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Sensor based Automatic Smart Medicine Dispensing Box

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Abstract:

In the times of Covid a major problem of spreading of infection fast due to contact has created lot of inconvenience for the treatment of patients. Moreover in our daily life we forget to take medicines on time. Hence a system which will help the patients with infectious diseases to take medicines on time without the help of any nurse or human intervention is needed.

In this paper we present our work which will assist the patients, elderly people, to take medicines on time. The system is developed with the following . Even elderly people usually forget about their medicines. So, we create this box where people can take medicines in time and keep themselves healthy. Even in hospitals, the nurses go from person to person to give medicine to patients. They will go to the patient's bed for a certain period of time every day as they are busy with other work too. In addition, there is the possibility of forgetting to give the medicines on time as they are busy or they are taking care of another patient. For this problem, there is no particular solution that can help the nurse solve this problem. They can only advise taking medication and monitoring it if they have enough time. Also, in this COVID-19 epidemic, nurses can use this medicine box to give medicine to infected patients. This project is designed to help blind patients. The alarm in our box will help the blind with their medicine and inform them too. All pill boxes are pre-loaded into the system, which patients need to take at the specified time. And our system has a quality that makes it understandable if the patient took the pills out of the box or not. Another advantage of our system is that the patient tries to delay the time of taking the medicine by opening and closing the medicine boxes to stop the sudden sound, but the end result is that the patient uses our convenient method of quick healing of their health. Also, our system is sensor-based, which makes it more convenient when it comes to COVID situations. Being a sensor-based system, it's totally a surface-untouched process, which will help the patients.

Key word: smart medicine box, sensor based medicine box, covid 19 prevention

I. INTRODUCTION

The Smart Medicine Box usually customized to give relief from the tension of medicine. Each and every one use to deal head trick daily life schedule, so maximum of us don't take care about our most important unit i.e. our health. This is the important for those persons who can't take care of themselves and have mane health issues. So, we set this like this way where it will give alarm at the time of medicines. It is very useful to those who forget to take medicines example aged person, also for blind people and the children whose working parents can't always there with them. In fact, in the pandemic situation, all the infected person is strictly isolated. Then it the best way for nurses to remind the patient to in take the medicines on time. Some introvert patients prefer to be alone, for them we can use the box. This project is designed to help pregnant patients with problems. The Smart Medicine Box is designed to help nurses manage in patients in particular. Elderly people are more affected by taking certain medications than others. They usually forget to take the medicine at the right time and forget which medicine they need to take. This box keeps all pill are pre-loaded into the system which medicine need to take at the specified time. Our system has a sensor that makes it understandable if the patient took the pills out of the box or not. As many of them will stop the alarm but due to emergency they won't take the medicine. At that

moment, our smart box will use its convenient method which will make the person compulsory to in take the particular pills. The details of the box is told in the later part of the report.

II. LITEARATURE SURVEY

According to WORLD HEALTH ORGANIZATION, over 80% of the people above the age of 60 years are prescribed medicines that are to be administrated 2-4 times a day. With the increase in cardiovascular diseases and diabetes among the peer group regular medicine administration that has become a necessity, but among this another 40-60% is having the issues related to forgetting the taking of medicines at right time.

IN [1], A pill box based on an MCS-51 microcontroller was proposed: that pill box can send out medicine using a stepper motor at a scheduled time, but there was no provision to record the time when the patient actually took the medicine. Apart from the above mentioned disadvantages of these previous systems are as follows:

