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Controlling Electrical Appliances Using IOT and AR

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Abstract - *Home automation is a topic that is gaining popularity every day, because of its great benefits. One can achieve home automation by simply connecting home appliances to the internet or cloud storage. The reason for this growing need for network automation enabled by the network is reaching its peak in recent days with its simplicity and comparable accessibility. Cloud-based platforms help connect to the object's surroundings for everyone to find it easy to access anything and everything at any time and place in an easy-to-use way using custom defined sites. Therefore, the cloud serves as the ultimate access point for IoT. Here we take the system that can control devices through a wireless based network or cloud-based approach. In the project we use an Io-based Home Automation system which aims to develop a home automation system that gives the user complete control over-all remote-control features of his or her home. The automation system will be able to be controlled from a centralized PC, Internet, and also remotely accessed via a PC with a Windows-based operating system. Augmented Reality is a successful technology that can facilitate the execution of complex tasks. Reality augmented mixes practical and realistic, making available to the user new tools to ensure efficiency in the transfer of information through a few processes and in a few places. Various Augmented Reality-based solutions have been proposed by the research community: particularly in Augmented Reality rehabilitation tools that offer new ideas and promise amazing progress.*

Key Words: Home automation, IOT, Augmented Reality, Cloud - Storage

1. INTRODUCTION

With the daily advancement of technology our expectation of higher living standards rises sharply. From high standards of living, we mean the use of smart phones, smart watches, smart glasses, smart TVs, highly advanced laptops etc. which makes human life easier. A smart home seems “smart” because its computer systems can monitor many aspects of daily life [1]. In this age of technological advancement, automation is a matter of the hour.

1.1 Introduction to IOT

Home automation aims to make a difference in people's lives. Controlling household appliances with our smart phones, smart glasses and smart watches without the use of regular switches is a home automation switch. The current emergence of a traditional medicine-oriented medicine model can be enhanced by the Internet of Things (IoT) paradigm which involves sensors (environment, clothing, and implants) spread throughout the home environment for the purpose of monitoring user health and enabling remote assistance. [2]. Automation increases our efficiency and comfort. These days most of us find ourselves clinging to our smart phones and smart devices. So, with the help of this smart device and after analyzing the market for smart devices we can do our daily activities by making our smart phones more personal.

1.2 Introduction to AR

The installation of an AR interface in automation is a great success as shown by the outstanding way of detecting and interacting. The client should provide a large website that contains information about objects that can be directed to the environment. So, in this report we propose a model where Augmented reality proves to be an easy-to-use home automation interface. Image processing in our model serves as the backbone of the entire system. control of machinery and equipment in a real-time environment. Our proposed model is based on Unity 3D and AR which uses the concept of image tracking and processing in the background server to control electrical and mechanical objects.

2. Literature Survey

This is a manifestation of Augment Reality (AR) via Internet of Things (IoT). AC electrical appliances can be controlled online anywhere in the world with buttons from Augmented Reality. For this demonstration, we used a transmission module to control any AC machine. As soon as the camera detects a target image, the two 'OP' and 'FEAR' visual buttons appear in the reality of the unpopularity of taxpayers we see. The device or LED in this case can be controlled by pressing those buttons in real time in the air. Unity Editor is a popular and useful platform for creating advanced apps for both mobile devices and digital glasses. To download and set up Unity, visit https://unity.com. The Vuforia engine is easy to add to any project and you can start by providing valuable samples from the Coalition Store.

2.1 Vuforia Engine

Vuforia is a popular taxpayer software development kit that we see (SDK) for mobile devices that allows the creation

of unpopular virtual apps. It uses computer-assisted visual recognition technology to track and track 3D images and objects in real time. This image registration capability enables engineers to place and direct visual objects, such as 3D models and other media, in relation to real-world objects when viewed with a portable device camera. The object then tracks the location and position of the image in real time so that the viewer's view of the object is in line with the target view. The Vuforia SDK supports targeted 2D and 3D models that include 'Unmarked' Image, 3D Target Model, and the adjustable Fiducial Marker type, known as VuMark. Additional features of the SDK include 6-degree local space device creation, Local Occlusion using 'Visible Buttons', timely image target selection, and the ability to create and resize target sets systematically during operation. Vuforia Provides Application Programming Interfaces (API) in C ++, Java, Objective-C ++, and .NET languages using the Unity game engine extension. In this way, the SDK supports both native iOS, Android, and UWP upgrades while enabling the development of AR Unity applications in both forums. The youngest generation these days, with a strong focus on character teaching, was born with ICT (Information and Communication Technology), so we recommend using the benefits of ICT such as AR. AR (Augmented Reality is a system that fills the real world with objects that appear to live together in the same space as the real world [3].

