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AUTOMATIC MEDICINE DISPENSER

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Abstract: The Automatic Medicine Dispenser is presented in this paper, with the aim of simplifying the process of taking medication for patients, particularly seniors, by ensuring timely and accurate dosage. This system can help reduce the likelihood of accidental overdosing or underdosing, which can lead to complications such as delayed recovery, illness, and even mortality. By notifying patients when it's time to take their medication and reminding them to take the appropriate dose, the automatic medicine dispenser can help address these issues. Additionally, the system allows for direct communication between patients and caregivers, as it will alert the caregiver if the patient misses a dose

Index Terms **- Dispenser, Motor Controller, Pills/Capsules, RTC, LCD, GSM**

I. INTRODUCTION

The current trend in healthcare is to move routine medical diagnosis and other health services from hospitals to patients' homes. This approach offers several benefits, such as improved accessibility to healthcare, particularly during emergencies. Additionally, hospitals can decrease their workload by delegating simpler tasks to the home environment. One significant advantage of this shift is the potential reduction in overall healthcare costs.

The rapid advancement of medical technology has resulted in the development of numerous new medications that can cure or alleviate many dreadful diseases. As a consequence, the number of pills or doses that a person must take has increased. Remembering to take medications at the correct time can be challenging for patients due to their busy schedules, age, or medical conditions that can impair memory. However, taking the appropriate medications at the right time is crucial to ensure the patient's condition does not deteriorate further. Unfortunately, patients may forget to take their medication as prescribed, resulting in poor adherence to the treatment regimen. This is a significant issue for patients

II. RELATED WORKS

[1] Huai-Kuei Wu, Chi-Ming Wong, Pang-Hsing Liu, Sheng-Po Peng, Xun-Cong Wang, Chih-Hi Lin and Kuan-Hui Tu “A smart pill Box with remind and consumption confirmation function”- 2015 IEEE 4th global conference on consumer electronics (GCCE). This paper gives an insight about the Smart pill box using barcode. The matrix barcode was printed on each medicine bag and the information contained in the matrix barcode included the patient’s name, patient identification (ID), hospital ID, medicine name, medicine ID, medication time, and other related information about the medicine bag. The camera was placed on the inner side of the cover to detect the matrix barcode and the medicine bag. A user interface on the surface of the cover was used to provide pill remind and alarm functions. After visiting a doctor and returning home, a patient need to only scan the matrix barcode using the camera of the pillbox, and all medicine related information will be loaded into the pill box. After the matrix barcode is scanned, the patient places the medicine bags in the pill box without dispensing the medicine in to the cell.

[2] Wissam Antoun, Ali Abdo and Suleiman Al-Yaman, Abdallah Kassem, Mustapha Hamad and Chady El-Moucary “Smart medicine dispenser”-2018 IEEE 4th Middle East conference on biomedical engineering (MECBME). This paper gives an idea about pill dispenser built using Arduino with keyboard and an LCD that let the user schedule his/her pills manually on a plate. It dispenses the pills and generates an audio alarm to alert the patient. Also, an SMS is sent to the caregiver phone number in case the pill wasn’t taken.

[3] Shih-Chang Huang,Yu-Chen Jhu, Guan-You Chen Hong-Yi Chang “The Intelligent Pill Box - Design and Implementation” 2014 ICCE-Taiwan. This paper gives insight about a smart technology that is with medication regarding too many diseases. Intelligent pill box is smart device which provides medicines based on the scheduled time. The pill box consists of Arduino chip which is programmable for distinct times. The Arduino signal is sent to motor and it will rotate and medicine comes out. There will be IR sensor which detect medicine is taken or not and it will record the data. If the person did not take the pill then alarm for every 30 min will be sent from the Skype software to the caregiver.