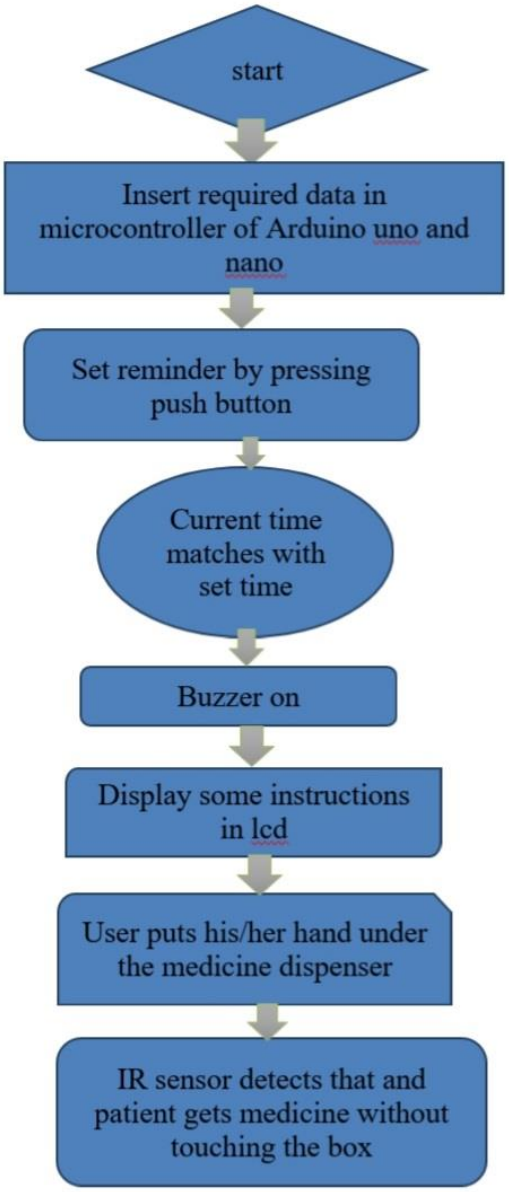
- The family members or patients need to fill the medicine in the pill box manually; this is an additional responsibility for family members of the elderly or even patients.
- Manually filling the medicine in the pill box may cause the medicine to dampen easily.
- In [2], An intelligent pill box was purposed. The IPB is based the hospital's medication system fully app-controlled. In the Arduino-specify the number of times they want to be reminded themselves through push buttons. An Arduino code has been generated for the reminding through buzzer and displaying through LCD and getting the medicine from the dispenser in a contactless way.

III. PROBLEM FORMULATION

The Arduino UNO, Arduino NANO, and IR Proximity sensor are used in this paper to specifically remind patients of the exact time of medicine intake.It is somewhat critical for elderly patients to remember different timings of medicine intake. In this paper, we have tried to develop a system using Arduino IDE and RTC module which can not only help aged people but also ease the work for nursing staff in hospitals. The key point of this approach is that, previously, the boxes were not connected through an app for smart control. We are combining both the reminder and smart control-based systems to improve the medication system. We have added a new feature, a sensor, which will make the process easier. After the buzzer, when the patient places his/her hand near the senor, the medicine will automatically come out in his/her hand. It will be very helpful to avoid germ contact, especially in the time of COVID because it will be a surface-untouched process. The scenario considered for designing the system is specifically for elderly and speically abled people.

IV. PROPOSED MODEL

This system transforms a normal medicine box into an advanced sensor-based automatic smart medicine box, which can solve a number of practical problems. The steps to designing the proposed model are: In this Arduino-based model, we have used the Arduino UNO and Arduino NANO. The Arduino is connected to a buzzer and an LCD display to remind and display the timings of medicine intake. The RTC module is used to remember a set time by the user. Push buttons are used to set the timings manually. The Arduino NANO is connected to the breadboard by way of which it opens the medicine box. A servo motor is used here to make the medicine come out by opening the gate after the buzzer buzzes when patient puts his/her hand near the sensor.

