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SMART MEDICINE DISENSER (SMD)

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ABSTRACT

The main objective of the paper presents a prototype of Smart Medicine Dispenser (SMD). The prime reason for the adaptation of this system is to help the patients who are in need for the assistance of medication. In this prototype, we have installed eight separate boxes in a cuboidal format which will be filled with the pills on regulation. We are also inaugurating an app for allowing the caretaker to manually update the prescription according to which the medication has to be taken. The prototype is designed with an accurate design for the communication between the patient and the caretaker. There will be a design of Fitbit which will play a vital role in the communication through an alarm. On accordance to all this installation, a sensor is to be used for the correct dispense of a medicine, receiving and transmitting signals for communication as well as for the indication of failure in the mechanism. In addition, every single information will be updated in the mobile application through which the caretaker will be handling the progress of dispense of the medicine according to the given prescription.

Keywords*: Dispenser, Fitbit, Android Application*.

1. INTRODUCTION

The world of healthcare has recognized to be immensely growing since the human health plays a vital role compared to any other phenomenon. Every individual in the present world is expecting technology in each field they come across in daily life since the surrounding has been completely technologies to reduce the difficulty of manhood. On accordance with the need of technology, the prototype is to be designed on the medication system in this paper. According to the WHO over 80% of the people over the age around 5060 years are facing chronic illness and they consume prescribed medicine, that are to be fed 2-3 times a day to stabilize their health issues. It has now become a system that only the medication taken on proper time could solve a patient's disorder. Due to certain circumstances, we can consider forgetting on taking pills, the proper system of medication is considered difficult to be followed. Even, if the patients are appointed with the caretaker, it would last for at least less than the need for the patient to take the medication. Considering the fact, a Smart Medicine Dispenser is proposed that are designed with the idea of handling and sorting out different pills according to the need of each patient. This system involves three different parts: the main dispenser processing model, a Fitbit (which is known as a wrist watch) and an Android application. The main dispenser processing model consists of the pill boxes which are allotted in the number of eight. Inside which contains a sensor which detects the number of pills entering the exit valve. The whole model is to be designed with all the processing devices including sensors, microprocessor, etc., and to be made into a compact size that gives a finish look as a condensed model. On the second part, a Fitbit device is to be designed which can monitor the patient's routine health and is especially designed for the alarm system that can signal on the prescribed time for the medication. The last one is the main process that is going to connect all the three parts together. The prototype consists of an Android Application that are designed to manually update the prescribed medicines on the dispenser part and for the Fitbit. It also signals to the Fitbit which would sound as alarm for the intake of the medicine. The actual programmings that are going to be installed in the App are completely manual and are user friendly. Thus, the three parts are combined to work together to process the Smart Medicine Dispenser (SMD).

2. LITERATURE SURVEY

To improve the medication regularity for patients, the organizations from various locations had installed an idea of Smart Medicine Dispenser kit. There are basically three existing system right now that actually could deliver the result of pill dispenser. Those are:

The Autonomous Pill Dispenser: Mechanizing the Delivery of Tablet Medication – 2016:

This project is based on an Arduino controlled, consumer device that are meant to dispense the right amount of medication on the right time. Here a cone shaped product holds one tablet for the correct dispense of the tablet. After the medication gets dispensed, the user is notified via SMS that his/her medication is prepared to be taken. This device is additionally configurable via an Android application; a caretaker can select dates and times the medication are going to be dispensed for up to 3 sorts of medication. The device relies on an HC-06 Bluetooth module for a serial activation signal. the primary set of results obtained measured how often the right pill was dispensed.

Design and development of Smart Medicine Box – 2018

This project of Smart Medicine Box is designed to help the introvert patients to take medication without others help. This project is to develop a robotic device that will help the patient take the medication by their own. There are four sensors used in this project like PIR, IR, temperature and ultrasonic sensors. The information is collected to the app through the Arduino microcontroller.

A sensible Medicine box for medication management using IOT – 2020

This includes the drugs box, like health monitoring, emergency alert through SMS are given to their caretaker and automatic opening and shutting of the lid. Using IoT system, vital parameters are recorded, uploaded to cloud and reviewed by clinicians. This helps the doctor to realize the patient's health condition. This could help avoid taking the prescribed medicine in hands and can live with the technology.

Modern Smart Medicine Dispenser Kit supported Emergency alert System – 1987

This system is the first revolution on the smart medicine Dispenser idea. This contains a sensible pill box for those patients who normally take medicines and to recall the patient's history for doctors for further treatment procedure (for remembrance). There was a huge difficulty for some patients to take medicines on correct time, so they tried to implement this idea in real life so that it would be easy for both the clinician and the patient. The evolution of the medicine dispensers is shown below:

Fig 1 – Evolution of SMD design

3. PROPOSED SYSTEM

On the base of the existing system, we are about to implement several ideas that could make the system simple and elegant for the usage. Our project is going to be consisted of three parts that simultaneously work for the patient's convenience.

1. The main Dispenser kit for dispensing the medication.
2. The Android application for the installation of information.
3. Finally, the Fit bit model for patient's personal update.

These three are going to be collaborated and make the process possible for the correct dispense of the tablet in the correct time.

