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IOT Based Smart Home Energy Meter

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Abstract: During the on going time period the need of power i.e. electricity is growing exponentially due to the rapid usage of various technologies present around us. Due to this it has been a matter of worry for the developing and developed countries for need of rapid power outages. Solution for this was inferred as buyer send individuals to monitor their daily usage in their respective places. The project emphasizes on Smart Metering to ensure a cleaner and efficient transmission of power depending upon one's use and to provide a sustainable development.
The meters used since the starting of era don't provide enough data for the buyer to be aware of the usage and what to or how to monitor the usage. Smart Meter helps the buyers to monitor them time to time usage and to remotely access their respective loads from anywhere. This project helps in obtaining a newer form of approach to the buyers to help the reduce the cost of usage of power and to help in sustainable development. In addition , we have implement system to monitor the use of each load so that the user can track daily energy consumption with the appropriate load.
Keywords: Smart Home Energy Meter etc

I. INTRODUCTION

Electricity supply in the first phase of house hold technology is only reliant on traditional energy meters. These meters are crucial for determining each house hold's energy use. With developments in technology, the usage of these meters has slowly decreased as fast adjustments have been made to address the issues that emerge with regular meters. When inhabitants are oblivious of their everyday actions, a huge problem occurs.

The monthly answer provided to customers is insufficient since consumers will be unaware of how much energy they spend. Smart Meters were designed and improved to address the issues with standard electric meters. Consumers will receive power warnings based on hourly power use, thanks to the utilization of Smart Meter data. The primary purpose of smart meters is to cut down on domestic power usage. Consumer behavior may be studied and evaluated with its expanding market attention.

To enhance user behavior, power usage patterns can be simplified. With the installation of smart meters, the power market may be reorganized, saving both energy and carbon dioxide emissions. Only if consumers have a positive experience with the meters can the independent and reliability be demonstrated. Consumer usage time can be reduce Smart Meters is connected to online payments.

II. LITERATURE SURVEY

Dr.. A. A Gurjar et al. [1] of Sipna COET The rating system also mentions features like real-time power monitoring ,which allows users to see the consequences of contraction and relaxation electrical objects and calculate the cost accordingly, as well as receiving notifications directly from the utility network. The publication features timely usage patterns for nights and weekends. The poll was carried out in numerous nations and places ,with the same results achieved to encourage people to acknowledge authority. Smart Meters are being used to promote the usage of renewable energy through social-tech updates. There is a proposed set of study questions, also including

1) Has been the answer beneficial in energy conservation and behavior change?
2) What constitutes a successful and good feedback presentation?

K. S. Abbirame et al. [2] of KVCET, Chennai, Tamil Nadu . Smart Meter usage and detection incorporates multiple Smart Meter installations constant monitor and send feedback to the customer. The users of the smart meters will get electricity without the worry of the and at the sametime carbon offset discharge scan also be predicted some times seen.

Samar Ali et al. [3] of Abu Dhabi University, UAE .The value of the Meter in real life in relation to the buyer as well big beneficiaries changed. Functions and advantage of Smart Meters set side by side to the described meter. Researchers were curious hypothesis of questions proposed in this particular research paper. The user should be familiar with the energy used. Hence we infer to have a sustainable development and use there source carefully.

Pughazendi N et al. [4] The poll is divided into four sections :socio economic concerns, technological concerns, casestudies, and predictions. The separation of instances was chosen to collect data for the study in an ordered manner, since we began with a literature study in the early stages of research.The services offered by the service provider determine the customer satisfaction in the digital economy.

A.Dutta et al. [5] The structure of the SEMS was made into action for production level of Smart integrated load conditions Electrical items. Unit prices, usage and usage costs under diverse real-life conditions i.e., very high, medium and non-peak values are divided. Each energy cost the object used is shown in the image.

