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SMART PILL BOX

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Abstract-This project focuses on an IoT-based Tablet Reminder System featuring an ESP32 microcontroller, OLED display, RTC module, buzzer, keypad, and servo motor. It allows users to set, store, and display reminders with accurate timekeeping ensured by the RTC module. Notifications are delivered through a buzzer for auditory alerts and a servo motor for visual cues, enhancing user engagement. Reminders are input via the keypad by entering the date, time, and message. The servo motor, controlled by PWM signals from the ESP32, provides precise movements to physically indicate reminders. The system is designed for local operation but can be extended to IoT platforms like Blynk or Firebase, enabling remote reminder management and cloud storage. Cloud integration would allow users to modify reminders remotely, receive push notifications on smartphones, and ensure data backup, enhancing convenience and reliability. This solution combines hardware components to create a practical, costeffective system for managing tasks like medication schedules or daily routines. It offers flexibility, scalability, and userfriendly features, making it suitable for diverse needs. With IoT capabilities, the system evolves from a local reminder tool to a connected smart reminder platform, supporting modern lifestyles with both auditory and visual alerts.

1. INTRODUCTION

In today's fast-paced world, managing time efficiently and remembering important tasks is crucial. With the growing complexity of daily activities, it becomes increasingly difficult to keep track of reminders manually. To address this, the IoT-based Tablet Reminder System offers an innovative solution that combines the power of the Internet of Things (IoT) with simple hardware components to create a reliable and interactive reminder system. This system leverages the

Esp32microcontroller to provide connectivity and control, while integrating other components such as an OLED display**,** Real- Time Clock (RTC) module, keypad, and servo motor. The keypad allows users to input reminders, including the date, time, and message. The RTC module ensures that the system always knows the correct time, allowing it to trigger reminders at specific moments. The OLED display serves as the visual interface to show the current time and active reminders, while the servo motor provides a mechanical alert by rotating when a reminder is due. Additionally, the system can be expanded to IoT platforms, enabling cloud-based storage and remote management of reminders, which could further enhance the user experience. By connecting the system to the internet, users can store and retrieve their reminders via a web or mobile interface, and receive push notifications when a reminder is due. This project demonstrates how integrating affordable and widely available electronic components can lead to the creation of a functional and versatile reminder system. The IoTbased Tablet Reminder System not only serves as an efficient solution for time management but also showcases the potential of IoT technologies in daily life, enabling greater convenience, automation, and control for users.

2. PROBLEM STATEMENT

In today's fast-paced world, individuals often struggle to manage their daily schedules and medication routines effectively. Forgetting important tasks or missing medication doses can lead to serious consequences, particularly for the elderly, patients with chronic illnesses, or individuals with busy lifestyles. While mobile phones and digital reminders are widely available, they may not cater to everyone, especially those who prefer a dedicated, userfriendly system with simple interfaces and tangible feedback mechanisms.

Existing solutions often lack integration with physical indicators and rely solely on auditory alerts, which may not be sufficient for individuals with hearing impairments or in noisy environments. Moreover, standalone reminder devices often lack remote management capabilities, limiting their usability in interconnected smart home ecosystems.

Therefore, there is a need for a cost-effective, reliable, and versatile system that combines visual, auditory, and remote management features to help individuals manage their reminders more efficiently.

3. CIRCUIT DIAGRAM

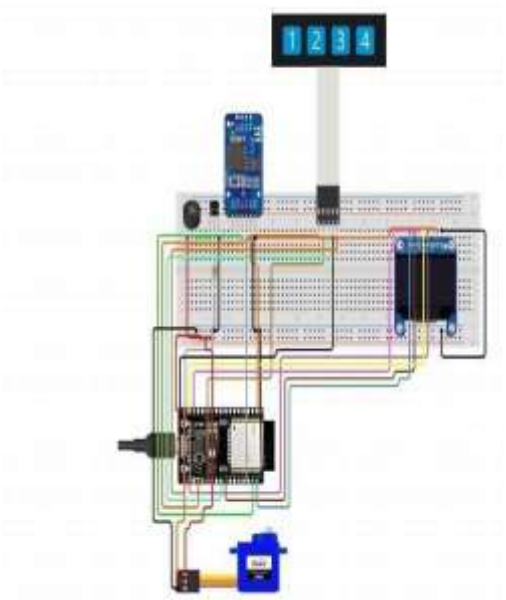

Figure:4.2 Circuit Diagram

4. LITERATURE REVIEW

The concept of a reminder system has significantly evolved with modern technologies such as IoT platforms, microcontrollers, and embedded systems. Various systems now manage reminders and tasks, ranging from standalone devices to complex cloud-based solutions. IoTbased systems offer remote access, data synchronization, and real-time notifications, as demonstrated by Nandi et al. (2019) with their Blynk and Node MCU system, and Vishwakarma and Patel (2018) with an Arduino and Wi-Fi module. Real-Time Clock (RTC) modules like the DS3231 and DS1307 are crucial for accurate timekeeping in embedded systems, enhancing reminder systems as shown by Kumar and Reddy (2017). Microcontrollers like Arduino, ESP8266, and ESP32 are central to creating compact and reliable reminder systems, as evidenced by Gajbhiye et al. (2018) and Singh et al. (2021), who developed systems using these technologies combined with LCDs and OLED displays. Servo motors, utilized by Patel and Desai (2016), provide physical alerts, enhancing the interactivity of reminder systems. Keypadbased interfaces offer simplicity and reliability for inputting reminders, as demonstrated by Chandran et al. (2019). However, challenges such as power consumption, real-time processing, and user interface robustness remain. Future research may focus on integrating AI for smarter reminders, voice assistants for hands-free use, and low-power communication protocols like LoRa or NB- IoT to enhance system reliability and energy efficiency, especially in remote areas.

5. CONCLUSION AND FUTURE WORK

The IoT-based Tablet Reminder System offers a robust and reliable solution

for managing reminders, integrating both efficient hardware and real-time software functionalities. Powered by the ESP32 microcontroller, the system ensures precise time synchronization and smooth user interaction, while components such as the RTC module, OLED display, keypad, buzzer, and servo motor provide timely, clear, and engaging notifications. The modular nature of the design allows for easy future upgrades, and the system's low power consumption ensures it can operate continuously over extended periods. This makes it particularly well-suited for healthcare environments and personal management applications where reliability and long-term performance are critical.

Looking ahead, several areas offer significant potential for future work. Developing a mobile app that enables remote synchronization and push notifications would enhance the user experience by providing access to reminders from any location. Integrating voice control would further increase accessibility, allowing users—especially the elderly or those with disabilities— to interact with the system handsfree. Additionally, the nclusion of advanced reminder features such as recurring reminders, priority-based alerts, and medication-specific notifications could make the system more versatile, particularly for healthcare applications where timely medication administration is crucial. Expanding IoT connectivity to synchronize data across multiple devices would provide users with a more unified and flexible reminder management system. Cloudbased management could also allow for easier updates and remote adjustments of reminders. Lastly, optimizing power efficiency by implementing techniques like deep sleep modes, energy harvesting, or solar power integration could extend battery life, ensuring the system remains reliable for longer durations without frequent recharging. These improvements would not only increase the system's adaptability but also expand its functionality, making it an even more valuable tool across a wide range of industries and user needs.

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