2.1 Blynk

Monitoring and control of household appliances the system is designed and operated using Blynk. Device performance is recorded and maintained by network coordinators. For this use a Wi-Fi network, which uses a modern ADSL wireless router. SSID network and Wi-Fi security parameter pre-configured. The security goal message starts the process with a visual home algorithm and when it is said to be safe it is rewritten and transferred to a real home network device. With the Blynk network, the Blynk controller has sent messages to the end. Security and security of all messages received by the visual home algorithm.

Reducing system costs and interfering with the installation of the Blynk communication system sequence is helpful. During this time many new breakthroughs have emerged, such as tools or systems that make daily human activity easier. To help, many organizations try to create human benefits such as systems, electrical devices or robots[4].

2.3 Unity 3d

Unity is a cross-platform game engine developed by Unity Technologies, which was first announced and released in June 2005 at Apple Inc.'s Worldwide Developers Conference as the Mac OS X game engine only. The engine has since been gradually expanded to support a wide variety of desktop, mobile, console and real-time platforms. It is most popular in the development of iOS and Android mobile game and has been used for games such as Pokémon Go, Monument Valley, Call of Duty: Mobile, Beat Saber and Cuphead. It is considered an easy-to-use tool for beginner developers and is popular in indie game development. The engine can be used to create three-dimensional (3D) and two-dimensional (2D) games, as well as interactive simulations and other animations. The engine has been adopted by non-video video industries, such as film, automotive, construction, engineering, construction, and the United States Armed Forces.

The Unity game engine was launched in 2005, aimed at "democratically" game development by making it accessible to more developers. The following year, Unity was ranked second in the Best Use of Mac OS X Graphics category at Apple Inc. Design Awards. Unity was first released for Mac OS X, and later added support for Microsoft Windows and Web browsers. Unity3D as a new type of professional game engine, a powerful magician function, is not limited to game development. Although currently Unity3D use is more focused on 2D and 3D game production, however and the software is constantly evolving, the work is gradually strengthening, it's the use of other features will gradually deepen. Unity3D has been marked as new period in game development, broad prospects, its impact will be huge [5].

3. Proposed IOT Model Architecture

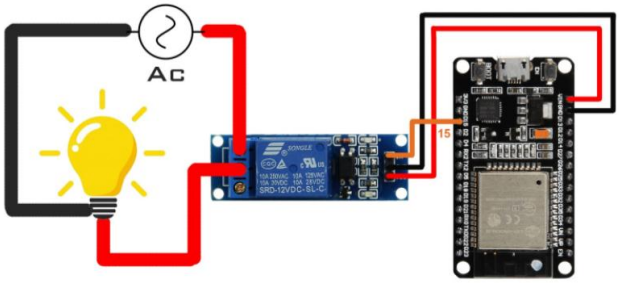

Fig -1: Circuit Diagram of IOT Model

3.1 Major Hardware Modules:

- Node Microcontroller Unit (ESP8266)
- 2 Channel Relay
- Jumper Wire(Male, Female)
- Connection Wires
- Any Electric Appliance
- Breadboard

3.2 Software Module :

- Blynk App
- Unity 3d
- Arduino IDE
- Vuforia Engine

4. Proposed Techniques

4.1 Image Target Detection

Targets Images show images that can be accessed by Vuforia Engine and tracked. The engine detects and traces the image by comparing the natural features extracted from the camera image against a well-known guided site website. Once Image Target is detected, Vuforia Engine will track the image and add your content easily using market image tracking technology.

4.2 Implement Virtual Buttons

Visual Buttons request the interaction of your Vuforia Targets moving from screen interaction to the real world. Learn from the Visible Buttons sample on how to use and adjust Visual Buttons and immerse your end users in your AR application.

