

IoT Enabled Smart Home and Health Monitoring System

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ABSTRACT

Hospital patients have a big impact on their health and are more likely to get various ailments if they don't get prompt and effective care. In recent years, it may have been challenging to observe patients. Consequently, a reply is needed. Anytime, wherever, keep track of the patients of your doctor. The solution to this is expected to be invented, according to recent Web of Things (IoT) device events. After our days, health is of the biggest significance. Researchers and practitioners in this field will benefit from this job since it will help them comprehend the enormous potential of IoT in the medical industry and pinpoint significant IoT difficulties. A good level of health is necessary for efficient everyday job. The goal of the project is to create a sensor that can be used with an IOT-enabled smartphone to vividly track a patient's heart rate. This article offers a portable framework that continuously monitors a patient's heart rate, temperature, and various other room-related metrics using a Wi-Fi module. Health monitoring systems and smart homes with IOT capabilities have been presented. Based on the output numbers obtained, the precise sickness from the doctor, even from a distance, and some settings, the system offers access to approved personal data via any IOT platform. The Wi-Fi module can be used to control the space. Users can control appliances from anywhere in the globe thanks to the Internet of Things (IoT).

Keywords: Web of Things (IoT), Internet of Things (IoT) and Building Automation Systems(BAS).

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I. INTRODUCTION

Nowadays, the Internet has impacted most people's daily lives and has become an essential component of life. Evidently, a smartphone with sophisticated features hits the market every second. He makes the case that internet users are following the explosive

growth in smartphone use, which is happening daily. Therefore, the ultimate goal of this initiative is to connect everything that humans own to the internet and then monitor and control more through cellphones. IoT refers to a set of networks that interact with effects, results, and actions by sending and receiving data over the internet.

Everything is connected in this place without the need for human participation, allowing the automatic determination of scheduled actions. IoT makes it easier to identify and communicate information in an open computer network, distribute sensor data via a wireless network, and operate systems openly. With the help of modern technology, the objects we use on a daily basis become intelligent, but this is not enough until we connect them so that they can react to the environment as it changes and provide results. From one machine to another, each with its own internet connection.

The development and upkeep of a public transportation system, the intelligent distribution of electricity, water, and gas, waste management, and the maintenance of city infrastructure like roads and public parks are some of the challenging tasks that require assistance in a dynamically changing urban area. We think IoT technology is the most effective way to manage these complicated systems. Smart cities powered by IoT technology are gaining popularity. Connecting physical objects to the Internet was the initial aim of the Internet of Things. Then the Web of Things (WoT) was created to make it simple to connect sensors to the internet, collect data, and share device-generated data online. To completely comprehend the idea of IoT technology, we read a number of periodicals, research, conference papers, and project reports. Similar to that, we looked at an IoT-based project. There have been numerous IoT designs and developments in the past. The following are a few of the suggested and actual smart city platforms.

Four cities are participating in the STAR-CITY project: Dublin, Bologna, Miami, and Rio. To forecast traffic congestion, they make use of semantic web technology. Information is gathered from six distinct sources, including weather data, Dublin bus streaming, social media feeds, road maintenance and upkeep, and city events. To identify high traffic volumes, they employ

rules from the Semantic Web Rule Language (SWRL). The project's main area of interest is traffic analysis.

As humans continue to advance in terms of technology, health is always a top priority. Health care is a subject that has gained importance, much like the recent Corona virus outbreak that contributed to China's severe economic crisis. Given how extensive the pandemic is, it is always preferable to check these people's health remotely. Right now, the solution is IoT-based health monitoring systems. Patients can be seen outside of the typical clinic settings by using remote patient monitoring (e.g., their home). In order to increase accessibility to offices for human services while lowering costs, this project intends to develop a smart patient health tracking system.

II. BUILDING AUTOMATION SYSTEMS

The conditions of the interior environment are automatically controlled by BAS. The automation of heating, ventilation, and air-conditioning systems is the traditional and still crucial component of BAS. The system's primary goal is to significantly cut expenses and increase energy efficiency. Enhancing energy efficiency will also contribute to environmental protection. Due to this, appropriate laws and standards in developed nations require the use of BAS (Kastner et al. 2005).

