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Auto Medication and Health Management System

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ABSTRACT

A ground-breaking advancement in the healthcare technology, the Auto Medication and Health Management System (AMHMS) seeks to transform how people take care of their medications and general health. This cutting-edge device combines sophisticated artificial intelligence algorithms with intelligent sensor technologies to give users automatic and customized medication management. Utilizing machine learning, AMHMS creates customized treatment plans and dose reminders by analyzing user data, such as vital signs, medical history, and prescription regimens. Additionally in real-time monitors including blood pressure, glucose levels, and heart rate, to enable proactive therapies and early detection of potential health is- sues. Users can easily access their health information and receive timely notifications or recommendations for changes in medication or lifestyle habits through seamless connectivity with connected devices and mobile applications. AMHMS also provides extensive data analytics capabilities that let medical professionals monitor patients' development, spot patterns, and decide on the best course of action for their patients. AMHMS's proactive health management features and user-friendly interface enable people to take charge of their health, prevent medication errors, and increase general well- being—all of which lead to a higher standard of living and lower healthcare expenditures.

1. Introduction

Considering our method is a revolutionary approach to auto- medication [1] and individualized health management that transforms the way people maintain and observe their well- being. Our platform, which makes use of state-of-the- art technology, data analytics, and user-friendly interfaces to enable patient to take control [2-4] of their health journey. Through connected devices and sensors, our system allows users to easily track important health metrics. Furthermore, this data is analyzed in real-time by our algorithms, which offer customized insights and suggestions based on each user's unique health profile. The auto- medication [5-7] feature of our system is one of its best advantages; it allows users to receive timely reminders for taking their medicines according to specified 2 schedules, which lowers the chance of missing doses and increases adherence to treatment. Furthermore, our technology facilitates communication between users and medical experts enabling remote monitoring and consultations that improve overall healthcare management. Our health management solution that combines proactive care, accuracy, and ease of use with auto-medication enables users to live better, more informed lives. seamless connectivity with connected devices and mobile applications [6-8]. AMHMS also provides extensive data analytics capabilities that let medical professionals monitor patients' development, spot patterns, and decide on the best course of action for their patients. AMHMS's proactive health management features and user-friendly interface enable people to take charge of their health, prevent medication errors, and increase general wellbeing—all of which lead to a higher standard of living and lower healthcare expenditures. The concept of an Auto Medication and Health Management System represents a significant step forward in leveraging technology to enhance medication adherence among seniors. By employing a simple microcontroller, this system transforms a conventional pillbox into an automated reminder and dispenser [9-10]. The pillbox has several sections for different kinds of medications, each of which is set up to be administered according to a set timetable. This automated system eliminates worries about forgetfulness or dose mistakes by not only reminding users when to take their prescription but also administers the necessary tablets at the appointed times. This system's ability to encourage independence and enhance seniors' general well-being is one of its main advantages [11-13]. It provides accurate distribution and timely reminders, enabling people to confidently manage their prescription schedule [14-15]. A higher sense of control and dignity might result from this improved autonomy, which can improve seniors' overall quality of life [16-17].

There is a large selection of pharmaceutical administration assistance devices available for professional users. Most of them are manual and comprise multiple portions referred to as pill trays. Several of the pill tray's slots can hold medication. Any number of sizes and combinations of medications can be kept in each compartment. The user is required to take the medication [18] from each tray once daily for a maximum of 28 days. There isn't an alarm on it to remind you when to take your prescription [19]. A gadget called the Pill-Mate-Medicine reminder notifies the user using both visual and audio signals. It serves as a reminder to users to take their drugs on schedule or to appear at scheduled times [20]. To help patients prevent mistakes, an app has been developed for cellphones. It serves as a reminder to users to take prescribed prescriptions on time and to document their intake patterns for future review by medical professionals [20].

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2. Methodology and Implementation

Advanced algorithms are integrated for patient data analysis, medication scheduling, and health monitoring in an auto medication and health management system. First, in-depth patient profiles are established, including past medical history, present ailments, allergies, and recommended drugs. Subsequently, prescription regimes are customized using specific health parameters such as vital signs, symptoms, and drug interactions. Data is collected by real-time health monitoring equipment, including sensors, and evaluated to track medication adherence and identify abnormalities or alterations in the status of health The system's implementation comprises creating user-friendly interfaces that make health data visualization, pre- scription reminders, and channels for feedback and intervention accessible to both patients and healthcare professionals. Ensuring smooth coordination with current healthcare systems through integration with electronic health records 3 facilitates data interchange and improves continuity of service. The system is continuously improved through feedback mechanisms and updates based on new medical recommendations and emerging technology, ensuring that it is effective and flexible enough to meet changing healthcare needs.