III. SYSTEM DESIGN

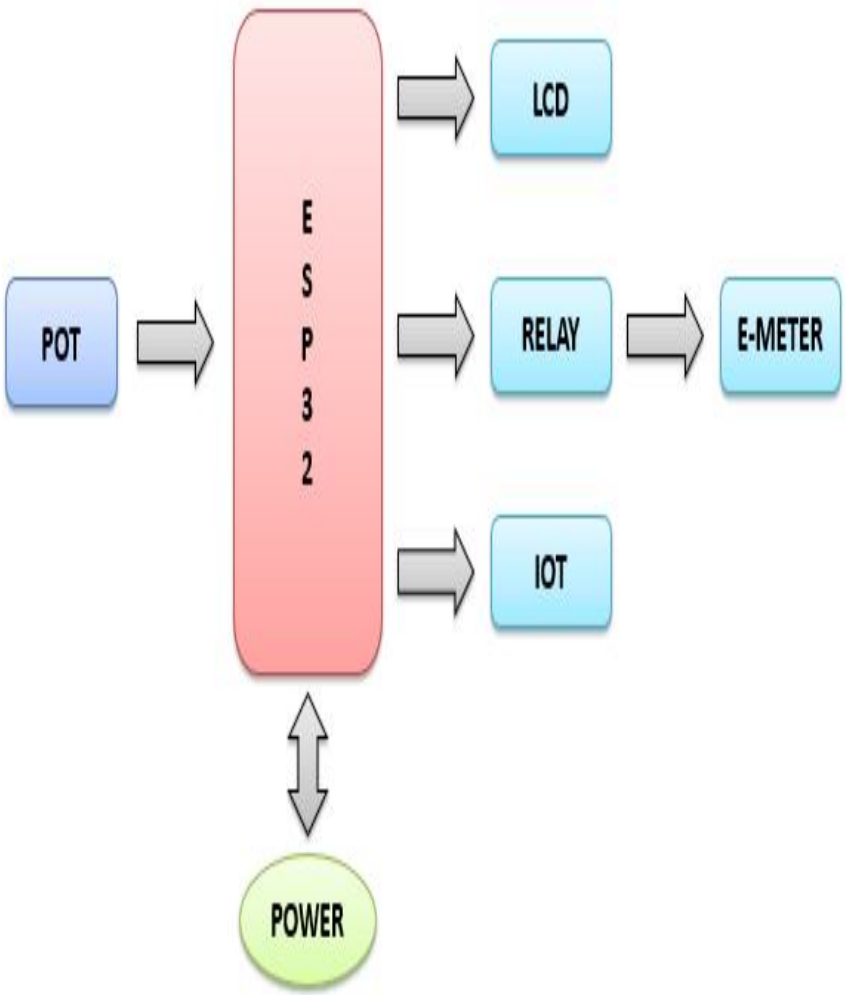

Fig 1. Block Diagram

The block diagram consists of AC source from which we get power for loads, one current sensor, a voltage sensor, ESP32 microcontroller, two relay modules and two different loads. The current sensor and voltage sensor will give the power value which will be given to the controller to turn on or turn off the loads. The load can be operated from remote distance using IOT Thing Speak application. We are not using any kind of physical switch to turn on or turn off the loads hence loads can be operated through IOT dashboard. Two relays are used to connect the respective load with controller. These relays will help to control overloading situation and prevent load from the damage. In the system, current sensors are used to measure the incoming and outgoing current flowing through energy meter. There lay module is used to control loads. ESp32controller will give the control signals to relay for operation.

