Smart Extension Board

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Abstract—**Smart Extension board is extension board device which is used to control many appliances and devices working on electricity remotely and saves a ton of energy this also enables one to monitor and analyze the devices and appliances efficiency on smartphones via Bluetooth application. Traditional extension boards are boards which only performs the on and off task to connect the supply voltage to the appliance or device, the smart extension board is more feature loaded then traditional extension boards. Smart Extension board can switch on and off the appliances or devices plugged to extension board without physically making a connect with board. This can be useful when you left devices turn on and when you are not home to control appliances or devices remotely. One can analyze and monitor the consumption of electricity by all appliances or devices connected to smart extension board. This helps in keeping track on energy consumption and utilization. Smart Extension board isolates the mains power supply from the appliances and devices to protect them from further damage in power fluctuation and natural calamities this is executed by integrating the optocoupler connected to the controller.**

I. INTRODUCTION

Human lives and human societies are taking their steps towards the future with the intelligence and assistance of machines and smart devices, this has impacted many of the fields and areas of our lives. Now a days one out of two tasks which humans perform are either with assistance of machine or fully automated, whether it is direct or indirect involvement of machines. This research paper presents an automated, machine-driven extension board which is intelligent and assists one in controlling their appliances and devices wirelessly and remotely with a Bluetooth app which pursuits following tasks.

1. Isolation:
There are many factors which affects the voltage in appliances and devices which results in fluctuations and overloading in the electrical circuit causing damage and breakdown in circuitry to avoid these circumstances and maintain the follow of stable supply to the appliance and device the smart extension board is completely isolated from AC mains supply using Opto-coupler.

2. Stabilization:
Every electrical circuit works on a specific voltage and current rating, to lengthen their life it is necessary to provide the appliance or device proper voltage. The obstruction in this can be natural factors like lighting, thunder, fallen trees and heavy rain which then causes voltage fluctuation and voltage overloading damaging the circuitry of appliances and devices. Smart Extension board is designed with a stabilizer to prevent this fluctuations and overloading to make sure the circuit does not break, providing no disturbance in the appliance.

3. Universal Charging:
Mobile and Smartphones have become an integrated part of our lives to keep up with this integration one should keep their mobiles and smartphones charged up, so the smart extension board is featured with universal charging USB port diminishing the Adapter.

4. Remote Access:
Traditional Extension boards are turned on and turned off manually making physical contact to the switch, the upgrading world and technologically advancing future coming ahead needs a smarter and technologically advance devices with streams of devices being IOT enabled, the smart extension board is also IOT loaded making it connected the internet to transmit and receive commands wirelessly and remotely. The extension board being wirelessly controlled can turn on and turn off appliances, devices conserving the electricity and resulting reduced bills.

I. LITERATURESURVEY

The paper summarizes of concept aiming IOT (Internet of Things) to expand benefits internet connectivity. It determines smart home system for controlling appliances, devices and equipment's operating using internet protocols. This project is ESP8266 microcontroller-based hardware and blynk application to control home equipment's wirelessly using wi-fi application.

[1] The research paper discusses the concept of healthcare scenario has been gradually changing in terms of the use of advance healthcare and healthware systems it discusses how IOT (Internet of Things) can play a vital role in improving the healthcare system. The sensing layer consists of all sensors, RFIDs and Wireless Sensor Network.

[2] The paper discusses the home automation system using microcontroller ESP8266, temperature sensor, humidity sensor

and relay modules.

[3] This research paper discusses Industrial Internet of Things(IIOT), NodeMCU microcontroller, and wifi application blynk app used to control equipment's and devices wirelessly and analayze the industrial equipment's efficiency and tracking manufacture's environment remotely.

[4] This project about Smart Extension board for domestic uses, the equipment, devices tracking, measuring in real-time, automatically turn on or off, control this via internet of things (IOT) protects the devices and equipment's from any damage. The project manages Internet of Things using web pages and android application connect to internet server.

[5] This paper incorporates voltage stabilizer which detects, corrects voltage fluctuation, overloading of electrical signal to create steady output for load connected to the supply voltage. The stabilizer circuit can detect and buck and boost voltage signals to maintain the output at load clean and stable. This includes a ESP8266 microcontroller and wifi application.

