

“IOT BASED SMART MEDICATION REMINDER AND HEALTH ALERT SYSTEM”

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Abstract: Many patients forget to take medicines on time due to busy schedules, aging, or memory problems. Missing medication doses can lead to serious health complications and ineffective treatment. The Smart Medication Reminder and Health Alert System is designed to assist patients in maintaining their medication schedule using IoT technology. The system uses a microcontroller with sensors, buzzer alerts, and IoT communication to notify patients when it is time to take their medicine. If the patient ignores the alert, notifications can be sent to caregivers. The system also monitors health parameters such as body temperature or heart rate and generates emergency alerts if abnormal conditions are detected. This solution improves medication adherence, enhances patient safety, and enables real-time monitoring through IoT platforms

Keywords: IoT (Internet of Things), Smart Medication Reminder, Health Monitoring System, Microcontroller, Sensors, Buzzer Alert, Real-Time Monitoring, Smart Healthcare, Automation, Patient Safety.

I. INTRODUCTION

In recent years, healthcare technology has improved significantly with the development of smart devices and Internet of Things (IoT) technology. IoT allows different electronic devices to communicate with each other through the internet and share real-time information. In the healthcare field, IoT plays an important role in monitoring patients, improving treatment quality, and providing better medical support.

One of the common problems faced by many patients is forgetting to take medicines at the correct time. This problem is especially common among elderly people and patients suffering from chronic diseases who require regular medication. Missing medication doses can reduce the effectiveness of treatment and may lead to serious health complications. Therefore, it is important to develop a system that helps patients remember their medication schedules.

The **Smart Medication Reminder and Health Alert System** is designed to solve this problem by providing automated reminders for medication. The system uses a microcontroller along with sensors, a buzzer, and display indicators to alert patients when it is time to take their medicine. These reminders help patients follow their medication schedule properly and reduce the chances of missed doses.

In addition to medication reminders, the system can also monitor basic health parameters such as body temperature and heart rate using sensors. The collected data can be processed and transmitted through IoT platforms, allowing caregivers or family members to monitor the patient's health remotely. If abnormal health conditions are detected, the system can generate alerts and notify caregivers immediately.

The proposed system improves patient safety, supports regular medication intake, and provides real-time health monitoring. It is especially useful for elderly individuals and patients who require continuous medical attention. By combining medication reminders with health monitoring features, the system provides an efficient and reliable solution for smart healthcare applications.

If abnormal health conditions are detected or if the patient fails to take the medicine on time, the system can send alerts or notifications to caregivers. This helps ensure quick response during emergency situations. Overall, the proposed system provides a **simple, cost-effective, and efficient solution** for medication management and health monitoring. It is especially useful for elderly people, patients with chronic diseases, and individuals who require continuous medical

supervision. By combining medication reminders with health monitoring, the system contributes to the development of modern smart healthcare solutions.

II. LITERATURE SURVEY

Several researchers have worked on smart healthcare monitoring systems to improve medication management and patient safety. With the advancement of Internet of Things (IoT) technology, many healthcare devices are now capable of providing real-time monitoring and automated alerts to patients and caregivers.

Rajesh Kumar et al. discussed the development of a smart pill reminder system that uses alarms and mobile notifications to remind patients about their medication schedules. The proposed system improves medication adherence and reduces the chances of missed doses among elderly patients. The study highlighted the importance of automated reminder systems in modern healthcare applications.

S. Prasad and K. Ramesh focused on an IoT-based health monitoring system that continuously tracks patient health parameters such as body temperature and heart rate. The collected data is transmitted to a cloud server where caregivers and doctors can monitor the patient's health condition remotely. The research demonstrated that IoT-based monitoring systems can provide early detection of abnormal health conditions and improve patient safety.

Anita Sharma et al. proposed a smart medication management system using wireless communication technology. The system includes sensors, a microcontroller, and mobile application support to send reminders and notifications. Their work emphasized that integrating communication technologies with healthcare devices can significantly improve medication compliance.