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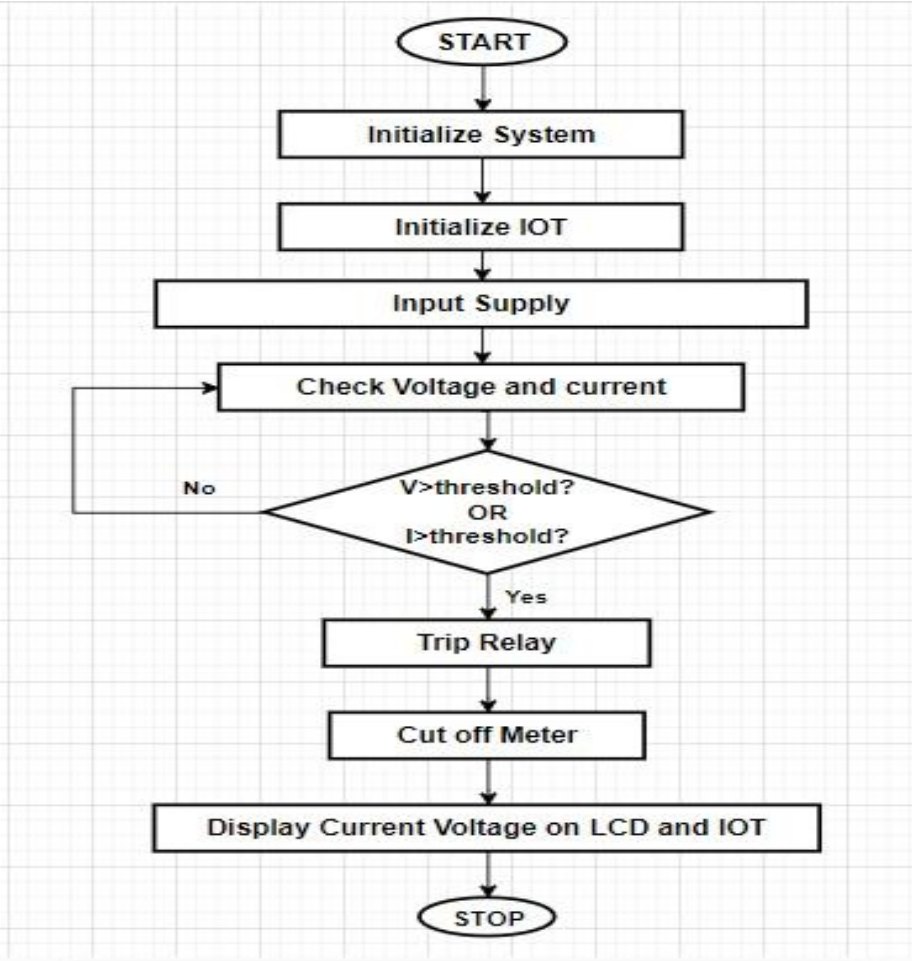

Fig2. Flowchart

IV. RESULTS AND DISCUSSIONS

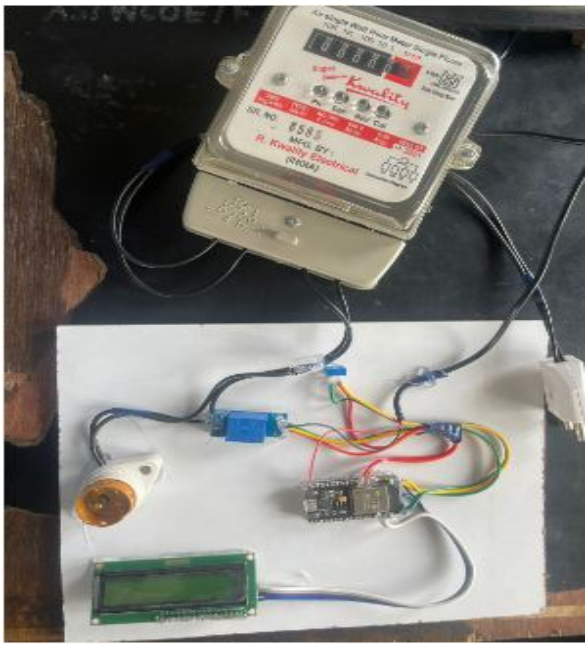

Fig 3. Hardware Assembly

In the above figure we have connected a bulb on Load 1 for measurement of current and voltage. The results show that the bulb we have used is consuming 0.53mA current and 230V voltage. The power rating of this bulb is displayed on LCD and that is120W.
We have operated this load from the Thing Speak Server. As soon as we touch the load 1 it will get turn on within a seconds, the LCD display is showing that only load 1 is ON whereas load2 is still off. We can connect any other load like fan, lamp or any other electrical device to load 2 for measuring their electricity consumption.
To switch between the loads, we have used relay module. This relay module will connect the load to the AC source.
The IOT dashboard shows in the above result when load is connected to the bulb. The result says that the bulb was consuming 0.41mA current and 230Vvoltage. The power consumed by this bulb was 93W. The result on LCD display was taken by the different load and for IOT we have connected different bulb. That is why the output of load are different in Thing Speak Server and on LCD display. We can monitor the power consumption of load from any distance with the help of IOT Thing Speak Server and can turn OFF or turn ON the loads if needed.

