a web camera. It is used to scan the image which controls the electrical load. This image is a pre-defined surface which acts as a marker. The surface is preferably of black background and the image of some other color.

##### B. Image Analyzer Unit

The function of this unit is to analyze the above captured image. This is done by using MATLAB® software. The continuous captured video by scanning device is converted into discrete frames at a particular rate. This captured frames are further compared with the reference and the changes are noted.

##### C. Decision making unit

The decision making unit is the micro controller 8051. The changes between the captured frames which are notified in the above step are analyzed by this decision making device. This unit actuates the actions necessary to control the electrical load.

##### D. Actuator and Isolator

Actuator is mainly responsible to change the electrical load condition. This unit functions as per the instructions provided by decision making device.

Isolator provides the isolation inside the circuit to avoid any damage to the micro controller as the electrical load need high voltage while the micro controller need very low DC voltage.

##### E. Electrical load

This is any device which works on high voltage ac supply of power or it can be any device which simply needs electricity to function.

#### V. IMPORTANT COMPONENTS

##### A. MATLAB®

This is a software platform by MATHWORKS® which is used to simulate the results and for computational mathematics. It has various tools and functions provided in it. The data can be presented graphically. This software can work in collaboration with many other tools this makes it most useful in the field of engineering.

##### B. Micro-controller 8051

Micro controller is a System on Chip (SoC). It has many elements inside it like memory, input/output ports, RAM, ROM which are all included on a single chip in integrated form. They are used in embedded applications and are economical.

The key features of 8051 includes ease of programming, availability, economical, consumes very less power, fast interrupts, counters, power saving mode and many others.

##### C. RS 232

It is a medium through which transmission of the data occurs in serial manner. The voltage range from +5V to +13V define LOGIC 0 and -15V to -13V define LOGIC 1 for RS 232. It is widely used in computer based applications.

##### D. Opto coupler

The optocoupler is used to provide electrical and magnetic

Isolation within the circuit so as to provide required safety while operating. For this reason we use MOC 3021. It uses light emitting diodes and photo diodes. Thus they are very small in size, portable.

##### E. TRIAC

The device acts as a triode for the alternating current. It is used to control the switching action in many applications as the current requirement is very less thus making the system more effective and convenient. The TRIAC used in this system is BTA16.

#### VI. ADVANTAGES

- Augmented reality will give the real world experience of the things which are yet to be implemented in real world.
- It will help elder and disabled or differently abled people to control devices in much simpler way.
- The user experience will be reformed.

#### VII. APPLICATIONS

- It is used in industrial applications to virtually see the changes to be brought in the existing system so as to avoid further inconvenience.
- Augmented reality is changing the presentation techniques in the field of Property and Real Estate.
- It is also used in medical sciences and educational field.

#### VIII. FUTURE SCOPE

- Augmented reality gives user its freedom to demonstrate outcome possibilities of any system in various environments, this will greatly help the scientists.
- It will benefit students for better understanding of concepts as they can view virtually all the assumptions which are not possible in real world.
- Remote access of such demonstrations will become possible with increase in the ease to operate.

#### IX. CONCLUSION

This research examined using image as a virtual switch using marker based Augmented Reality technology for controlling of electrical load. It has further decreased the boundaries between real world and virtual world. In this demonstration we have successfully controlled the electrical load using an image. Augmented reality has exploited the modern technology and has stretched its horizon even further.

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