SYSTEM ON - OFF INDICATOR IN COLLEGE LAB

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ABSTRACT: This project's goal is to show if a computer is on or off. It is a demonstration with three computers, but it may be expanded to be used in laboratories with more computers. The lab managers often remind us to turn off the computers when we are ready to leave the room, and it takes a lot of work for them to make sure every single one is off. Our invention uses LEDs to show whether the system is on or off. The main components of this project are Arduino, sensors, a Wi-Fi module, and relays.Our plan is to install automatic doors that need two passkeys to open and shut. If any of the systems are still on, the in-charge is notified as soon as we input the passkey to shut the door. The doors cannot be opened once the close key has been entered until the open key has been entered. The doors may be manually opened using the open key once again to manually switch off the system. Not only may turning off a system save electricity, but it also extends its lifespan.

I. INTRODUCTION

This project's goal is to provide system status information without requiring human system checks on every system. With the use of LEDs, this displays the system's status and notifies the person in control when the lab doors are closed but the systems are still operational. This indicates the system's state automatically, which lessens the workload for the person in control. The Blynk app has the ability to send notifications when the system is still in the "on" state. Therefore, node MCU is mostly used in this whole procedure. An Arduino Uno may also be used, however a wifi module is required. In the event that we use a node MCU with a fixed wifi module (system on-chip connectivity). We are looking at a demo of two computers in this project, as well as a door demo using servo motors for opening and shutting. This initiative also extends the system's lifespan and contributes to power conservation.

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Microsoft's Windows 10 is an operating system designed for use on PCs, tablets, embedded systems, and IoT devices. Corporate IT departments may utilize mobile device management (MDM) software to protect and govern devices running Windows 10 thanks to built-in capabilities. Additionally, companies have the option to use conventional desktop management programs like Microsoft System Center Configuration Manager.

Multi-factor authentication is built into Windows 10 using standards created by the FIDO Alliance. With the Windows Hello platform, the operating system now offers enhanced support for biometric authentication. Similar to Kinect, devices with compatible cameras that need infrared illumination—like Intel RealSense—allow users to log in using their iris or facial recognition. Users who own devices that enable readers may log in using their fingerprints. In February 2018, support for palm vein scanning was also included thanks to a collaboration with Fujitsu. Asymmetric encryption is used to safeguard credentials, which are kept locally.

Software

The Arduino IDE (Figure 1.1), or Integrated Development Environment, is the proprietary software for the Arduino Uno. It offers an editor for writing hardware programs. For a design application, the code editor was easy to use. It gives you a very clear picture of the source code's function, constants, variables, etc. in terms of color and font. Brace matching, syntax highlighting, and automated code indentation are some of its features.

Arduino's programming language is a condensed version of C/C++ that is built on "sketches," which are fundamental programming constructs made up of variables, functions, and programming structures. These may be turned into a C++ program by them.

The program is compiled using software, after which it transforms into machine-understandable instructions and produces an object file. The object file is combined with the normal Arduino Libraries, which provide the built-in Arduino function definitions. One hex file is the end result of this. It uses USB to send this hex file to the microcontroller.

II. RELATED WORK

Computers and the internet are being used by schools and universities all over the globe to educate pupils digitally and artistically using data visualization. In a classroom, computers are utilized to help pupils develop their imaginations and creative thinking. Drawing tools, audio, spreadsheets, video lectures, PPT presentations, and other resources are highly helpful for learning in-depth and precisely. The result of this is the new education business model known as digital classrooms, smart classrooms, and tiny classes.

Education is recognized as the most significant factor in our lives. With computers, the educational system is being revolutionized. These days, almost all types of educational institutions, including universities and schools, employ computers in the classroom. A vast array of schools and institutions offer their students online courses and online degree programs.

A computer is a valuable educational tool for both educators and students. Without a computer, we would not be able to access educational resources like blogs, YouTube, eBooks, newsletters, e-newspapers, etc.

That being said, one of the greatest applications of computers in our everyday lives is to help us become more knowledgeable and proficient.

As students, we utilize computers almost daily. They are an essential component of being a student. There are computer laboratories with plenty of computers in every engineering institution.