II. METHODOLOGY

Begin by defining the requirements for the smart extension board. Understand the market dynamics and the needs of potential users. This involves considering features such as remote control, energy monitoring, surge protection, USB charging, voice control, and compatibility with home automation systems. These requirements form the foundation for the design process.With a clear understanding of the requirements, delve into researching the components and technologies that will bring the smart extension board to life. Explore microcontrollers suitable for smart home applications, investigate wireless communication protocols like Wi-Fi, Bluetooth, or Zigbee, and identify sensors that will enable functionalities such as power monitoring.Selecting the right microcontroller is crucial. It should have the processing power to handle the desired features and functions. Implement a robust wireless connectivity solution, ensuring seamless communication for remote control and interaction with other smart devices. Pay special attention to security measures to protect user data during transmission.Efficient power management is a key aspect of a smart extension board. Incorporate surge protection components to shield connected devices from power surges. Choose energy-efficient components for power distribution, and design mechanisms that prevent overloads and short circuits, ensuring the safety of both the extension board and the connected devices.
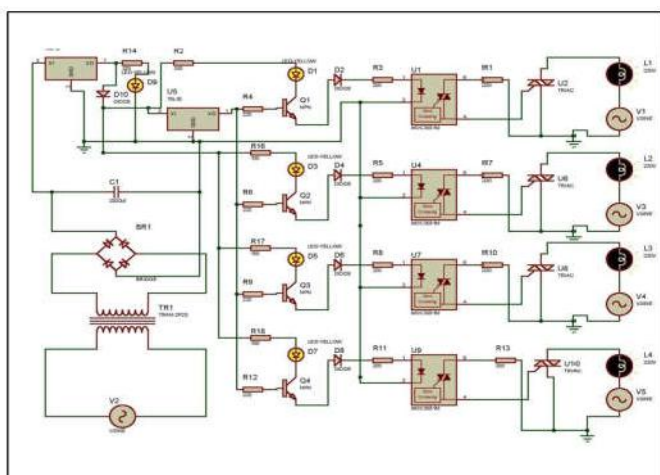

Fig.1.0:Circuit Diagram

IV. HARDWAREREQUIREMENT

A. 5V 4 channel Relay module

The **four-channel relay module** contains four 5V relays and the associated switching and isolating components, which makes interfacing with a microcontroller or sensor easy with minimum components and connections. The contacts on each relay are specified for 250VAC and 30VDC and 10A in each case, as marked on the body of the relays.

B. ESP8266Microcontroller

The ESP8266 is a low-cost Wi-Fi microchip with built-inTCP/IP networking software and microcontroller functionality.But initially there was little information in English about the chipand the commands it received. The model's very low priceand very few external components indicate that its final sizecould be very cheap; This attracts many hackers to explore themodel'smodule,chipandsoftwareandtranslateChineseliterature.

C. OLED Display

An organic light-emitting diode (OLED), also known as organic electroluminescent (organic EL) diode, is a type of light-emitting diode (LED) in which the emissive electroluminescent layer is an organic compound film that emits light in response to an electric current. This organic layer is situated between two electrodes; typically, at least one of these electrodes is transparent.

V. COMPREHENSIVEOVERVIEW

The Smart Extension Board comprises of a ton of features compared to an traditional extension board which is a device that is remotely controlled, provides isolation of mains supply and extension board appliances, equipment's and devices, it carry out the stabilization process to provide a uninterrupted follow of supply protecting the circuit of the connected devices, also monitors the individual device power consumption and tracks efficiency and wirelessly controlling appliances, equipment's and devices from turning on and turning off.

VI. CONCLUSION

The Smart Extension board is a autonomous extension board which perform tasks which a traditional extension board cannot perform it provide many features which can be innovative and comprises internet of things (IOT) which carry out the monitoring of the individual device power consumption and transmit it to the Bluetooth application or store it to the database and retrieve or fetch when it is necessary. It also performs isolation of the high main supply and the low appliance, equipment and devices in order to protect them from any damage from overloading or natural disturbances like thunder, lighting causing fluctuations in the supply this also ensures the flow of the supply by boosting it or bucking it using a voltage stabilizer to maintain the circuitry without breaking the circuit in any of the mentioned cases. It offers a USB charging port also so one can charge their smartphones with depending on their Adapter configurations.

III.   REFERENCES

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