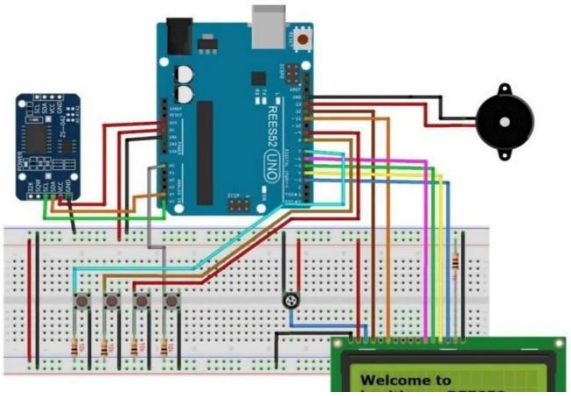


Components used

Our set up includes

1. Arduino UNO
2. Breadboards
3. Real time clock
4. LCD Display
5. Buzzer
6. IR Proximity Sensor
7. Jumper Wires
8. Push Buttons
9. Servo Motor
10. Single Strand Wire

Working prototype



Circuit diagram

Arduino UNO circuit:-

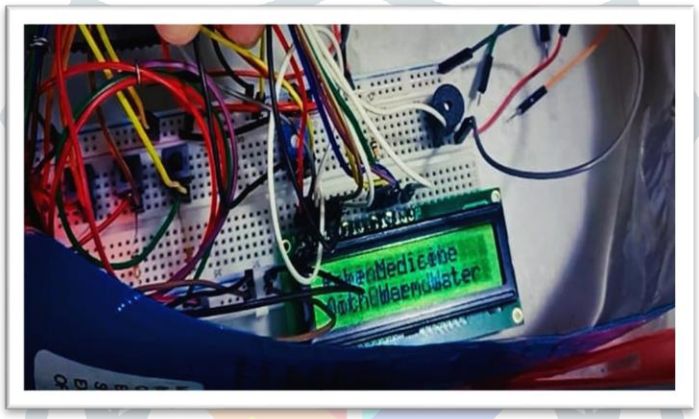


Fig 1. Circuitry of Automatic smart medicine box

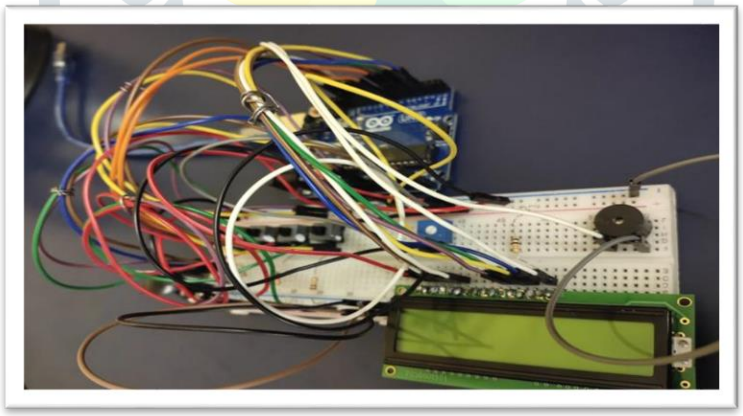


Fig2: Circuitry of Automatic smart medicine box

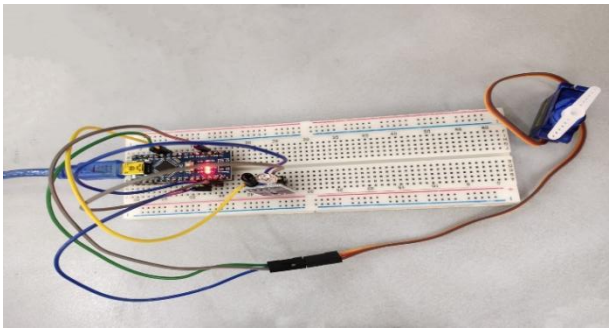


Fig3: Circuitry of Automatic smart medicine box

V. RESULT ANALYSIS

- **OVERALL PERFORMANCE**

The overall performance of our device was satisfactory. During display on LCD, characters are displayed with a gentle yellow backlight, which helps the user identify the characters correctly. The pushbuttons work swiftly without staggering. The sensor is also working properly and controlling the servo motor properly to make the medicine come out. The light intensity of led displays was satisfied so that the number displayed could be easily recognized. During the test, we found that the light intensity for some led displays was a little different than the others, but this would not affect the users' ability to recognise the numbers displayed. The buffer was able to produce a clear and loud synthesised sound when the comparison stage was triggered.