[4] C. Parcas, I. Ciocan, N. Palaghita and R. Fize “Weekly Electronic Pills Dispenser with Circular Containers” 2015 IEEE 21" international Symposium/or Design and Technology in Electronic Packaging (SIITME) This paper gives an insight about weekly pill dispenser with circular containers. Here the compartments are made for the medicines which will be distributed at prescribed time intervals. The package has 7 circular containers with compartments. The first compartment contains the pills, which has to be taken in the morning and second one in the noon and third one in the evening and fourth compartment pills have to be taken in night. All seven circular containers are driven by a single stepper motor. The pill box is controlled by microcontroller which can be

programmable. The user has to set time for the medicine and at the prescribed time pill will be released and the pill box will generate an alarm. If the patient doesn't take medicine, the dispenser will send a signal to a monitoring station, which can handle the situation.

III. OBJECTIVE

The objective is to create a smart medicine box that incorporates the following features:

A. An alarm to notify patients when it is time to take their medication.
B. Alert messages to remind patients to take their medication when they are not near the smart medicine box.
C. Automatic notifications to refill the smart medicine box when medication supplies are running low.
D. Alert messages to remind doctors to attend to the patient when they are ill.

IV. METHODOLOGY

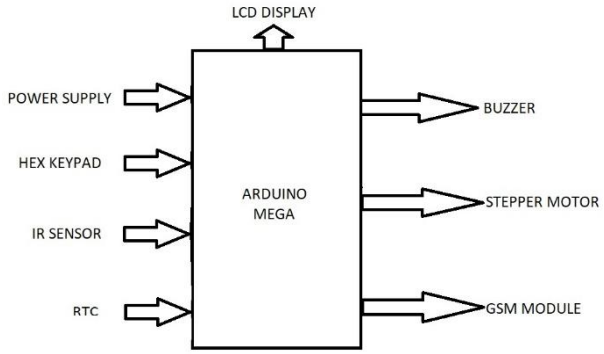

Figure 1: Block Diagram

The Automatic Medicine Dispenser is a simple device that can be easily operated using four buttons - Set Time, Set Slots, Increment, and Decrement. It consists of three compartments for storing different medicines, and the number of compartments can be increased as per the prescription requirements. The device is controlled by a microcontroller, RTC, and a stepper motor driver.

To initiate the dispensing action, the motor driver receives a command that triggers the stepper motor to rotate by 120 degrees. The metallic shaft connected to the stepper motor pushes the medicine out of the compartment. The four buttons have specific functions - the Set Time button is used to set the current time, the Increment and Decrement buttons are used to adjust the dispensing date and time, and the Set Slot button is used to set the slot timings.

Upon setting the parameters, the buzzer will sound at the scheduled time and during the dispensing process. To start the dispenser unit, press the Set button, and the LCD will display the name of the project as per the program. You can change the date, time, and slot timings as per your requirements using the buttons. Once the changes are made, the medicine dispenser is ready to use.

When the medicine is dispensed, the stepper motor initiates the alarm, which will not turn off until the medicine is taken. If the medicine is not taken within the set time, an SMS will be sent to the guardian using the GSM module.

V. EXPERIMENTAL RESULTS

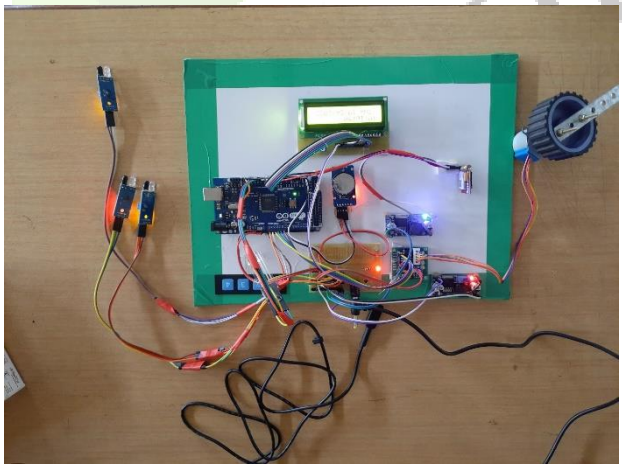

Figure 2: Circuit Setup

The Automatic Pill Dispenser shares similar functionality with existing medical assistants, making it a reliable and useful alternative solution. The dispenser container stores medication in the form of pills, which are manually placed in different compartments.

