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WIRELESS HOME CONTROLBY BLUETOOTH LOW ENERGY TECHNOLOGY

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Abstract:- Environmental concerns have garnered widespread attention, but electricity consumption continues to contribute to environmental pollution. To effectively conserve energy, users must have a clear understanding of individual appliance consumption. Existing energy feedback systems often present technical data that is inaccessible to most users. The most efficient approach to address environmental concerns associated with electricity consumption is by minimizing usage. This challenge is addressed through the creation of the Smart Energy Consumption Monitoring System. It enables users to manage power consumption within their building, providing real-time insights into electricity usage and automatically generating consumption reports. The system is designed to enhance the comfort, security, and energy efficiency of modern homes. The fundamental elements of this system consist of the microcontroller, which serves as the central hub for controlling temperature, light intensity, and motion detection. Multiple sensors, including temperature sensors, light sensors, and motion detectors, are strategically placed throughout the home to monitor and respond to environmental changes. The controller orchestrates the data from these sensors, allowing homeowners to remotely control temperature settings, adjust lighting levels, and receive real-time alerts on detected motion. This level of automation not only increases convenience but also enhances security by deterring potential intruders through intelligent lighting and motion-activated alerts. The proposed energy detection device utilizes an controller and various sensors like the ACS712, electric meter, and Wi-Fi connectivity. Collected data is analysed using the Internet of Things technology, facilitating seamless power consumption monitoring and management from anywhere, at any time.

1. INTRODUCTION

1.1 GENERAL

The Bluetooth wireless technology is set to revolutionize the way people perceive digital devices in our homes and office environment. Now they are no longer just the individual devices; instead, with the embedded Bluetooth technology, they form a network in which appliances can communicate with each other. This wireless technology is especially useful in home environment, where there exists hardly any

infrastructure to interconnect intelligent appliances. It could be suitably used for home automation in a cost-effective manner. Operating over unlicensed, universally available frequency of 2.4 GHz, it can link digital devices within a range of 10 m (expandable to 100 m, by increasing the transmitted power) at the speed of 1 Mbps. Building upon this theme; we propose a home automation system based on Bluetooth technology [1,2]. There are certain issues involved in the design of a home automation system. The system should be scalable, so that new device can easily be integrated into it. It should provide a user-friendly interface on the host side, so that the devices can be setup, monitored and controlled. The interface should also provide some diagnostic services so those problems with the system, if any, can be tracked down. The overall system should be fast enough to realize the true power of wireless technology. It should also be cost effective in order to justify its application in home automation. The system developed during the course of this research consists of a Host Controller (HC) implemented on a Personal Computer (PC), and a microcontroller based temperature-sensor/fan-controller, that is able to communicate with the host through the Bluetooth link. The system is based on Home Automation Protocol (HAP), developed by the authors in order to facilitate the master–slave communication in a home automation network [3]. This protocol ensures a prioritized, interlocked exchange of data. It also supports dynamic addition and removal of devices on the network. A user interface on the PC offers device registration, control as well as diagnostic utilities. Bluetooth development kit from Ericsson was used for the development [4]. A microcontroller was used as a device controller for client modules [5,6].

2. LITERATURE SURVEY

2.1 EXISTING SYSTEM

The existing home automation system operates on Wi-Fi connectivity, allowing control of devices through a smartphone app. In the existing system, traffic monitoring and control systems primarily rely on fixed infrastructure such as traffic lights, cameras, and sensors embedded in the roads. These systems collect data at specific points, leading to a fragmented view of traffic conditions. Traffic management is often reactive, with limited ability to predict and mitigate congestion before itoccurs. Manual intervention is frequently required to address unexpected traffic events, leadingto delays and inefficiencies. Moreover, the integration of real-time data from various sources isoften lacking, resulting in suboptimal traffic flow and increased travel times.

2.2 PROPOSED SYSTEM

The proposed system will utilize Bluetooth Low Energy (BLE) technology for home automation, enhancing reliability and efficiency in device communication and control. The proposed IoT-enabled real-time traffic monitoring and control management system aims torevolutionize intelligent transportation systems by leveraging interconnected devices and advanced analytics. This system will utilize a network of IoT sensors, and connected vehiclesto continuously gather comprehensive realtime traffic data. The system will enable proactiveDepartment of EEE, GNITC 1Intelligent Transportation System (ITS)traffic management, reducing congestion, improving road safety, and enhancing the overall efficiency of the transportation network. Additionally, it will facilitate seamless integration of data from multiple sources, providing a holistic view of traffic conditions and informed decision-making.

3. BLOCK DIAGRAM

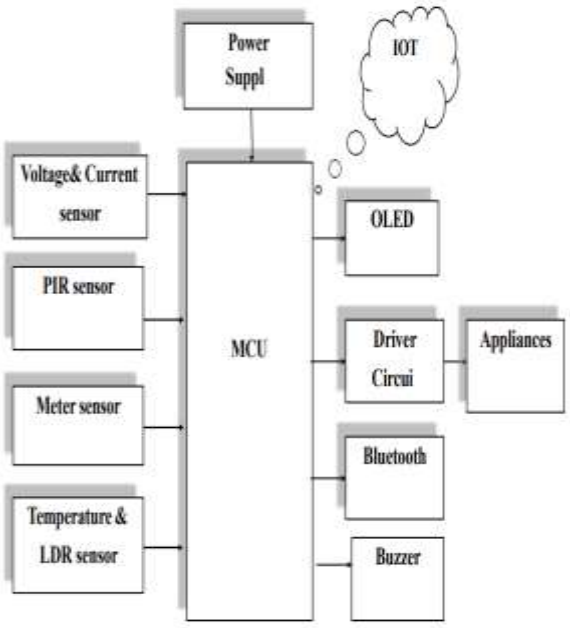

FIG: 1 Block diagram

3.1. HARDWARE COMPONENTS

- Regulated power supply.
- Voltage sensor
- Current sensor
- PIR sensor
- Meter sensor
- Temp and LDR sensor
- Micro controller.
- IOT

