

Smart Tablet Box for Patient

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Abstract:

Most of the people, from young to the old age forget to take tablets on time. There should be a means to always remind such people to take tablets on time. This paper presents a Smart Tablet box to users who regularly take drugs or vitamin supplements. Our tablet box is Microcontroller based programmable, that reminds users which specific tablet to take at particular times of day and serves at those times each day. It contains 21 separate slots in a box. Therefore users can set information for 21 different tablets for one week dividing a day into three parts as morning, afternoon, evening. When the tablet time have been set, it will remind users to take tablets using sound and light. The specific box from which the tablet needs to be taken will be displayed on LCD and by an LED placed on the corresponding slotted section of the box.

Index Terms- Microcontroller, Programmable, Sound, Light

I. INTRODUCTION

Medication adherence is a significant problem the healthcare system currently faces. With the tremendous growth in medical technology, there is cure for many dreadful diseases through the intake of several new tablets. The number of tablets to be taken by each person has increased. It has become hard for us to remind ourselves to take the tablets at particular time. This Smart Tablet Box helps us in reminding of the tablet that we should take at that particular time. The information that a patient must remember in order to take just one tablet is actually complex and is made up of seven properties: the name of the drug, for which disease it is used, how to take it, the number of daily intakes, when to take it (before, during, or after a meal), dosage, and duration of the treatment. The proposed system consists of real time clock with LED based slot indicating on a normal tablet box along with a LCD to display the current date and time with indicating a particular slot number of the box.

II. MOTIVATION

The Medication adherence describes the patient's tablet taking behavior and it is vitally responsible to ensure patients consume the right tablet at the right time which contributes to the activeness of the treatment. There are a few problems which have been identified with regards to this issue which are memory loss and poor eyesight especially among the senior citizens. Proportion of the world's population aged 60 years or over increased from 8 percent in 1950 to 12 percent in 2013. It will increase more rapidly in the next four decades to reach 21 per cent in 2050. With this, independent living has become a commonplace for the patient. The performance required are ease of use for the patient, a Bright warning LED, audio alerts and good a display unit. Hence, this motivated us to develop a tablet box which would keep a track number of dosage need to take at a particular time for patients.

III. REVIEW OF LITERATURE

Taking Tablet at right time in proper amount will lead towards the faster recovery. In reality what happens is that, they get their prescribed medication but fail to follow their health care professional's instructions. Many patients while taking prescript medication do not follow their doctor's instructions. Some common reasons for this are patient may start feeling better and decide to not finish all of the medication. Patient may not notice an improvement in their symptoms right away

and may stop taking the medication. Some medications are expensive, and patient may skip doses or take less than they were prescribed to try to save money

Aakash Sunil Salgia, K. Ganesan and AshwinRaghunathof VIT University explained SMART TABLET BOX as Untimed tablet administration can always show adverse effects on the health of the patients. The proposed system is designed to help these patients to take the required tablet in the right proportion at the right time. The basic ideology is integrating the principle of Alarm clock with Light based slot sensing on a normal tablet box. An alternate to the light based sensing method using capacitive fields is also employed.. With the GSM technology, we are able to connect to most people around the planet. So a link between the patient and the chemist is employed using GSM.[1] The above research paper when summarized did not have the following things taken in to consideration: 1.An audio output 2.LED indication for respective slot

S. Mukund and N.K. Srinath II Year B.E. Student, Department of Electrical Engineering from R.V. College of Engineering Bangalore had the following things explained as;. The major components of this medication dispenser are a microcontroller interfaced with an alphanumeric keypad, an LED display, a Motor Controller, an Alarm system, a multiple tablet container and dispenser. The overall operation is to facilitate the user to set the timings to dispense multiple tablets at required timings. The major objective is to keep the device simple and cost efficiently. Each compartment can hold different combination of tablets. The user is required to take the tablet from each tray each day for a maximum of 21 days. It reminds at a pre-set time to take tablets or attend certain events. A smart phone application is designed to help patients to avoid mistakes. It reminds its users to take correct tablets on time and record the in-take schedules for later review by healthcare professionals [2]. The above research paper when summarized did not have the following things taken in to consideration: 1.It uses a smart phone which requires continuous usage of internet which may be not available in all geographical regions 2.Smart phone may or may not be able which makes it prior to use it.

P. Raga Lavima, Mr. G. SubhramanyaSarma (M. Tech) Electronics and Communication Engineering, Lingayas Institute of Management and Technology explained this project gives an experimental idea of patient's health condition and monitor environmental conditions and controlling. Health platform has been proven in fields trials and if any vital signs recognized then gives alert to predefine care takers through SMS alert and monitor the conditions continuously with an IP address of WIFI. The objectives of this paper are to provide an overview of unobtrusive sensing and wearable systems with particular focus on emerging technologies, and also to identify the major challenges related to this area of research[3] The above research paper when summarized did not have the following things taken in to consideration: 1.It uses a smart phone which requires continuous usage of internet which may be not available in all geographical regions with the application of IOT as the heart of the project. 2. GSM module to transmit and receive SMS may be quite expensive and also unreliable since it works on network coverage.

