

Smart Medicine Remainder Box for Elderly People with IoT

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Abstract: *This project focuses on developing a Smart Medicine Reminder Box for elderly people, leveraging IoT technology to enhance medication adherence. The system utilizes an Arduino AT Mega microcontroller to gather data from various sensors. An IR sensor is employed to detect the presence of medicine in the compartments, ensuring accurate monitoring of medicine intake. To provide timely reminders, a Real-Time Clock (RTC) module is integrated, triggering a buzzer alert when it is time for medication. The ESP8266 Wi-Fi module connects to the Blynk platform, sending alert notifications to caregivers or family members via a smartphone app. Additionally, a GSM module is included to make call alerts, ensuring critical reminders are not missed. This multi-faceted alert system is designed to support elderly individuals in maintaining their medication schedules, thereby improving health outcomes, and reducing the risk of missed doses*

Keywords: Smart Medicine Reminder Box, IoT, Arduino AT Mega, ESP8266, Blynk, GSM module, RTC module, IR sensor, elderly care, medication adherence, alert notifications

I. INTRODUCTION

In today's aging society, ensuring that elderly individuals adhere to their prescribed medication regimens is a significant challenge. As people age, they often face multiple chronic conditions that require complex medication schedules. Missed doses or incorrect administration can lead to severe health complications, hospitalizations, and reduced quality of life. Therefore, there is an urgent need for innovative solutions to assist elderly people in managing their medications effectively. The Internet of Things (IoT) has revolutionized various aspects of healthcare, offering new ways to monitor, manage, and improve patient outcomes. By integrating IoT technologies into everyday health management tools, it is possible to create systems that are both user-friendly and highly efficient. IoT-enabled devices can collect real-time data, send alerts, and provide continuous monitoring, making them ideal for applications like medication management for the elderly. The Smart Medicine Reminder Box is designed to address the specific needs of elderly individuals in managing their medication. This innovative device leverages a combination of sensors, microcontrollers, and communication modules to provide a comprehensive solution. At the core of the system is the Arduino AT mega microcontroller, which collects data from an IR sensor to detect the presence of medicine in each compartment. This ensures that the system can monitor if the medication has been taken as scheduled. To ensure that elderly individuals do not miss their medication, the Smart Medicine Reminder Box incorporates multiple alert mechanisms. A Real-Time Clock (RTC) module is used to schedule and trigger buzzer alerts at designated times, reminding users when it is time to take their medication. Additionally, the ESP8266 Wi-Fi module connects to the Blynk platform, enabling real-time notifications to be sent to caregivers or family members via a smartphone app. For critical reminders, a GSM module is used to place call alerts, providing an additional layer of assurance. By integrating these technologies, the Smart Medicine Reminder Box not only assists elderly individuals in adhering to their medication schedules but also provides peace of mind to their families and caregivers. The combination of auditory, visual, and remote alerts ensures that medication management is thorough and reliable. Ultimately, this project aims to enhance the health outcomes and quality of life for elderly individuals, reducing the risk of medication-related complications and supporting their independence.

II. LITERATURE SURVEY

1. Yusnira Husaini^{1,2} and Ekbal Rosli^{1,2} (2017) "Creating and Developing an Intelligent Medical Device" This study discusses the effective design of The Smart Medicine Box, which enables introverted people to take their medications on their own without assistance. The goal of this project is to create a machine that will let patients take their medications on their own by using an IOT app system to operate the Smart Medicine Box, which will help introverted individuals deal with emotional disturbances. For this project, four types of sensors are used: infrared, temperature, PIR, and ultrasonic.
2. In May 2016, Naga UdayiniNyapathi, Bhargavi Pendlimarri, Karishma Sk, and Kavya Ch4 "Using an ARM 7 Micro controller, a smart medicine box" This essay discusses how Our Smart Medicines Box assists in reminding us to take our medications on a regular basis and which ones to take. Thus, even if it is little and straightforward, this implementation will be a very significant and helpful advance in the field medical medicine.
3. Mahendar¹, Roopsingh², Naga Swetha R¹, Chinna⁴ (2015) "WITH IOT, SMART PILL BOX USING" In this work Conclusion Technology elements Node MCU, OLED display, buzzer, push button, and mobile application are integrated into the PILL Box. Each module has been thoughtfully positioned to provide an acceptable output, ensuring the optimal operation of the device. In addition to guaranteeing public safety, this technique stops incorrect dosing. It lessens the effort required to recall prescription names, and individuals will receive a medication schedule with the name and time of the medication, as well as information to report an emergency.
4. A safe and effective in-home wearable insomnia tracking and diagnosis device has been suggested by Hamida et al (2013). With the use of contemporary technology, such as experimental communication estimate and security protocol security and overhead, the remote clinical expertise system could get the patient's sleeping data at home.
5. A smartphone application designed to assist patients in avoiding prescription organization errors was developed by Zao et al. The "Medicine Update Expert" application has been proposed by Prasad B. There is a 15-update cap on this app. When using either non-rehashing or rehashing caution designs, a patient can choose these updates. One should choose one of both of these caution designs at a time. There should be at least an hour's gap between two cautionary designs. Reminders must be sent out at the appointed time. An LED sign or a caution vibration might serve as this reminder.