M. Ahmed and N. Khan studied wearable healthcare devices that monitor vital parameters and send emergency alerts in case of abnormal readings. These devices use IoT platforms to provide real-time data analysis and remote monitoring. The research showed that combining health monitoring with automated alert systems can help caregivers respond quickly during emergencies.

IoT-based gas detection systems use gas sensors, microcontrollers, communication modules, and cloud platforms to detect gas leaks and automatically trigger safety actions such as alarms, ventilation, or gas supply shutdown.

From the above studies, it is observed that many systems focus either on medication reminders or health monitoring individually. However, there is still a need for an integrated system that combines medication reminder functionality with real-time health monitoring and alert mechanisms. The proposed **Smart Medication Reminder and Health Alert System** addresses this requirement by providing both medication scheduling alerts and health monitoring capabilities using IoT technology.

III. PROBLEM STATEMENT

Many people, especially elderly patients and individuals with chronic diseases, need to take medicines regularly at specific times. However, due to busy schedules, forgetfulness, or lack of proper reminders, patients often miss or delay their medication doses. Missing medicines can lead to serious health problems, reduced effectiveness of treatment, and sometimes medical emergencies.

Traditional reminder methods such as alarms or manual tracking are not always reliable. These methods do not provide monitoring or alert caregivers if the patient forgets to take the medicine. In addition, most patients do not have systems that continuously monitor their health conditions.

Therefore, there is a need for a **smart and automated system** that can remind patients to take medicines on time and also monitor their basic health parameters. Such a system should provide alerts and notifications to patients as well as caregivers to ensure better healthcare management and patient safety.