3. User requirements

User who utilizes this device have several needs, but the main ones are cost, safety, dependability, performance, and serviceability. The necessary features include being lightweight, simple to operate for both the patient and the caregiver, well-built to prevent possible tampering, and an excellent display unit. AMHMS is a long-lasting and easily repairable product. Mechanical devices are protected for longevity and safety by an encasement, and the software is dependable. The system reset function, tiny size, and light weight are its primary features. In many situations, a locking mechanism is necessary to prevent misuse of the device. For safety, parts including electrical, SMPS, and motors must be encased.

Numerous elements are considered prior to initiating the design process. When creating the medicine box, the following factors were taken into account: The device must feature a circular base with thirty blades that resemble fans forming compartments. Pills and capsules should be kept in each compartment. Software needs to be dependable and able to record both the dispensing of current and future medications. To secure it and prevent tampering, a mechanical lock must be included. It is required to have an LED display to show the state of operation and to provide relevant instructions. Alpha numeric keypad, servo motor, LCD display, and microcontroller interface to be designed. Notifications in both visual and audible formats must be offered. The quality of medicine must be preserved by proper storage.

4. Block Diagram of Dispenser

An ESP32 microcontroller serves as the central processing unit of the automated medication and health management system, coordinating the operations of multiple parts. These consist of a keypad for user input, an LCD display for visual feedback, a servo motor for drug distribution, and sensors like a pulse and temperature sensor. These parts connect with each other through the ESP32, allowing for functions including dose control, real-time health monitoring, and medication scheduling. With this configuration, customers may conveniently track important health data through the system's UI and control their medicine intake with ease.

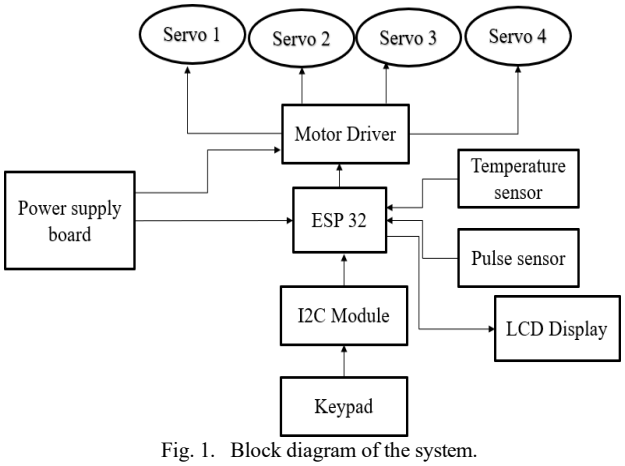

Fig. 1. Block diagram of the system.

5. Circuit Diagram

This covers the idea design for both the software and hardware. A block diagram of the various parts of the medication dispenser is displayed in Figure 1. It has the microcontroller, which is the system's brains and controls how the entire thing works. It offers a Keypad interface and an LED display for interacting with the outside world. The text display shows the current setting process in addition to providing information about the settings. The purpose of the program is to guide the user through the process of using the system efficiently and without any issues.

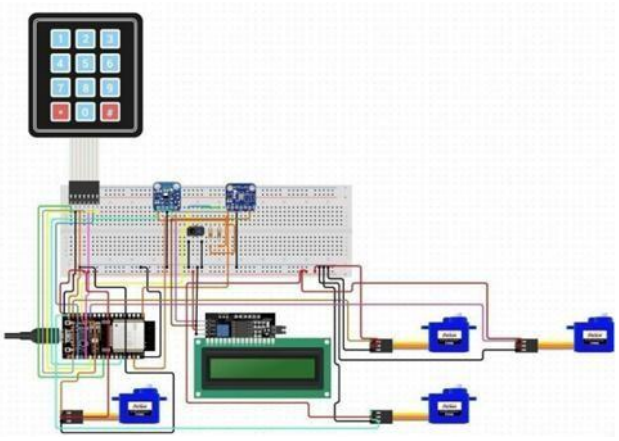

Fig. 2. Circuit diagram.