Visual buttons provide a useful way to make targeted images based on images. Manage events with OnButtonPressed and OnButtonReleased when a button appears to be blocked from the camera. When creating a Visible Button, size and placement should be carefully considered in relation to user information. There are a few features that will affect the responsiveness and usability of the visual buttons. Augmented reality (AR) is a new technology that already has the potential to be used in education. While most research has been done on AR, a few studies have been done in the field of education. Number courses in AR are growing due to the efficient use of this technology in recent years [6].

- Button length and width.
- The location of the target that it covers.
- The placement of a button relative to both the image border, and the other buttons to the target.
- The bottom of the button has a high brightness and detail to make the event easier.

4.3 Apply Multi-Image Target Detection

Multi Target is a collection of Multi-Image Targets integrated into a geometric arrangement defined as boxes. This allows for tracking and discovery on all sides and can provide multiple application situations, for example, marketing, packaging, and teaching situations. Start by creating your Multi-Targeted Vuforia Target Manager and upload your images to the size of your Multi Targets.

4.4 Upload Arduino code to Wi-fi Module(ESP8266)

ESP8266 is widely available for low-cost Wi-Fi modules.. In the menu select | File | Favorites | In the Arduino IDE menu select | Tools | Board: ..... | Board Manager ... | In the text box of the Board Manager dialog box type ESP, then select “esp8266 by ESP8266 Community” and click the Apply button. When the installation is complete, press the "Close" button. Connect your USB cable ESP8266 module to a computer. You can check with a blank drawing or a small drawing like Blink. In the Arduino IDE from the menu select the type of board you have. In my case this is “NodeMCU 0.9 (ESP-12 Module)” And from the Arduino IDE menu, select Serial Port to which the module is connected Click the Upload button to compile and upload the drawing.

4.5 Connect Blynk App to Wi-fi Module(ESP8266)

Download the Blynk app from the Google Play Store and Sign In. To Create a New Project Press + icon at the top. Gave You a Project Name. Select Device as Arduino UNO Type to connect like Wi-Fi and press Create. As soon as you create an Auth Token it will be sent to your registered email. You can also send it later to your Project Settings (Nut Icon) page -> Devices. To add a button press + and select Button. Press the newly created button to edit it. Name it and set the PIN digit to digital D13. Change mode to CHANGE.

4.6 Extract APK from Unity

With the installation of Android Build Support, you will be able to change the construction platform of your project to Android. To do so, go to File> Create Settings and select Android Arena. Then, click the Change Field button. Change Build Platform Unity If the Platform Change button is missing, then your build platform is already set to Android. Creating an APK file Once your platform has been changed to Android, the Change Field button should be replaced by the Create button. then download that apk to your phone and install it.

5. Proposed System Design

The following features are used in our proposed system

1. To standardize IOT and AR/MR in Our day-to-day life.
2. To operate a appliance using Virtual Reality.
3. To operate any device which is working on electricity with the help small electronics circuit i.e. IOT
4. To secure the system by allowing only authorized users to access the device.