3.2. SOFTWARE REQUIREMENTS:

- Raspberry Pi Pico
- Embedded C

4. IMPLEMENTATION (WORKING PROCEDURE)

The fundamental elements of this system consist of the microcontroller, which serves as the central hub for controlling temperature, light intensity, and motion detection. Multiple sensors, including temperature sensors, light sensors, and motion detectors, are strategically placed throughout the home to monitor and respond to environmental changes. The controller orchestrates the data from these sensors, allowing homeowners to remotely control temperature settings, adjust lighting levels, and receive real-time alerts on detected motion. This level of automation not only increases convenience but also enhances security by deterring potential intruders through intelligent lighting and motion-activated alerts. The proposed energy detection device utilizes an controller and various sensors like the ACS712, electric meter, and Wi-Fi connectivity. Collected data is analysed using the Internet of Things technology, facilitating seamless power consumption monitoring and management from anywhere, at any time.

5. CIRCUIT DIAGRAM

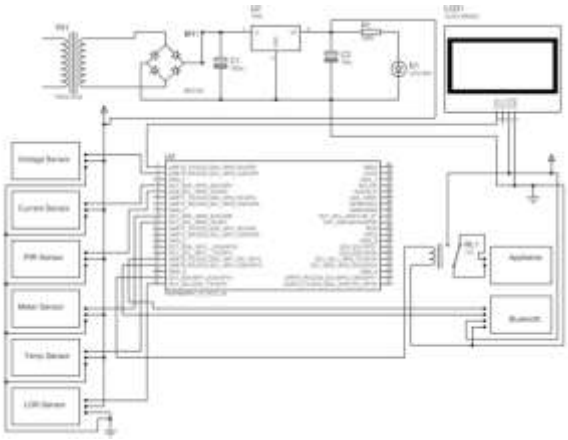

Fig : 2. circuit diagram

6. RESULT

This project is well prepared and acting accordingly as per the initia specifications and requirements of our project. Because of the creative nature and design the id of applying this project is very new, the opportunities for this project are immense. The practical representation of an experimental board is shown below:

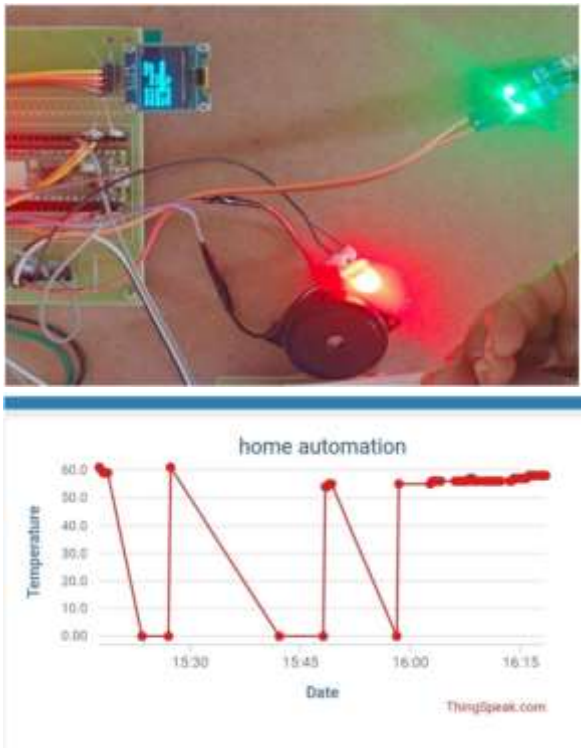

Fig:3. Project Model

7. CONCLUSION

The objective of this proposal was to develop a home automation system based on Bluetooth wireless technology. The result is the HAP, which allows the user to monitor and control different appliances connected over a Bluetooth network in home environment. The system has been demonstrated to be functioning by developing a room temperature control system. The nature of this project is such that it provides a great scope for further developments. In this system, the error detection and correction facility is only handled at the Bluetooth level. Similar facility can be developed at the application level. Also, some security measures to avoid interference of neighboring home automation systems can also be incorporated into the application. The functionality of the HAP can be tested for a larger network, using multiple Bluetooth devices. For this project, we have used I2 C interface between the DC and the ADs. One can explore the possibility of a parallel interface for faster appliances, or power line interface, etc. In our application one Bluetooth module is associated with only one DC. However, one can assess the viability of a multi-drop RS232 interface between a Bluetooth module and DCs. Of course, in ideal situation, each appliance will have its own Bluetooth module. With the explosion Internet and related technologies, the home system looks set to enter this arena. The homeoffice concept that enables consumers to control their home appliances via the Internet is also possible. With our home system, which consists of the HC that usually takes a form of PC, Internet connectivity can easily be established and control be made available. Efforts in such direction will help realize a truly wireless, fully automated home automation system.

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