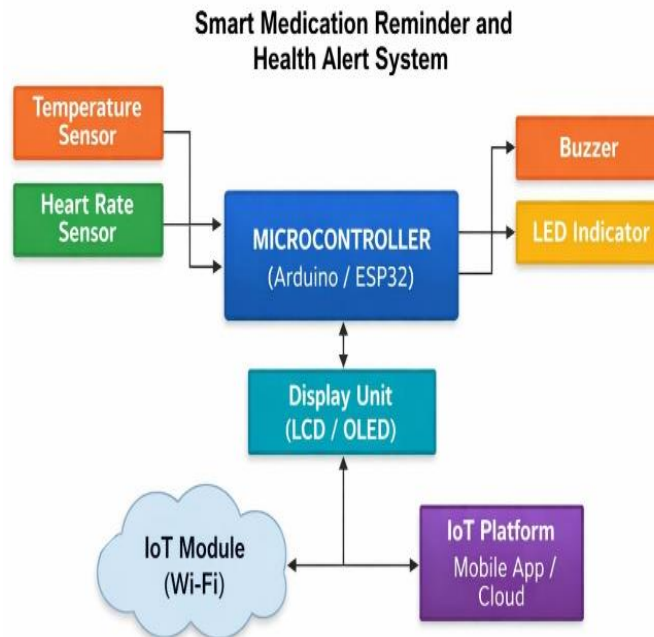
IV. BLOCK DIAGRAM

Fig:1 Block Diagram

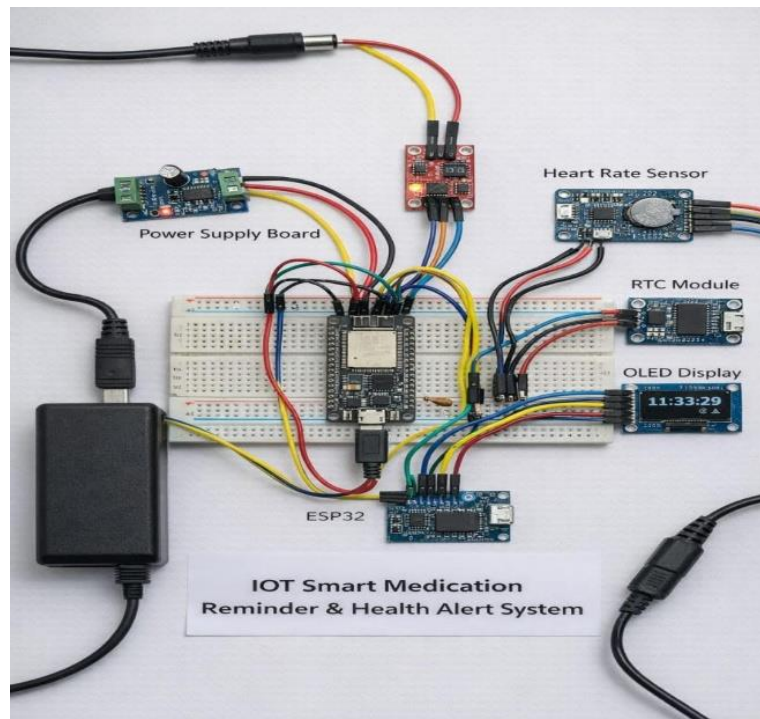
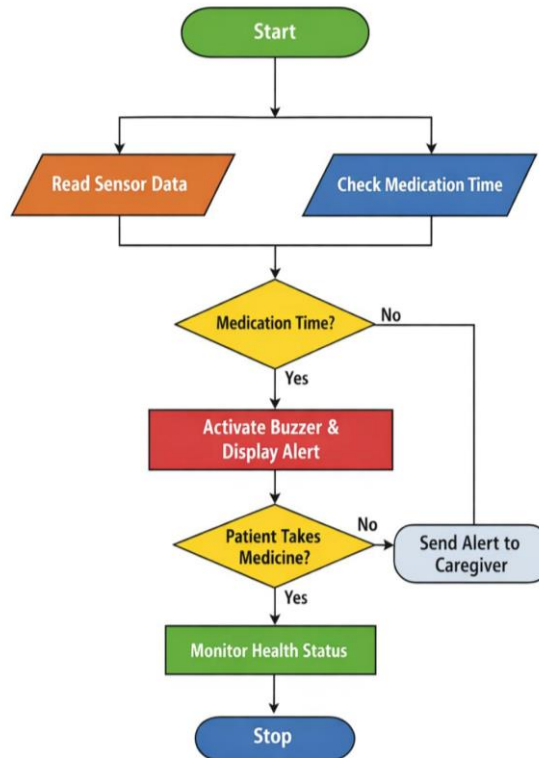
V. CIRCUIT DIAGRAM

Fig:2 circuit diagram

VI. FLOW CHART



VII. SYSTEM ARCHITECTURE OVERVIEW

The system architecture of the **Smart Medication Reminder and Health Alert System** is designed to combine sensing, processing, and communication technologies to provide an efficient solution for medication reminders and patient health monitoring. The system is mainly divided into three layers: the **sensing layer, control layer, and IoT communication layer**. These layers work together to ensure smooth operation and reliable performance of the system.

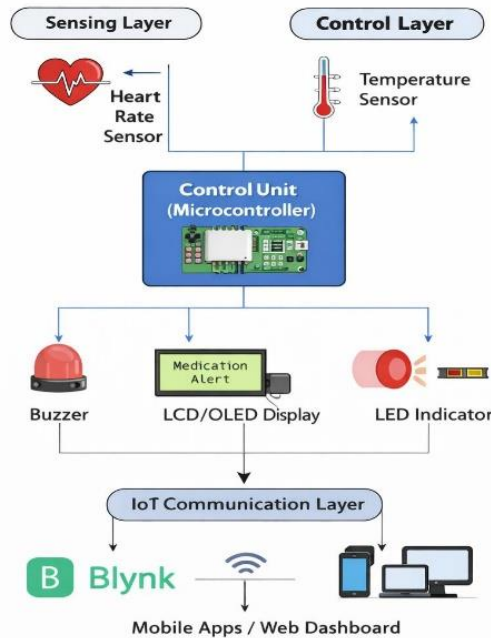
The **sensing layer** consists of different sensors used to collect health-related data from the patient. Sensors such as **temperature sensors and heart rate sensors** are used to monitor important health parameters. These sensors continuously measure the patient's health conditions and send the collected data to the control unit for further processing. The sensing layer plays an important role in detecting abnormal health conditions and ensuring timely alerts.