4. METHODOLOGY

We are about to give a detailed methodology of the system by implementing the process that could possibly convey the proposed system. The system is going to be completely focused on the dispenser kit that is programmed to dispense the medicine. The design is made in such way that it could make the dispenser work to dispense the correct tablet on the specified time.

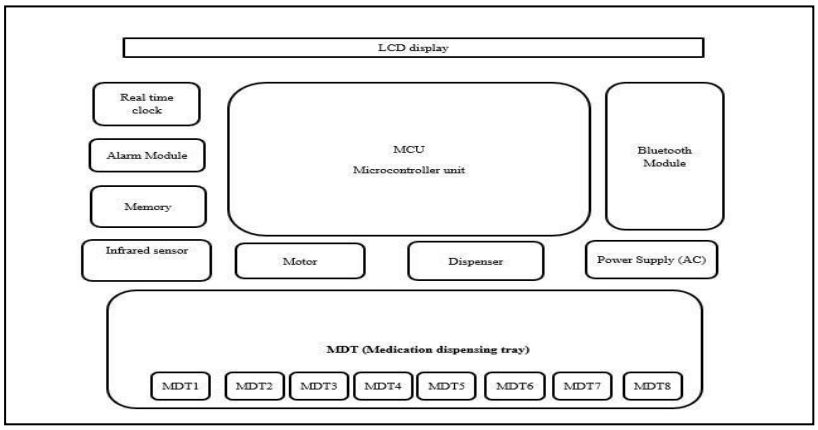

Fig 2 – Dispenser Block Diagram

The sensor that is going to be implanted checks the proper dispense of the tablet. The alarm beeps and signals on the LCD display to indicate the dispense. The motor will turn out and make the tablet reach the last dispense tray. The dispenser kit is going to contain eight dispenser box, each one is going to contain a prescribed tablet that are further going to be installed through the app. The dispenser kit is future going to contain hardware parts such as:

1. Microcontroller (PIC16F877A).
2. Infrared Sensor.
3. Buzzer.
4. Servo Motor.
5. Liquid Crystal display (LCD).

The software part consists of the following:

1. MPLAB IDE.
2. MC Programming Language - Embedded C.

The next step will be the installation of the prescribed medicine in the designed android application. The time of the medicine according to the prescription are uploaded so that it would be easy to give a customized dispense of the medicine.

Fig 3 – Android Application

The Fit bit model is an idea that could help the patients updated in hands for taking the medication.

5. WORKING

The working of the Smart Medicine Dispenser starts with the installation of prescribed medicine on the app. The App starts with the login option which could be given to the caretaker. They can be customized easily and are hand friendly. The information installed here and directed through cloud to the dispenser kit and make the dispenser kit ready for dispense through the sensor application. If the pill is not taken, the alert is given to the Fitbit of the patient to inform taking pills. If not taken after that, an alert will reach the caretakers handle able app for intimation. The below chart indicates the basic flowchart of the working discussed above. Thus, this can be proceeded to the proper dispense of the tablet that could help the patient take easy medication.

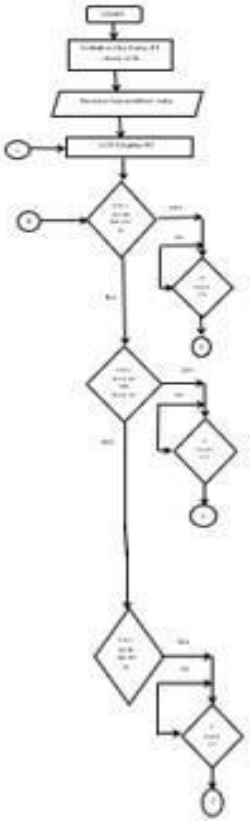

Fig 4 – Flowchart

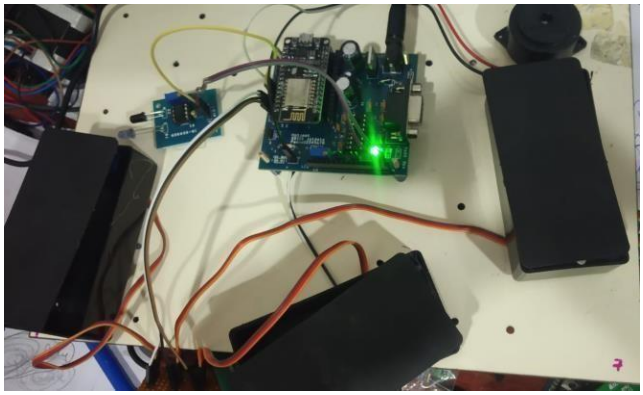

Fig 5 - Prototype

6. RESULT

The problem statement of the project has been evolved and made a recovered issue solved for the best of our knowledge. This could really help the patient take the medication to avoid certain complications who are facing chronic illnesses. The app is built in such a way that it always delivers a proper information to the dispenser kit. All hardware and software equipment are built in such a way that it helps the mechanism to dispense the correct tablet at the particular time. The motor and the tablet holder make a sense to implement the process properly. Thus, it can be declared that the idea of Smart Medicine Dispenser (SMD) is built and displayed as a prototype model.

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