V. CONCLUSIONS

The proposed system is able to all eviate the suffering of the customer and make users worry about the excessive use of electricity and faulty home appliances. With this program, customers can easily view a complete heartbeat, complete units and total electrical costs. The program is easy to read and reliable. The data stored in the cloud is of great value in the extraction of energy meter data in the future. In a big sense, a power distribution company like DPDC is able to identify the pattern of local use.

VI. ACKNOWLEDGMENT

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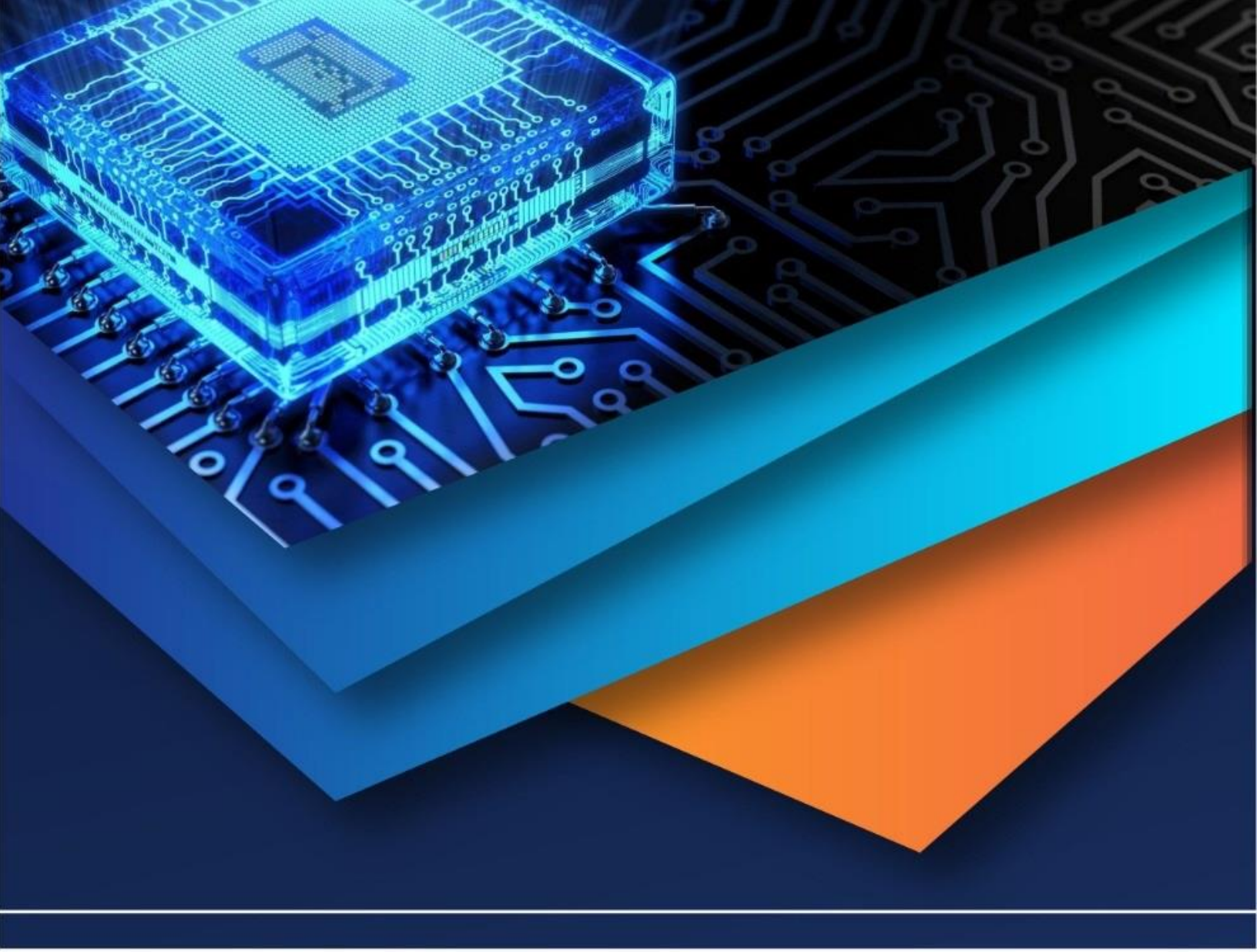

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