International Conference on Human-Computer Interaction 2016: Long with the improved technology and living quality, people's lives have become more and more comfortable. The ages of patients with chronic diseases drop and the numbers year by year, therefore the demand of medication for chronic disease will keep growing. To easily record and remind the time of taking medication, the smart tablet box has been developed. However, currently most of smart tablet boxes were designed for elder lives who usually stay in home. This study introduces a smart tablet box system which applies magnet and tablet computer as its entity to be interface. The system uses 3D printing technology to produce prototype kit, and the magnet so that each cartridge is connected. Through installing Liang Rong-Haos Gauss Sense to enhance its accuracy of sensor, the user can operate the tablet computer to obtain information wanted by moving, rotating and combing the tablet

box. The above research paper when summarized did not have the following things taken in to consideration, with the following disadvantages: 1.3D printing technology is used, which is a very advanced feature. 2. An expensive methodology, using Gauss sensors to communicate with the tablet computer which may not be affordable to all.

Naga Udayini Nyapathi¹, BhargaviPendlimarri, KarishmaSk, Kavya says that, Most of the people, from young age to the old age forget to take tablets on time. This paper presents a Smart Tablet box to users, who regularly take drugs or vitamin supplements, or nurses who take care of the older or patients. Our tablet box is programmable that reminds the users which specific tablet to take at particular times of day and serves at those times each day. It contains three separate boxes. Therefore, users can set information for three different tablets. When the tablet quantity and time have been set by making use of the keys provided, the tablet box will remind users or patients to take tablets using light. The specific box from which the tablet needs to be taken will be displayed by a led placed on the corresponding box. This Smart Tablet Box helps us in reminding us of the tablet that we should take at that particular time. Each box has a led display placed on the box. He or she can also specify the different combinations of tablet boxes to be open for each day

IV. PROPOSED WORK

This proposed system contains twenty-one separate small slots with LEDs (21units); a buzzer; a keypad, micro-controller and LCD screen, as shown in Fig. 1.

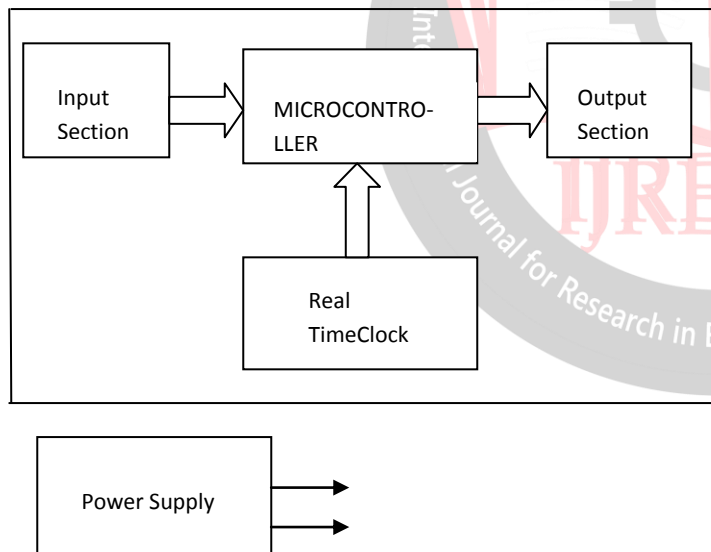


Fig.1 Block diagram of proposed system

In the proposed system the input section consists of Keypad which is used for the user to enter the information of time, when the smart box would send reminder (displaying on LCD and playing buzzer and indicating on the slotted section through LED). It is also used for the user to enter a number to command a specific tablet box to indicate on a specific day. (Say, indicate No.1 tablet box on Monday). The keypad is also used for stopping the sound and LCD display that gives an acknowledgement to the system that the user has taken the tablet from the corresponding slot of the tablet box. The output

section consists of the LCD screen to display the instruction information and the current time and date. The buzzer is used to play the sound to remind the user to take tablet.

We used a tablet box containing 21 separate slots to place the tablets. Each slotted section of the box has LED placed to indicate from which slot the tablet needs to be taken [2]. Microcontroller is used to execute all the commands.

As we switch on our device, the current time and date that is stored in the RTC is displayed on LCD. The device initially asks the user to set the alarm timings using the keys. A buzzer is connected to the microcontroller. The alarm time is compared to the current time by the microcontroller and when they match, an interrupt is generated. Then the LED on the tablet box glows and buzzer sound is also generated indicating which tablet should be taken. It includes a keypad switch to make sure that the tablet is taken by the user, If not then snooze facility is included in the system where a time delay 5 minutes is provided after every interval. Built in Real Time Clock (RTC) plays the key role in our present application.