III. METHODOLOGY

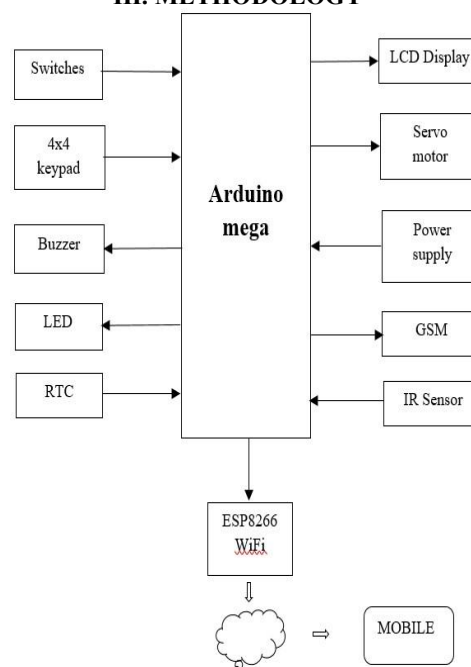


Fig. 1Flow for Arduino Mega

The proposed method consists of Arduino uno as a general-purpose board, 4x4 keypad matrix, led, buzzer and NodeMCU etc. In this module we are providing security system with the password access and password reset system. So, the patient or authorized person only can access the module and if he or she wants they can reset the password. The patient needs to provide the correct key then only the module box will open with the help of electronic lock, else it will show incorrect password on the LCD. There will be 3 slots given to keep the medicine and with each slot on switch is given, so based on the provided time the particular slots led and buzzer will activate the user needs to give the correct password and open the prescription reminder box and he or she needs to take the medicine. If the user took the medicine IR sensor will detect the where medicine is taken or not based on that if medicine Takane, call will go to the concern person using GSM and Gmail alert will send using Blynk app by using esp8266 wifi module.

IV. RESULT

The implementation of the Smart Medicine Reminder Box for elderly individuals has proven to be highly effective in enhancing medication adherence and ensuring timely intake of prescribed medications. The system successfully integrates the Arduino AT mega microcontroller, IR sensors, RTC module, ESP8266 Wi-Fi module, and GSM module to provide a robust, multi-layered alert mechanism. The IR sensor accurately detects the presence of medicine in each compartment, while the RTC module triggers precise buzzer alerts at scheduled times. The ESP8266 Wi-Fi module facilitates real-time notifications via the Blynk platform, allowing caregivers to monitor adherence remotely, and the GSM module ensures critical reminders are communicated through call alerts. Overall, the Smart Medicine Reminder Box has demonstrated significant potential in reducing missed doses, thereby minimizing health risks and improving the overall well-being of elderly users.



Fig. 2 Result Screenshot

V. FUTURE SCOPE

Continued innovation in IoT technology will likely lead to enhanced connectivity and interoperability, enabling seamless integration with other smart home devices and healthcare systems. Machine learning algorithms may be integrated to personalize reminders further, adapting to individual medication regimens and lifestyle patterns. Additionally, the integration of voice recognition and natural language processing could offer more intuitive interfaces, catering to users with varying levels of technological literacy. Furthermore, advancements in miniaturization and battery technology may lead to more compact and portable designs, increasing convenience for elderly individuals on the go. Overall, the future of smart medicine reminder boxes for the elderly with IoT holds the potential to revolutionize medication management, improving adherence, health outcomes, and overall quality of life.

VI. CONCLUSION

The Smart Medicine Reminder Box for elderly people, utilizing IoT technology, presents a comprehensive solution to address the critical issue of medication adherence among the elderly. By integrating the Arduino AT mega microcontroller, IR sensors, RTC module, ESP8266 Wi-Fi module, and GSM module, this project ensures that elderly individuals receive timely reminders and accurate monitoring of their medication intake. The IR sensor confirms the

presence of medicine in each compartment, while the RTC module schedules and triggers buzzer alerts to remind users when it is time to take their medication. Additionally, the ESP8266 Wi-Fi module connects to the Blynk platform to send real-time notifications to caregivers, and the GSM module provides call alerts for critical reminders. The multi-layered alert system enhances reliability and ensures that no dose is missed, thereby reducing the risk of health complications arising from missed or incorrect medication. The remote monitoring capability provided by the Blynk platform also offers peace of mind to family members and caregivers, enabling them to support their loved ones effectively. Overall, the Smart Medicine Reminder Box leverages the power of IoT to improve health outcomes, support the independence of elderly individuals, and contribute to a higher quality of life. This project demonstrates how innovative technology can be harnessed to solve real-world problems and improve healthcare delivery for vulnerable populations.

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