When the computers are not in use, the lab's administrators are in charge of shutting them down. Any person in control finds it laborious to personally inspect every machine before shutting it down. Thus, in order to save labor, our idea used LEDs to indicate the system's state.The matching system is ON if the LED is on. The associated system is off if the LED is off.

The person in charge finds it simpler to manage the lab's systems as a result.And with the aid of NodeMCU, if the lab door is closed and the system happens to be switched on, it notifies the person in charge that the system is still turned on.The project as a whole extends the system's lifespan and conserves energy.

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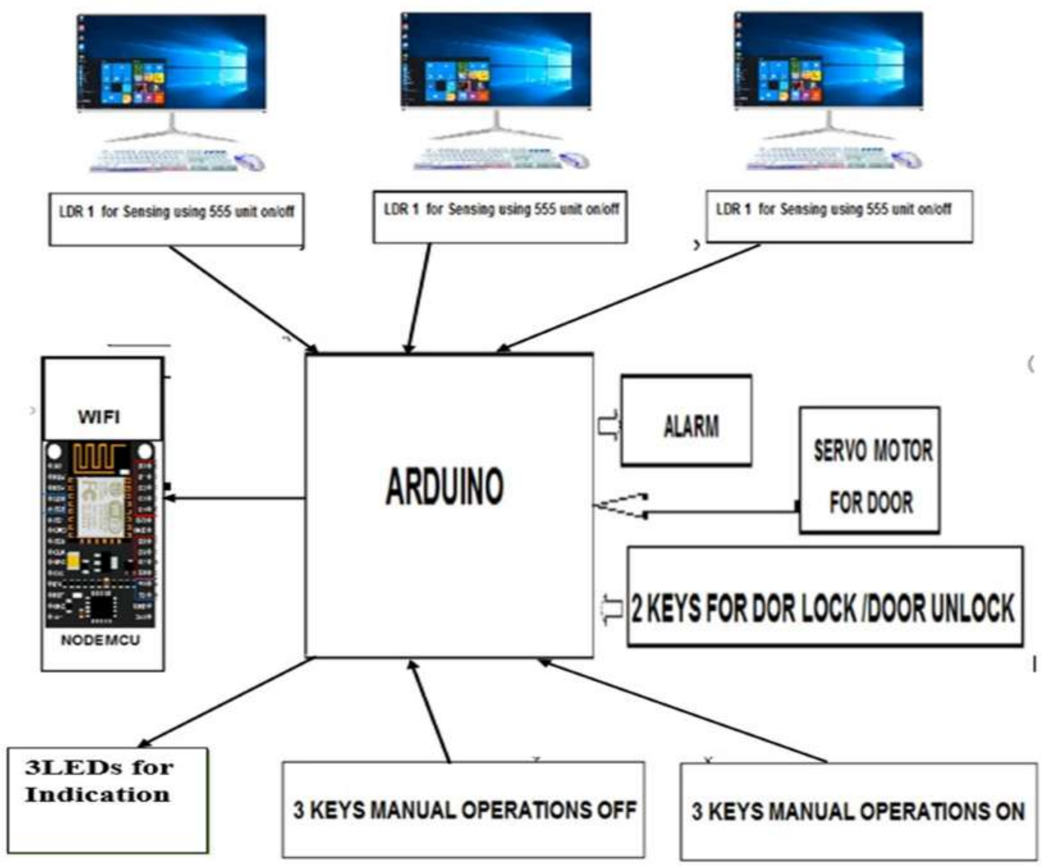
III. Block Diagram

The System Status Indicator prototype for our project is represented by this block diagram.Our project is a three-computer demo model. Therefore, three LEDs are selected and treated as LEDs on the mother board.A demonstration model of doors is a servo motor. Nothing is communicated to the person in charge if the doors are open, but they may still check the status by glancing at the LEDs. A 555 timer device and an LDR are taken and positioned next to every LED. The 555 timer unit's LDR measures the LED light intensity and signals the timer appropriately. The system is either ON or OFF depending on whether the signal is high or low. Once the signal is received, the 555 timer unit provides the Arduino with it as an input. After setting it up, Arduino sends the signal to the Node MCU.

The Node MCU notifies the person in control of the system number whether it is still ON if the doors are closed by hitting the shut key, assisted by the Blynk app.