Our device uses the real time clock (RTC) to provide real-time functionality. This state machine determines which key has been pressed and provides keypad debounce functionality. We use the external oscillator to build a real time clock for the device. Since the accuracy for the external crystal oscillator has a very high accuracy, and based on our calculation, our RTC should only delay about several minutes in a week. Such error is tolerable, since we not particularly used the RTC as an alarm clock.

The device's logic structure contains three major stages:

1. User initialization stage.
2. Comparison stage.
3. Reminder stage.

In the user initialization stage, the user enters the current time, date and tablet information (including amount and serve time for each type of tablet). After the user finishing entering all the information, the device will enter the comparison stage unless the initialization button is pressed. During the comparison stage, the system compares the tablet information for each of the sub-box with the time counted by RTC. Once the information entered by the user matches the RTC time, the system will jump out of comparison stage and enter the reminder stage. In the reminder stage, the device will continuously play sound, and the LED will blink on the particular slotted section.

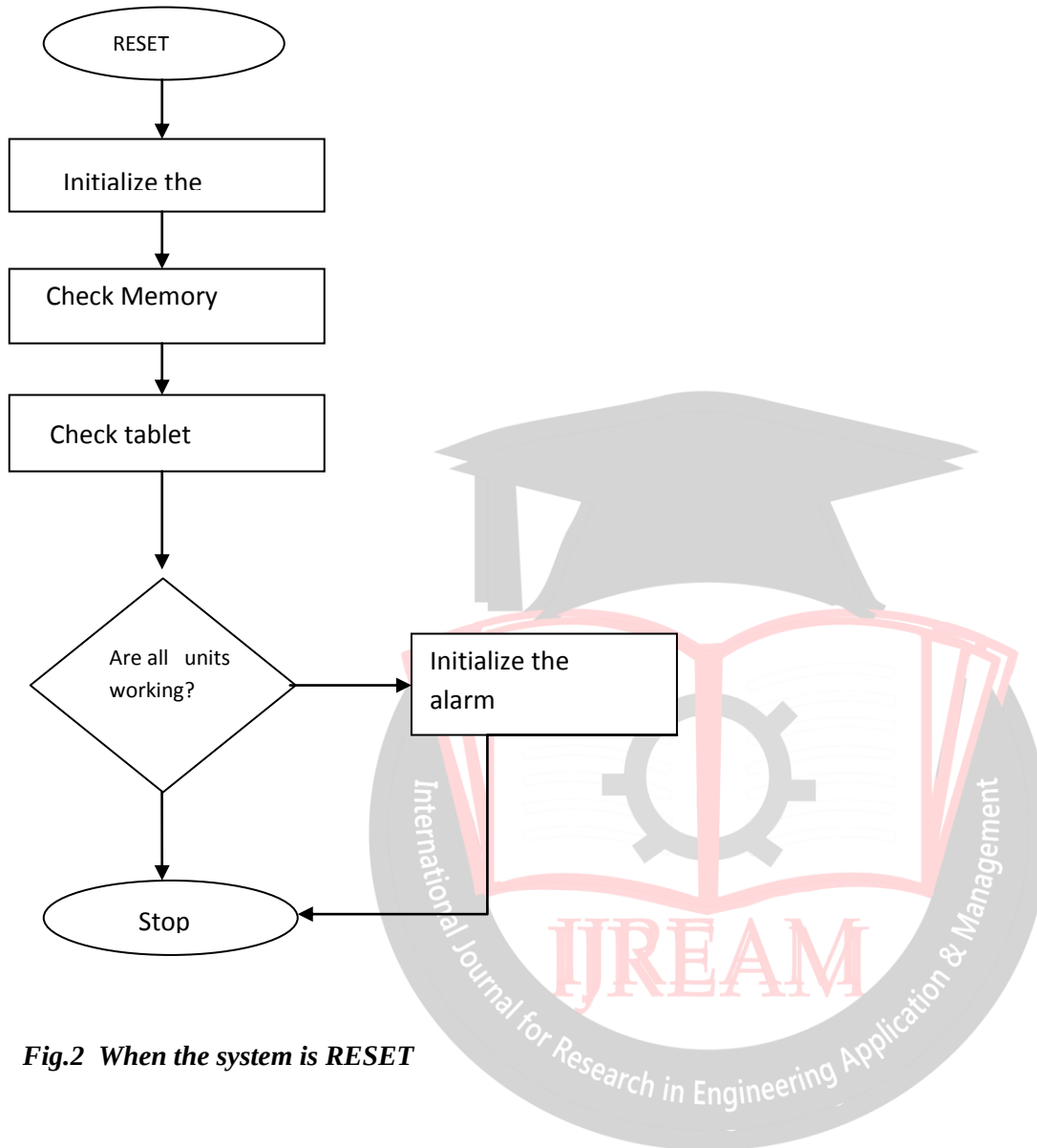


Fig.2 When the system is RESET

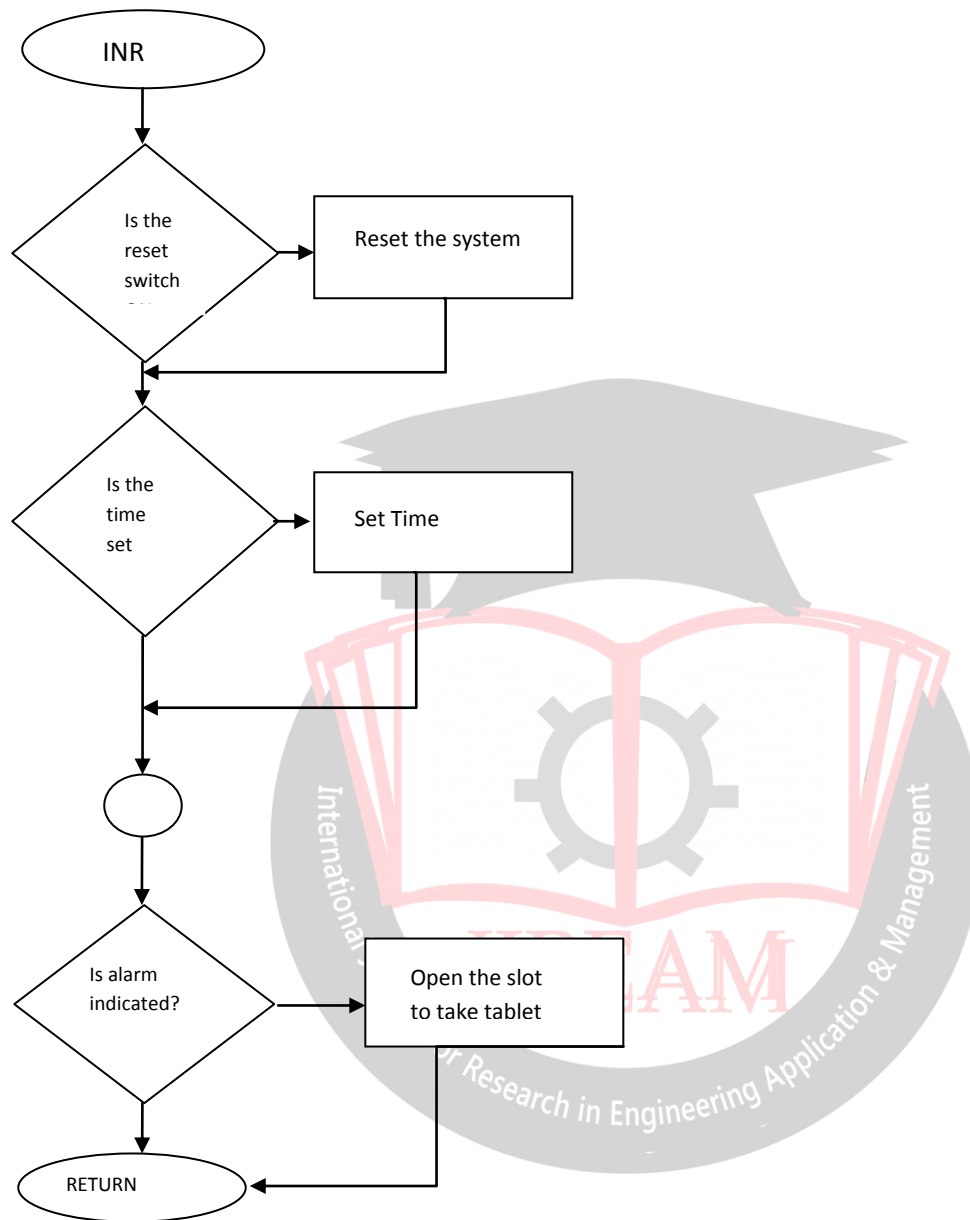


Fig.3 When the system is interrupted

Software requirements: MPLAB X, PROTEUS 7

Hardware requirements: Tablet box, Microcontroller, Keypad, LCD, LED, Buzzer, RTC

V. FUTURE SCOPE

The system can be further employed with a weight sensor to indicate that the tablet has been taken or not and a automatic dispenser to open only the required slot indicated by the system

VI. CONCLUSION

The Smart Tablet Box can be programmed for different tablets. It is dynamically possible to set the time and date.

Our system contains buzzer and LED indication for each slotted section of tablet box for patients. The LCD is used for displaying current date and time with number of slot also, the keypad used for manually entering the date and time to set according to the prescribed time given by the doctors.

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