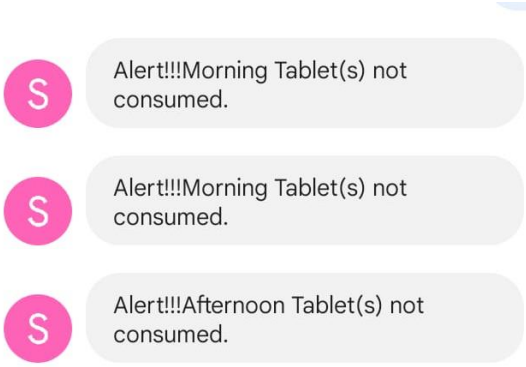

Figure 3: Reminder Message

VI. IMPLEMENTATION

The following are the steps involved in assembling and implementing the project:
Step 1: Configuration of Programmable Devices
Configure the Arduino Mega as the main controller module and connect it to an LCD display for user interaction, a keypad for entering user requirements, and a relay used to send messages using the GSM module, depending on the medication.
Step 2: Code Setup in Arduino Uno
Set up the code in the Arduino Uno.
Step 3: Integration of Hardware Modules
Connect the Arduino Mega to all modules, including the GSM module and the LCD.
Step 4: Connection of GSM Module
Connect the GSM module to the Mega to send messages.
Step 5: Powering up all devices
Connect the system to a power supply and voltage converter to convert the voltage to 5V-2.5V. Using this power supply, the system can function without any issues.

VII. CONCLUSION AND FUTURE SCOPE

The Smart Medicine Box enables patients to become more self-sufficient in their daily lives by helping them take their medicine on time. This system is designed to remind patients to take their medication, reducing the burden on family members and caretakers. It improves patient safety and comfort and has the potential to benefit a larger section of society. To enhance its versatility, the system can be adapted and made more cost-effective by utilizing alternative technologies in the future.
i. Additionally, the Smart Medicine Box can be enhanced by incorporating a syrup dispenser, which can be controlled by the Arduino. This feature would be especially beneficial in childcare centers.
ii. By adding a slider to the dispenser, the need for a person to collect medication can be eliminated. This can be achieved by using a weighing sensor to calculate the difference in container weight before and after the medicine is dispensed.
iii. The dispenser's security can be increased by implementing a password protection system, which can be achieved by integrating a keypad with the Arduino.

REFERENCES

[1] Huai-Kuei Wu, Chi-Ming Wong, Pang-Hsing Liu, Sheng-Po Peng, Xun-Cong Wang, Chih-Hi Lin and Kuan-Hui Tu “A smart pill Box with remind and consumption confirmation function”- 2015 IEEE 4th global conference on consumer electronics (GCCE).
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[4] C. Parcas, I. Ciocan, N. Palaghita and R. Fize “Weekly Electronic Pills Dispenser with Circular Containers” 2015 IEEE 21" international Symposium/or Design and Technology in Electronic Packaging (SIITME)
[5] Lozano, Rafael, Mohsen Naghavi, Kyle Foreman, Stephen Lim, Kenji Shibuya, Victor Aboyans, Jerry Abraham et al. "Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010." The Lancet 380, no. 9859 (2013): 2095- 2128.
[6] Hall, Mark A., Elizabeth Dugan, Beiyao Zheng, and Aneil K. Mishra. & Trust in physicians and medical institutions: what is it, can it be measured, and does it matter & The Milbank quarterly79, no. 4 (2001): 613- 639.
[7] Peel, Elizabeth, Margaret Douglas, and Julia Lawton. & Self-monitoring of blood glucose in type 2 diabetes: longitudinal qualitative study of patients & perspectives ,Vol no. 7618 (2007): 493.
[8] S. Majumder, E. Aghayi, M. Noferesti, H. Memarzadeh-Tehran, T. Mondal, P. Zhibo and M. Deen, "Smart Homes for Elderly Healthcare--Recent Advances and Research Challenges," Sensors, vol. 17, no. 11, pp. 1-32, 2017