This covers the idea design for both the software and hardware. A block diagram of the various parts of the medication dispenser is displayed in Figure 1. It has the microcontroller, which is the system's brains and controls how the entire thing works. It offers a Keypad interface and an LED display for interacting with the outside world. The text display shows the current setting process in addition to providing information about the settings. The purpose of the program is to guide the user through the process of using the system efficiently and without any issues. The motor controller is set up to rotate and cause the tablets or capsules to fall into the output chamber at the appropriate moment when the timer internal interrupt interrupts. An LED is lighted after the pills or capsules are dropped, allowing the user to be alerted. Additionally, it alerts the patient to the need for quick action by emitting a beeping sound through the speaker. The alert beep stops, the LED goes out, and the pouch opens so the user may take out the tablets when they touch the button designed to open it. The user must press the pouch button in order for the pouch to close the door after selecting the tablet. The alarm goes off again after two minutes if the bag door is not closed. This instance suggests that the medication was not selected. The user needs to select the tablets and shut the door dropped, allowing the user to be alerted. Additionally, it alerts the patient to the need for quick action by emitting a beeping sound through the speaker. The alert beep stops, the LED goes out, and the pouch opens so the user may take out the tablets when they touch the button designed to open it. The user must press the pouch

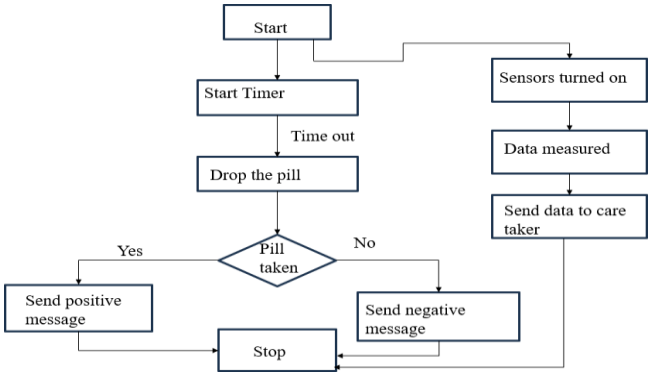

Fig. 3. Proposed flowchart

button in order for the pouch to close the door after selecting the tablet. The alarm goes off again after two minutes if the bag door is not closed. This instance suggests that the medication was not selected. The user needs to select the tablets and shut the door.

6. Results and Discussions

The auto medication and health management system is a comprehensive digital platform that simplifies the process of managing users' medications and overall

health. Among its features are prescription tracking, automated medication reminders, and integration with wearable health data. Users can enter their prescription regimens and health goals to ensure adherence and optimize wellness. After that, the system produces customized alerts and recommendations. Information on drug interactions, side effects, and lifestyle decisions that impact health may also be included.

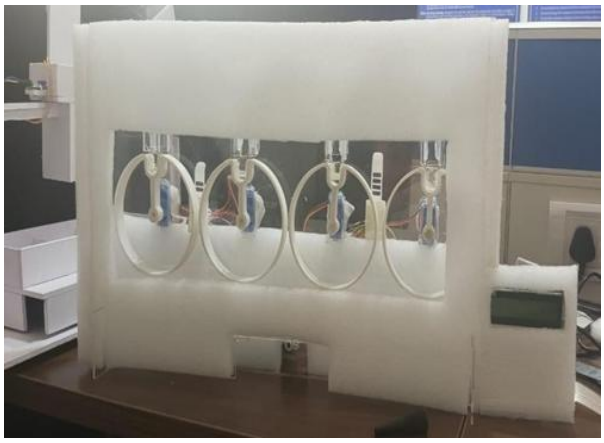

Fig. 4. Result.

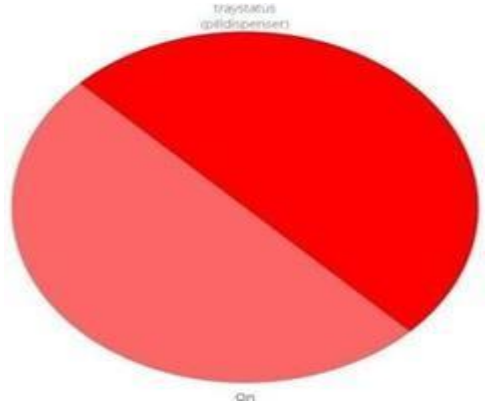

Fig. 5. Tray status

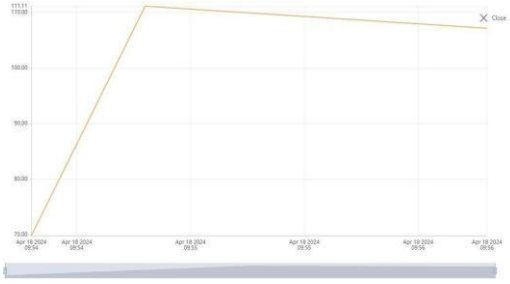

Fig. 6. BPM waveform

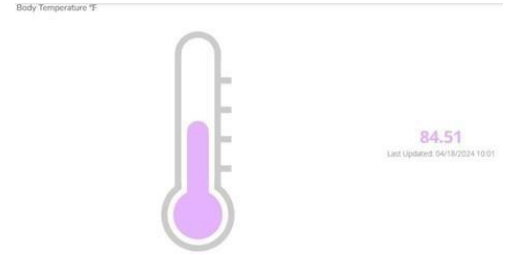

Fig. 7. Temperature reading

7. Conclusion

Any size tablet or capsule can be used with the Automatic Medicine Dispenser. It has been shown that the dispenser for 21 different prescriptions can be set to run for 31 days. Up to four alarm sounds might be heard every day. Depending on the needs, the number of times and number of tablets to be chosen can be dynamically altered.