The **control layer** acts as the central part of the system. It mainly consists of a **microcontroller such as Arduino or ESP32**, which processes the data received from the sensors. The microcontroller is responsible for managing the medication schedule and generating alerts when it is time for the patient to take medicine. When the programmed time arrives, the microcontroller activates output devices such as **buzzers, LED indicators, or display units** to notify the patient. If the patient fails to respond to the alert within a certain t

The control layer also manages the interaction between different hardware components such as sensors, display modules, and communication modules. It ensures that all components work together smoothly and perform their functions efficiently. The microcontroller processes sensor data and determines whether the readings are within normal limits or if an alert should be generated.

The **IoT communication layer** allows the system to connect with internet-based platforms for remote monitoring and data sharing. Using Wi-Fi modules available in microcontrollers like ESP32, the system can transmit patient health data to **IoT cloud platforms such as Blynk or ThingSpeak**. Caregivers, family members, or healthcare providers can access this information through mobile applications or web dashboards.

System Architecture Diagram



System architecture of iot based gas leakage detection and automated control

VIII. WORKING PRINCIPLE

The **Smart Medication Reminder and Health Alert System** operates by integrating sensors, a microcontroller, alert devices, and IoT communication to ensure timely medication intake and continuous health monitoring. The system is designed to automatically remind patients about their medication schedule and notify caregivers if necessary.

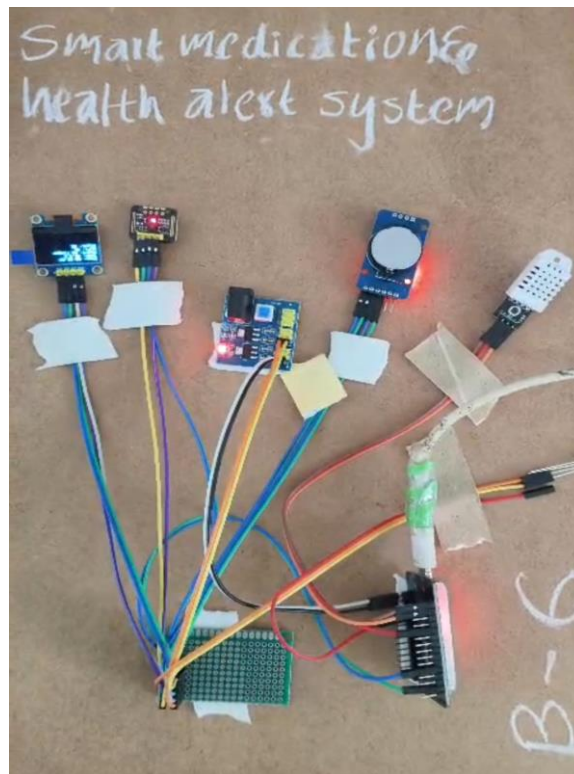
At the beginning, the **medication schedule is programmed into the microcontroller**. The microcontroller continuously monitors the system time and compares it with the stored medication schedule. When the programmed time matches the current time, the system activates alert devices such as a **buzzer and LED indicator** to remind the patient to take the medicine. A display unit like an **LCD or OLED screen** can also show the reminder message, medication name, or dosage instructions.

Once the alert is generated, the patient is expected to take the medicine and acknowledge the reminder. If the patient responds to the alert, the system resets and waits for the next scheduled medication time. However, if the patient ignores the reminder for a certain period of time, the system can send **notification alerts to caregivers or family members through an IoT platform**. This helps ensure that the patient does not miss important medication doses.