In order to achieve the goal of a "smart/smart building," it is currently popular for BAS to incorporate data from all different types of building systems. Smart buildings have the potential to lower energy consumption, save construction and running costs, and improve home comfort because of their increased knowledge of what is happening within and outside the structure and their capacity to respond appropriately (Bertez 2010). Different BASs have been implemented in Albania over the past ten years, primarily for automating the HVAC systems of large functional buildings like office buildings, commercial centres, and businesses, hospitals, warehouses,

department stores, etc. Smart systems are also on display at significant shopping malls. The system is imported through a licence purchase or foreign direct sales from well-known multinational BAS and integrators or increased knowledge of what is happening both within and outside the building and their capacity to respond appropriately. The contracts are typically built on turnkey agreements. Despite the numerous benefits that these technologies offer and the fact that they are now more affordable, the market in Albania for the construction of private structures is particularly wary of such investments. BAS are generally not seen by construction company management as strategic in the face of competition, and as a result, they are generally unwilling to invest in them. According to a recent study, bad management culture and a lack of updating with current technology knowledge are the most significant factors affecting BAS investment reluctance (Zavalani 2009a). The Albanian government has energy efficiency as one of its main objectives, just like other European nations. This objective is being brought into compliance with the European Community Directive 2001/77 and the Treaty Establishing the Energy Community's energy efficiency principles. Plans to increase the effectiveness of electric energy consumption, particularly in the residential sector, have been developed under the National Energy Strategy and the National Energy Efficiency Law (Ministry of Industry and Energy, 2003). However, there is no provision in the action plan to promote BAS investment (Zavalani 2009b).

The Albanian government has energy efficiency as one of its goals, just like other European nations. This objective is consistent with the Energy Community Treaty and European Community Directive 2001/77 regarding energy efficiency. Plans to increase electrical energy efficiency, particularly in residential areas, are included in the National Energy Strategy Package and the National Energy Efficiency Act (Ministry of Industry and Energy, 2003). However, it was

impossible to anticipate that would boost investment in BAS in the action plan (Zavalani 2009b). We think that the following arguments account for such decisions:

1. Lack of updating modern technology knowledge officer
2. Lack of technically qualified human resources
3. Gaps between academic knowledge and public industry needs
4. Lack of experience and participation in "high-tech" transfer procedure
5. Brain drain
6. Low number of knowledge-based businesses
7. Lack of public programs to promote technology transfer and innovation.

III. LITERATURE SURVEY

Fig1. shows the design of an ESP32-based home monitoring system. I don't think so. ESP32 is an open-source architecture that uses Arduino microcontroller.

The Arduino platform offers an integrated development environment (IDE) for microcontroller programming that is based on the Processing project and supports the C, C++, and Java programming languages. The Arduino Uno and the Arduino Mega are two different models of Arduino. Both the Arduino Uno and the Arduino Mega have 80 input and output pins each, allowing you to connect a sizable number of home appliances. The Arduino Uno has 20 input and output pins. The processor is faster than other processors because it is built on the ARM architecture. Using data from both sensors, the IR sensor will tally the number of individuals present.

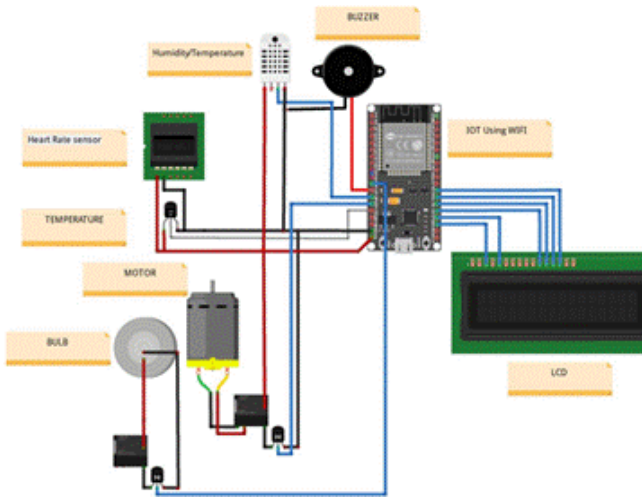


Fig 1: Design of IOT enabled Smart Home and Health Monitoring System.

The count will be increased when a human is detected by both sensors. The LCD panel will display the number of persons in the room. It will be obvious that someone entered the room if the second sensor's timer is longer than the first sensor's timer. A person has left the room if the first sensor's timer is longer than the second sensor's timer, which is a necessary condition. As soon as the person enters the room, the light bulb in the room begins to illuminate, and when the room is empty, the light bulb stops lighting. As a result, the system conserves energy by turning off the light bulb when the room is empty.

The system provides a security-based feature as the alarm will start ringing whenever someone enters the room. The piezo buzzer is used for alarm in the system. One of Tirana's tallest homes, with 21 floors above ground and 3 below, recently underwent design and application of an Intelligent Building and Management System (IBMS). The structure houses parking, offices, VIP apartments, restaurants, bars, a high-end shopping mall, and other amenities. The period is imported from Italy via a flip key agreement that is entirely based on a design that was developed by our team. The IBMS is designed to provide complete integration of all engineering and security components of the building through an open, transportable, and interoperable

system. The goal is to give managers access to all information in a control room inside the building (through a reliable Intranet) or via remote access via a standard Web Browser over the Internet. The IBMS is also designed to provide monitoring, control, alarm, and operational services that are entirely based on pre-established algorithms or scenarios.