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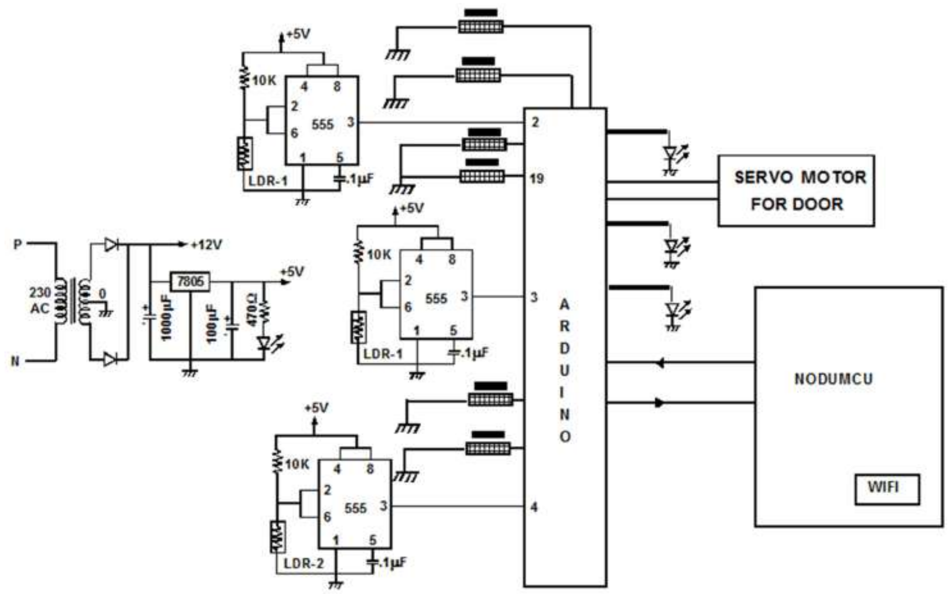
IV. SYSTEM ARCHITECTURE



FLOW OF EXECUTION

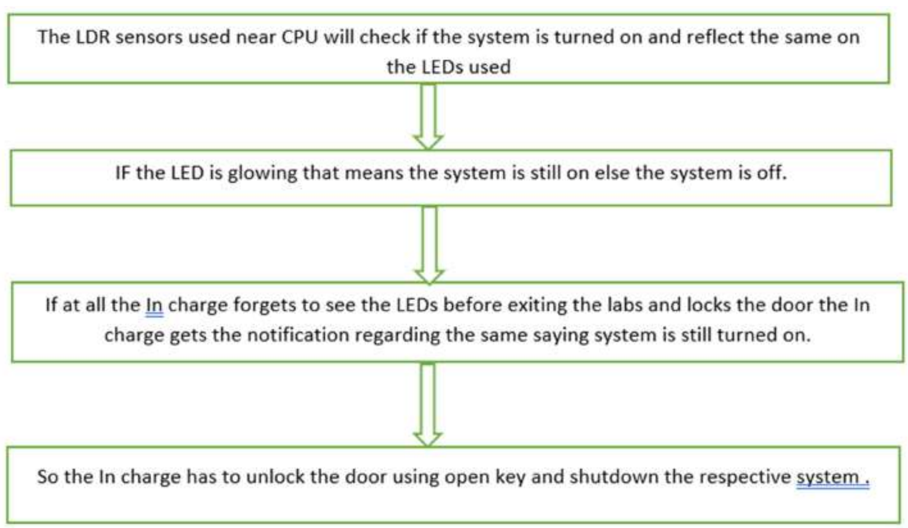


Figure Flow of execution

Our project's main goal is to display if the lab's systems are on or off. We are installing a 555 timer unit and an LED near the motherboard led of the system to detect if it is on or off. LDR recognizes the mother board's light. When the system is turned on, the LED recognizes the light and signals the Arduino with a high signal. Then, in order for us to know that the specific system is on, the Arduino sends a high signal to the node MCU signaling the specific system state. The Blynk app notifies the person in control of the system's status via notifications. The execution flow is shown in the figure above.