References

[1] Kuo GH-W. Research and implementation of intelligent MedicalBox.Kaohsiung, TW: Department of Electrical Engineering, I-Shou University; 2009. M.S.thesis.

[2] S.-C. Huang, H.-Y. Chang,Y.-C. Jhu and G.-Y. Chen, “The intelligent pillbox-design and implementation,” in Proceedings of the IEEE international conference on consumer electronics, May 26-28, Taiwan.

[3] Shinde Shashank, Kadaskar Tejas, Patil Pushpak, Barathe Rohit. A smartpill box with remind and consumption using IOT. Int Res J Eng Technol 2017;4(12):152e4

[4] Hayes TL, Hunt JM, Adami A, Kaye JA. An electronic pillbox for continuous monitoring of medication adherence. In : Proceesings of the 28th IEEE EMBS annual international conference, Aug. 30-Sept. 3; 2006.

[5] Shinde Shashank, Kadaskar Tejas, Patil Pushpak, Barathe Rohit. A smartpill box with remind and consumption using IOT. Int Res J Eng Technol 2017;4(12):152e4.

[6] Sawand A, Djahel S, Zhang Z, Na F. Multidisciplinary approaches to achieving efficient and trustworthy eHealth monitoring systems. Commun. China (ICCC), 2014. IEEE/CIC Int. Conf.; 2014. p. 187e92

[7] Chandana, H. Manduva S., and M. R. Arun. "An loT based Patient Health Monitoring System using Node MCU." International Research Journal of Engineering and Technology (IRJET) 7.10 (2020): 1599-1604.

[8] Kumar, R., and M. Pallikonda Rajasekaran. "An IoT based patient monitoring system using raspberry Pi." 2016 International Conference on Computing Technologies and Imelligent Data Engineering (ICCTIDE 16). IEEE, 2016.

[9] Khan, T., & Chattopadhyay, M. K. "Smart health monitoring system" 2017 International Conference on Information, Communication, Instrumentation and Control (ICICIC) (pp. 1- 6) IEEE, 2017.

[10] Gogate, Utara, and Jagdish Bakal. "Healthcare monitoring system based on wäeless sensor network for cardiac patients" Biomedical & Pharmacology Journal 11.3 (2018): 1681.

[11] Ru, Lei, et al. "A detailed research on human heath monitoring system based on internet of things." Wireless Communications and Mobile Computing 2021 (2021). Auto Medication and health Management System Dept. of Electronics and Communication Engineering 27

[12] Bbendwade, Pradip S., and Sarika M. Patil. "Patient monitoring system using MSP430 microcontroller." 2013 International Journal of Advanced Research in Electronics and Communication Engineering (JARECE) 4.1 (2015).

[13] Shirzadfar, Hamidreza, et al. "Wavelet Technique and Function for Noise Removal from ECG Signal." International Journal of Bioinformatics and Computational Biology 3.1 (2018): 1-5.

[14] Ateş, Gözde, and Kemal Polat. "Measuring of oxygen saturation using pulse oximeter based on fuzzy logic." 2012 IEEE International Symposium on Medical Measurements and Applications Proceedings. IEEE, 2012.

[15] Manias, Elizabeth, Snezana Kusljic, and Angela Wu. "Interventions to reduce medication errors in adult medical and surgical settings: a systematic review." Therapeutic advances in drug safety 11 (2020): 2042098620968309.

[16] Korra, Seena Naik, et al. "Portable manure dispenser machine." IOP Conference Series: Materials Science and Engineering. Vol. 981. No. 2. IOP Publishing, 2020.

[17] Church, Frank C. "Treatment options for motor and non-motor symptoms of Parkinson’s disease." Biomolecules 11.4 (2021): 612.

[18] Joseph, Stephen Bassi, et al. "Metaheuristic algorithms for PID controller parameters tuning: Review, approaches and open problems." Heliyon 8.5 (2022).

[19] Laghari, Asif Ali, et al. "A review and state of art of Internet of Things (IoT)." Archives of Computational Methods in Engineering (2021): 1- 19.

[20] Xiao, Tete, et al. "Masked visual pre-training for motor control." arXiv preprint arXiv:2203.06173 (2022).