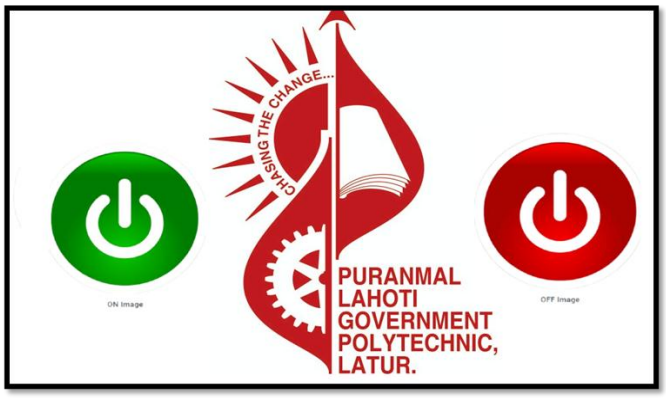

Fig -2: Unity 3d Model Design

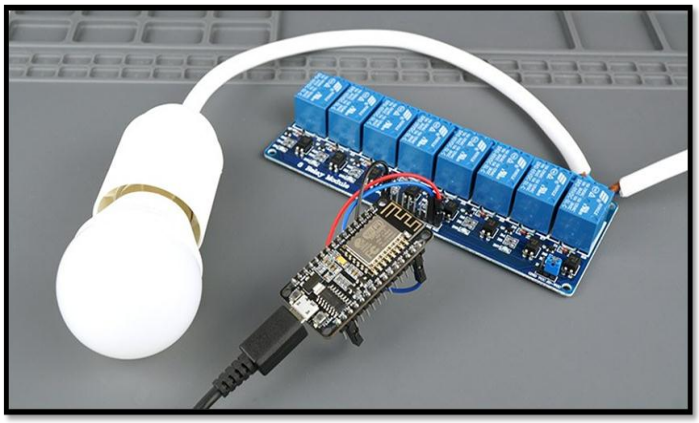

Fig -3: IOT Model

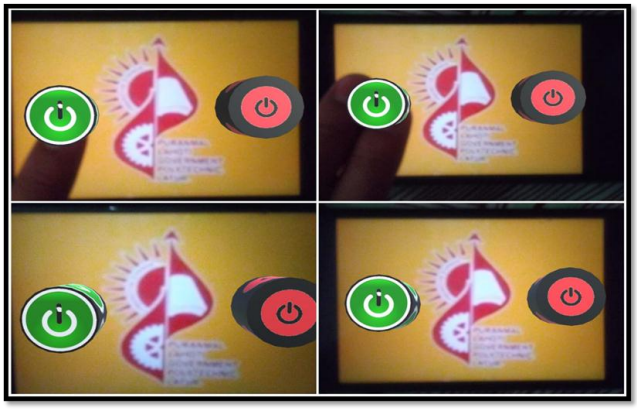

Fig -4: VR App Interface

6. Advantages and Disadvantage

6.1 Advantages

1. Easy access-

At the moment, you can easily find the information you need in real time, from (almost) anywhere you are. Only smart device and internet connection are required.

2. Energy Saving-

Home automation systems have definitely proven themselves in the energy-saving arena. Automatic thermostats allow you to pre-set the temperature based on the time of day and day of the week. Real energy savings ultimately depends on the type of device you choose and its default power. But on average, manufacturers estimate that systems can help consumers save anywhere from 10 to 15 percent on heating and cooling costs.

3.Easy –

Luxury is another major selling point for home automation devices, which eliminate almost minor annoyances such as turning off the lights before going to bed or adjusting the thermostat when you wake up in the morning. Many systems come with remote dashboard power, so forgetting to turn off that coffee pot before you leave no longer requires a trip back home. Just drag the dashboard onto a smart device or computer, and turn off the coffee pot in a few seconds.

4.Security-

Remote monitoring can make your mind more comfortable while you are away. With remote dashboards, lights and lights can be turned on and off, and automated blinds can be turned on and off. These skills - combined with automated security systems - can help you reduce the risk of interference: you will be notified immediately if something goes wrong.

6.2 Disadvantages

1. Internet Dependence: The basic requirement for a smart home system is the Internet. Without a good and strong internet connection, you will not be able to control this. If there is no internet connection for some reason, there is no other way to access and manage your system.

2. If the device is controlled by Wi-Fi, you need to make sure you are using a private Wi-Fi network channel that can be accessed externally.

3. We have lost control of our lives — our lives will be fully controlled and dependent on technology.

4. Excessive use of the internet and technology makes people unwise because they rely on smart devices instead of doing manual labor, which makes them lazy.

7. CONCLUSION

The IoT system combines home electrical devices with individually. Methods to be used at home automation includes those that work with flexible construction control of household chores, such as TV, fan, electricity tubes, refrigerator etc. After reading and understanding literature research and other available activities, we suggest a strategy that will give us a better understanding of Natural conditions at home. We also provide a notification to the user about any errors occurring on the devices. In this paper we plan to eliminate most of them human interaction by providing an intelligent system. Development of this program through the Internet of Things technology. Through these programs we can truly manage making low cost, smart homes and flexible its repair natural conditions and solve its mistakes with power to save.

8. Future Scope

The future scope of home automation systems includes making smart homes more efficient. Homes can be connected to sensors that include sensors, light sensors and temperature sensors and provide automated device-based switching.

Additional energy can be saved by ensuring that the house stays afloat before turning on appliances and checking light and turning off lights when needed. The system can be integrated closely with home security solutions to allow greater control and security for homeowners.

The next step would be to extend the program to a larger scale, such as offices and factories. Home Automation provides a global standard for interactive products. Standardization enables smart homes to control electrical, lighting, environment, energy and safety management and flexibility connect to other networks.

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