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V. EXPERIMENTAL ANALYSIS AND RESULTS

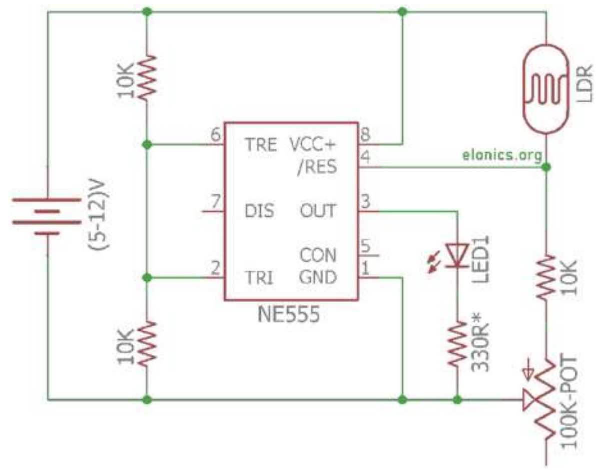

Figure LDR Sensor

The intensity of light shining on an LDR (light dependent resistor) is inversely proportional to its resistance. It suggests that the LDR sensor's resistance (Figure 4.2) would decrease with increasing incoming light intensity and vice versa.Conversely, a voltage higher than 0.8V applied to Pin-4, the reset pin of a 555 timer integrated circuit, causes it to activate. For the output to be ON once the IC is turned on, the voltage between Pins 2 and 6 must be between 1/3 and 2/3 of the supply voltage. The output turns on, for instance, if the voltage at the reset pin is higher than 0.8V and the voltage at Pins-2,-6 is half the supply voltage.In the circuit, an LDR, a resistor, and a potentiometer were used to construct a voltage divider. The 555 timer IC's Pin-4 (reset) is then attached to it. As a result, the voltage at the voltage divider drops below 0.8V in the dark, increasing the resistance of the LDR and turning off the 555 timer IC. The IC turns on when there is sufficient light and the reset pin voltage rises over 0.8V.The supply voltage is split in half by the two 10K resistors and supplied at Pins 2 and 6. This guarantees that anytime the IC is triggered, its output will turn on.

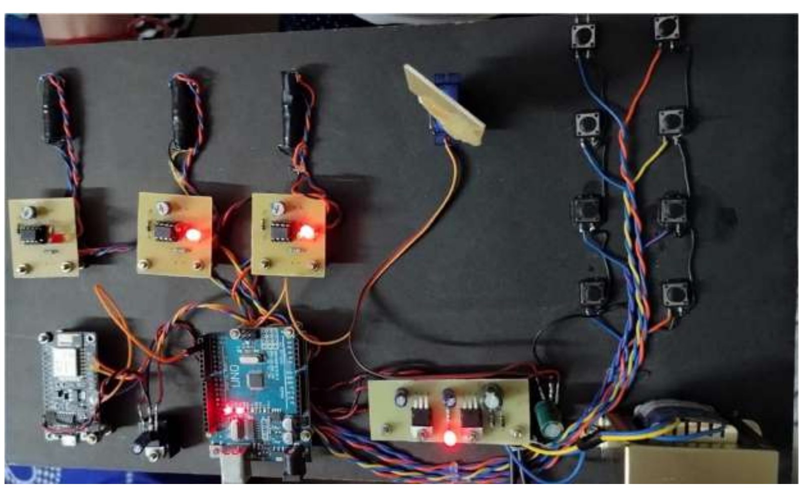

Figure Hardware Module

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VI. CONCLUSION FUTURE SCOPE

A sample model was created utilizing an Arduino, a NodeMCU, and a 555Timer Unit to show the state of the system in college laboratories. Three example systems are used in the development of this demo model. The LED on the 555Timer device indicates the systems. Every LED signifies a system. If the NodeMCU is still being used, a notice is sent to the person in control every time the lab door is closed with a key.

This may be improved so that it can be used in college laboratories and other locations with lots of systems. This may be quite helpful in any location where there are many of computers since it is a laborious effort for an individual to manually verify and shut down every single machine. The person in charge will find it easy to know the system's state as a result.The person in charge also saves a ton of time doing this. This prolongs the system's lifespan and prevents needless harm to the system in addition to saving a significant amount of electricity.

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