IV. BLOCK DIAGRAM

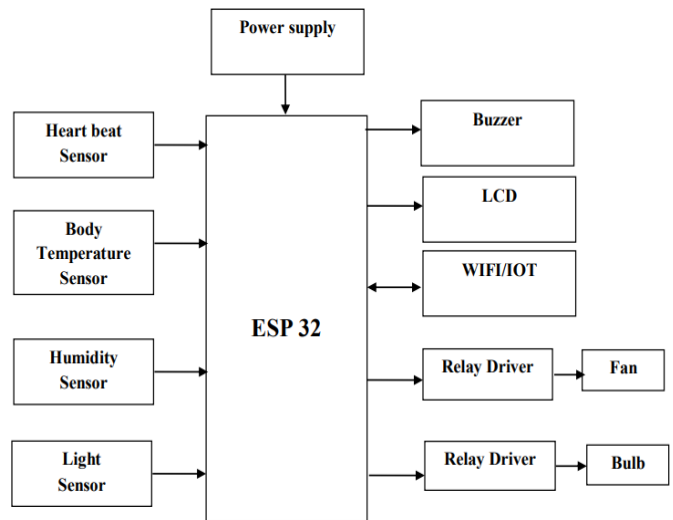


Fig 2: Block Diagram

V. FLOW CHART

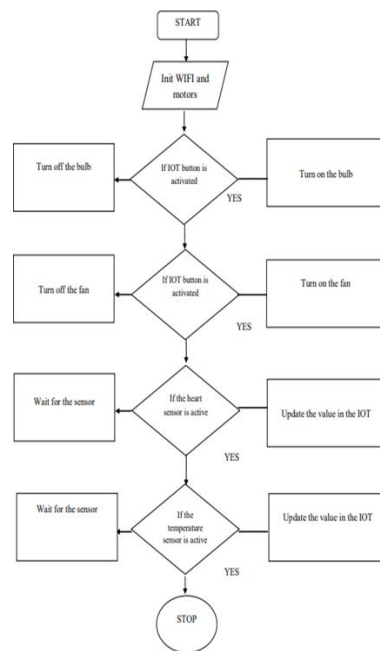


Fig 3: Flow Chart

VI. WORKING MODEL

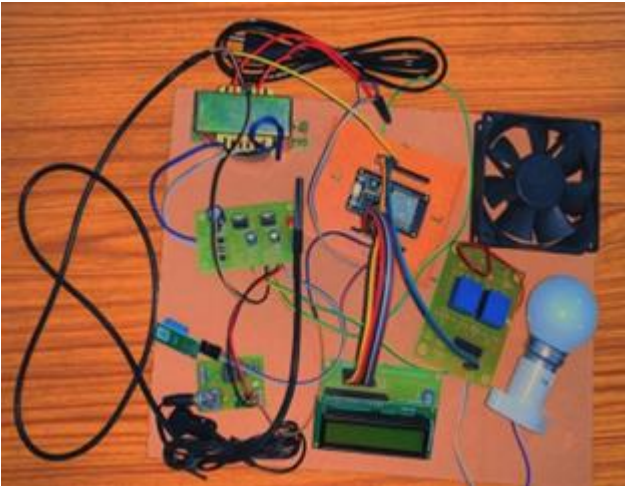


Fig 4: Working Model

VII. CONCLUSION

The "IOT-enabled Smart Home and Health Monitoring System" project has been designed and tested successfully. The software is built to benefit from the capabilities of every piece of hardware when it is combined. Each module's presence has been thoughtfully considered and strategically positioned to enhance the unit's performance. A developing technology was also used to accomplish the project successfully, including sophisticated integrated circuits and sensors.

Users can specify their health parameters on an IoT-based device, which can help them improve their health over time. Finally, if necessary, the sufferer can get medical attention. They can quickly and simply share with doctors the data from one app on their health parameters. IoT is currently regarded as one of the most attractive technologies for health monitoring, as we are all aware. It guarantees that the parameter data is secure inside the cloud, and most crucially, it enables any doctor to remotely check on any patient's health. The device will measure the body's temperature, heart rate, humidity, and SpO2 level, then use Bluetooth to transmit the information to an app. Additionally, the LCD screen receives this data,

enabling patients to see their present health more rapidly. Elderly patients, asthmatics, COPD patients, chronic patients, COVID-19 patients and diabetics will be able to monitor their health over time with the system we have developed.

VIII. FUTURE SCOPE

One of the primary sources of useful information is the use of IoT devices to gather data. Researchers need to focus on storing, accessing, transmitting, and processing the enormous amount of data they will produce from the massive acquired case history data. The deployment of appropriate communication protocols still requires research. For example, establishing multiple IoT standards to promote interoperability, scale the cost of IoT objects, and evaluate risks and uncertainties. IPv6 is also used to address things individually. Therefore, in the future, we must create new protocols. We can get security as technology expands. We can gain deep knowledge about overcoming obstacles. Things are simple to programme, monitor, and regulate. The Internet of Things allows us to can secure our house or place from anywhere.

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