In addition to medication reminders, the system also performs **health monitoring using sensors**. Sensors such as temperature sensors and heart rate sensors continuously measure the patient's health parameters. These sensor readings are sent to the microcontroller, which processes the data and checks whether the values fall within normal ranges.

If any abnormal health condition is detected, such as **high body temperature or irregular heart rate**, the system immediately generates an alert. This alert can be displayed locally on the screen and also transmitted through IoT platforms such as **Blynk or ThingSpeak**, allowing caregivers to monitor the patient's condition remotely.

The IoT connectivity of the system allows real-time data transmission to cloud platforms where health information can be viewed through mobile applications or web dashboards. Caregivers and family members can monitor medication status and health parameters from anywhere.



IX. RESULTS AND DISCUSSION

The **Smart Medication Reminder and Health Alert System** was successfully implemented and tested to verify its performance in reminding patients about their medication schedule and monitoring basic health conditions. The system was able to generate alerts at the programmed medication time using a **buzzer and LED indicator**, which effectively reminded the patient to take the medicine.

During testing, the system accurately followed the preset medication schedule and activated the alert devices at the correct time. The reminder message was also displayed on the **LCD/OLED display**, making it easier for the patient to identify the medication time. The system response time was quick and reliable, ensuring that the reminders were delivered without delay.

sensor levels to identify the gas leakage. The ThinkSpeak is a Cloud in which it can receive the sensors data via Wi-Fi Module and it can represent the data as a field graph in the various parameters. The ThinkSpeak can generate the api key. The Api key can be given in source code. By Giving SSID and Password we can connect the wi-fi module with the thinkspeak services. The results show that the system performs reliably in providing medication reminders and health monitoring. The system is simple, efficient, and suitable for healthcare applications, especially for elderly patients who require regular medication and continuous health monitoring.

X. CONCLUSION

The **Smart Medication Reminder and Health Alert System** provides an effective solution to help patients take their medicines on time and monitor their basic health conditions. The system uses sensors, a microcontroller, and alert mechanisms such as a buzzer and LED to remind patients about their medication schedule. It also allows caregivers to receive notifications if a medicine dose is missed or if abnormal health conditions are detected.

This system is especially helpful for elderly people and patients who require regular medication. By providing automatic reminders and health monitoring, the system reduces the chances of missed doses and improves patient safety. The integration of IoT technology also enables remote monitoring, allowing caregivers to track patient health in real time.

proposed system is simple, reliable, and cost-effective. It helps improve medication adherence and supports better healthcare management.

The system can be further improved with advanced features such as mobile applications, additional health sensors, and cloud-based data analysis in the future integration of IoT also allows real-time monitoring and remote access through mobile or web applications, making the system more efficient and reliable.

Overall, this technology enhances safety, reduces human intervention, and ensures quick response to gas leakage situations. The system improves patient safety by reducing the chances of missed medication and by providing alerts in case of abnormal health conditions

XI. FUTURE WORK

The **Smart Medication Reminder and Health Alert System** can be further improved by adding advanced features and technologies for better healthcare support. Some possible future improvements include:

- ✔ **Mobile Application Integration** – A dedicated mobile application can be developed to allow users and caregivers to set medication schedules, receive reminders, and monitor patient health data in real time.
- ✔ **Automatic Pill Dispenser** – The system can be upgraded with an automatic pill dispensing mechanism that releases the correct medicine at the scheduled time.
- ✔ **Additional Health Sensors** – More sensors such as blood pressure sensors, oxygen level sensors, and glucose sensors can be integrated to monitor more health parameters.
- ✔ **Cloud Data Storage** – Patient health data can be stored in cloud databases for long-term monitoring and medical analysis by doctors.
- ✔ **AI-Based Health Prediction** – Artificial Intelligence and Machine Learning techniques can be used to analyze health data and predict potential health problems in advance.
- ✔ **Emergency Alert System** – The system can be connected with hospital or emergency services to send alerts automatically during critical health conditions.

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