- **USER EVALUATION (USABILITY)**

Our smart medicine box is intended to be used by user who don't have any engineering background, do not understand English. For user evaluation, we planned to do two rounds of user evaluation. At first round of evaluation includes persons who have

Technical background and who doesn't have technical background.

In the first round, people have stressed more on automatic switching off the system and convenience of user's for inserting pill information as input.

In the second round, the problem faced by users is words displayed on LCD are hard to understand. It would also be helpful to create a user manual to help the user to use the device and also opt for a larger LCD. Here the germ contact problem will also be solved by the IR proximity censor.

PROBLEM	SOLUTION	PRIORITY
Germ contact	Medicine will automatically come out by censor	High
Words displayed on LCD are hard to understand	To create a new user manual	High
Manual switch off	Automatic switch off	Low

Table 1: Utilility of the smart medicine box

CONCLUSION & FUTURE ASPECT

We want to conclude that health treatment should be taken on time which is often avoided by many people especially the elderly. We try to find the solution by the developing an advanced technology- enabled medicine box called **Automatic Smart Medicine Box**. Implementing would be a great and effective step in the field of treatment. As we mention all the advantages and the utility of the smart box. This technology is a solution for senior citizens and blind people and many other busy persons.The main goal of this development is to monitor the medication in time. This simple different technology will help bridging the gap between physician and client, thus restraining the patient from overdependency on others for reminding the time of taking medicine. The goal of the system is to lead a healthy and stress-free life for patients who have difficulty taking medication properly at specified time.

Thus, in conclusion, this advanced technology would be useful for daily life of old people and immovable person and for the patients who are suffering from highly infectious diseases. Further more,We are planning to open this medicine box through face recognition in future and will try to develop our system by marking different medicines with different prospective. The medicine box can be made movable to reach out to patients as per their requirement.

VI. REFERENCES

[1] Viral Doshi, Nirav Mehta, Shrishti Dey, Rajesh Prasad, International Journal of Advance Research, Ideas and Innovation(volume5,issue 1)

[2] Sanjay Bhati, Harshad Soni, Vijayrajsinh Zala , Parth Vyas &Professor MR.Yash Sharma "Smart Medicine Reminder Box, IJSTE(volume 3 issue 10)

[3] Suneetha Uppala1, B. Rama Murthy2, Smart Medicine Time Indication Box, International Journal of Science and Research (IJSR), Volume 6 Issue 1

[4] H.-W. Kuo, "Research and Implementation of Intelligent Medical Box,"M.S.thesis, Department of Electrical Engineering, I-Shou University, Kaohsiung, TW, 2009

[5] 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.

[6] T.L. Hayes, J.M. Hunt, A. Adami and J.A. Kaye, "An electronic pillbox for continuous monitoring of medication adherence," in the processing of the 28th IEEE EMBS Annual International Conference, Aug. 30-Sept.3, 2006.

[7] D. Kornack and P. Rakic, "Cell Proliferation without Neurogenesis in Adult Primate Neocortex," Science, vol. 294, Dec. 2001, pp. 2127-2130, doi:10.1126/science.1065467.
[8] Pei-Hsuan Tsai, Tsung-Yen Chen, Chi-Ren Yu, Chi-Sheng ShiSmart Medication Dispenser: Design, Architecture and Implementation- h, Member, IEEE, and Jane W. S. Liu, Fellow, IEEE.

[9] . Mukund & N.K. Srikanth, "Design of automaticMedicineDispenser",R.V.collegeofengineering, Bangalore, 2012

[10] Jason et al., "Robotic pill dispenser",Sahrdaya College of Engineering and technology,Trissur, Kerala, 2014.

[11] https://quartzcomponents.com/products

[12] https://ee power.com/resistor- guide/resistor-fundamentals.