

AUTOMATIC PILL DISPENSING MACHINE**¹Udgire Manoj Kumar, ²Ansari Mohd Anas, ³Mr. Momin Farrukh, ⁴Momin Mohd Rabee, ⁵Mr. Pathak Anoop**

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ABSTRACT

Medication for many people can become complex and overwhelming. Poor medication adherence can erode and well-being of a person especially elders. As they often forget to take medication on time. The idea is to help people at the right time before complex, costly and intensive measures like hospital admission become necessary. For individual's this requires easy access to medication on time. This project has created new pathways between the local authorities for the access of medication and peace of mind.

Many hospitals and people will benefit from the APD (AUTOMATIC PILL DISPENSER) which will help and manage self-medication on time. Will help to weaken the workload for the hospital as well as staff, which will become easier to look after patients. This also applies to those who have workload and forget to have their medication on prescribed time or have the responsibility.

INTRODUCTION

Today, 24x7 healthcare monitoring and supervisory facilities demand a great amount of money and human labour. Caring of the aged is of a serious concern in the developing countries. Family members are responsible for the care and management of the old. In the modern age it is difficult for family members to be available all the time to support the aged. Today, in our society most families are nuclear. Elderly would prefer to remain independent and their desire for independence is natural, but it is a worry for their children. Sometimes despite their best effort, the aged fail to remember to take their medication on time. As the people getting busier these days, they tend to forget to take their medicines at prescribed schedule. As a consequence of this Geriatrics are facing unnecessary disposal of themselves into the hospitals. Since the target audience of the device are the Geriatrics, it must be user friendly, handy, safe to use, light in weight. This, added with the innate forgetfulness of the human mind can result in grave irregularities, often leading to negligence, critical situations and despair. Often we cannot comprehend the harm we inflict on our body by not taking pills at the right time, delaying intake or leaving it midway altogether, or even erroneously taking the wrong dosage. While automation and technology has helped in some of the key sectors to remove human error and achieve a desired level of efficiency, taking pills at the right time is still not seen as an area which could be synchronized by modern technology. Conventional pill bottles could be reconfigured into an automatic multi-pill reminder and dispenser for ease of operation and usability. With the help of Arduino Uno, we have attempted to create a model of an automated pill reminder and dispenser containing single day Compartments for keeping different types of pills such as tablets, capsules and injection bottle having prescribed administration schedule and are a modern day alternate to a standard pill dispenser. To build a working prototype we made use of our own Engineering Design Approach where we followed different steps to achieve different attributes. A system is to be designed in such a way that it can dispense the pills at pre-set time. This could seriously reduce the work load of hospital staff significantly. In APD each compartment can be triggered individually at the given time and time can be set manually for the pills to be dispensed at any time of the day. After the last compartment gate is opened and the pills are dispensed then all gates will go to their initial position automatically for the next batch

of pill to be reloaded. At first the timer is set in Arduino via the keypad which read the time from RTC and shows it on the display with each compartment number to set the gate trigger time.

Medication dispenser is one such approach to help them take their medicines efficiently. As the cost of in-home medical care rises, it has become more and more incumbent among individuals to opt for a device that effectively takes care of their medications. The Automatic Pill Dispenser serves the purpose.

LITERATURE REVIEW

Wmpd report (2012) this report shows the results of usage of automatic pill dispenser on the patients is overwhelmingly positive also helps the patients to save money in long run by minimizing the medication errors. Mr. Christopher and et.al (2016) his team has built an APD device which was built with the help of 3D printing thus reducing the cost of manufacturing as compare to other device and helped to reduce the medication errors. Shaantam Chawla et.al. (2016) has built an APD that has consistent ability to trap and the release of the medication and there are certainly improvements that can be made for future iteration of original model. Which works on Bluetooth serial signal transfer and heightened SMS delivery rates would mitigate the issue.



BLOCK DIAGRAM

COMPONENT

The working of the dispenser consists of a number of components.

1. Arduino UNO.
2. Bread board
3. Servo Motor (Micro servo 9G – SG90)
4. 16x2 Display with I2C
5. 4x4 Keypad
6. RTC (Real Time Clock)
7. Male to Male and Male to Female Jumper wires.
8. Link rods.
9. 6 Volt-1Amp Power Adapters.



FRONT VIEW



TOP VIEW



SIDE VIEW

RESULT

We have set 4 slots for 4 different time of medication. We had set four trigger times for 4 different slots. We had trigger time as for

Gate no.1 as 9 am;

Gate no. 2 at 12 pm

Gate no. 3 at 6pm;

Gate no. 4 at 9pm

Every single slot was opened on the triggered time respectively.

And then all were reset after the last slot was opened back to their original position for the next dosage to be filled.

When gate were triggered same time buzzer and led were triggered. In all the triggered time buzzer buzzed for 60 second and led blinked for same time whenever a slot was opened to dispensed the pills.

CONCLUSION

According to our result and test performed we can safely say that pill kept inside the device will be dispensing at their triggered time. Once the last pill is dispensed then the all the motors will reset to their initial position. The

APD build was outlined, and developed using servos, an Arduino, an LCD screen, connectors, and CAD design. The simple build process allows for a low cost alternative to what is available on the market today using a simple, flexible manufacturing process. APD has the potential to decrease accidental overdoses; while increasing the quality of life of its users and lowering hospital visits and medical costs. Future improvements would include more safety features as well as increase the amount of dispensing units that could be attached. With continued refinement, the APD for the home could be a real solution to a current healthcare hazard, one that can benefit many people in the near future.

REFERENCE

1. Mira, J. J., Lorenzo, S., Guilabert, M., Navarro, I., & Pérez-Jover, V. (2015). A systematic review of patient medication error on self-administering medication at home. *Expert opinion on drug safety*, 14(6), 815-838.
2. Roughead, E. E., Semple, S. J., & Rosenfeld, E. (2016). The extent of medication errors and adverse drug reactions throughout the patient journey in acute care in Australia. *International journal of evidencebased healthcare*, 14(3):113-122
3. McCarthy, D. M., Davis, T. C., King, J. P., Mullen, R. J., Bailey, S. C., Serper, M., ... & Wolf, M. S. (2013). Take-Wait-Stop: a patient-centered strategy for writing PRN medication instructions. *Journal of health communication*, 18(sup1), 40-48.
4. Gift Arnold MUGISHA , Faith-Michael UZOKA , Chinyere NWAFOR-OKOLI (2017) A Framework for Low Cost Automatic Pill Dispensing Unit for Medication Management; IST Africa 2017
5. Shree, S. R. B., Shekar, P. C., Arjun, A., Manoj, G. R., Nithin, A. & Raj, R. S. (2014). Automated medication dispensing system: Eleventh International Conference on Wireless and Optical Communications Networks, Vijayawada, 1-6. doi:10.1109/WOCN.2014.6923079
6. Frank, S., Justin, D., Gary, T., (2009). iWander: An Android Application for Dementia Patients: Department of Computer Science. Florida State University, Tallahassee Florida 32306
7. Mrityunjaya D H, Kartik J, Uttarkar , Teja B, Kotrash Hiremath(2016); Automatic Pill Dispenser; researchgat.net
8. Sabah mohammed (2012); Construction of smart medication dispenser with high degree of scalability and remote manageability have designed a dispenser that achieved high degree of scalability
9. WMPD report(2012) ; automated pill dispenser project; pivotell.co.uk
10. Mr. Christopher chariah, mr. jonathan , dr. sholing he , dr. hossein rahemi , dr. hugh jack;(2016) automatic pill dispenser ; american society of engineering education