Review on Smart Pill Box Monitored Through Internet with Remind, Secure and Temperature Controlled System

Mayuri Vijay Kondawar[1], Prof. Ashish Manusmare[2]

[1]Department of Electronics & Communication Engineering, Ballarpur Institute of TechnologyBallarpur, India
[2]Department of Electronics & Communication Engineering, Ballarpur Institute of TechnologyBallarpur, India
Corresponding Author: Mayuri Vijay Kondawar

Abstract: *In this day and age the majority of the general population is experience the ill effects of bunches of illnesses and they use medication to improve their wellbeing however some patient like older folks need steady help which the vast majority of the relative can't give so as to assist them with this obligation we have built up this venture. The principle normal for this framework to remind the patient to take prescription in time just as refilled confine time and can educate the families remotely when the patient take the medication. The wellbeing structure of this pill box can avert the medications mishandling. Security that enables keeping the pills to out of the scope of unapproved individual for the most part from kids, screen the temperature of pill box on the off chance that it surpass the 30°C in light of the fact that more temperature of pill box may lose some viability of that pill. SPB give Pulse sensor is use to estimating the pulse rate and emergency button to educate the relative or specialist in crisis condition.*

Keywords*: Internet of Things, Medicine Box, Arduino, Mobile Application*

I. Introduction

As per report distribute in Lancet on September 2018 said that 122 Indians for each beyond words to low quality of consideration every year. So there is have to bring issues to light about the better nature of consideration and giving outperforms quality consideration. So as to give outperform nature of consideration and to keep the patient solid the proposed thought will be efficacious. Sensor play an always significant job in restorative innovation with the point of making medication gadgets much increasingly viable and more secure while improving their task just as Internet of Things or IOT alludes to the billions of physical gadgets around the globe that are presently associated with the web, interfacing and sharing information. IOT makes our life simple by associating world remotely. By utilizing this innovation our propose framework is work. In this procedure of encryption the timetable information or specialist's solution are send to pill box through versatile application. The LCD are set for sign and Audio framework for caution alarms and IR sensor used to include the pill in shrewd pill box, utilizing NODE MCU information is send to cloud stage. The current methods to the market for the update incorporate a pill box. Be that as it may, this does not fulfill the need of better quality consideration. For that this framework contain the update utilizing sound framework and guarantee the refilling time of the pill box, keeping up the temperature of the shrewd pill box, crisis catch and most significant element the security.

II. Literature Review

[1] This venture has concentrated on the issues looked by individuals worried to their endorsed medicine. It helps the patients as well as the overseers of the patient by helping perfect add up to remember medication at the correct time. The keen medication box utilizing smaller scale controlled stage has been demonstrated to work agreeably. The upside of this crate is that it is exceptionally simple to utilize and multifaceted nature is less. This guarantees the patient expends the correct measurements of drug at the ideal time which eventually decreases the rate of mortality. Since it additionally guarantees the utilization of meds by the ideal individual, the rate of unlawful utilization of endorsed tranquilizes likewise diminishes. Fundamental to most parts of medication from essential consideration to particular medicines, doctor prescribed medications have turned into a noteworthy segment of wellbeing frameworks around the world. Attributable to their psychoactive impacts, these medications are frequently taken in manners not expected by the specialist or by somebody other than the individual for whom it had been endorsed. Patients regularly neglect to take their endorsed prescriptions or expend it out of the timetable prescribed by the specialist. There are additionally cases of young people taking medications, for example, sedatives, CNS depressants and stimulants from their loved ones. Our objective for this undertaking is to manufacture a framework around physician recommended drugs

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that verifies a patient's entrance of such medicine dependent on their character and pre-scribed plan, and furthermore encourages the drug specialist or specialist to screen this utilization.

[2] This paper introduced a security related and ease prescription box that can help and screen patients concerning the exact admission of their drug. This framework can distinguish the flawed portion of pills taken, the missed drugs and the inaccessibility of pills in the restorative box. Cautions are being produced with drug box and by means of a versatile application that can be introduced on the patient relative's telephones so as to help checking him. A propelled medication box checking, investigation and control framework is proposed in this paper. The last structure depends on a shrewd and safe restorative box that helps patients in taking as much time as necessary. Two fundamental functionalities describe this framework: security which guarantees the prosperity of the patient and the great working of the framework by copying the electrical parts and the security that enables keeping the drug to out of the range of the youngsters via naturally looking the therapeutic box at whatever point the patient takes his pills. This framework can likewise be observed by the patient guardians as it will be connected to a telephone application. This application will be utilized to design the restorative box by figuring the heaviness of every pill, setting the calendar of therapeutic admission, disturbing the client of the quantity of residual pills, creating cautions at whatever point the patient does not take the required number of pills or doesn't take them by any means, etc… This framework was actualized and tried by in excess of 50 patients who were taking a few prescription sorts (every single one of them takes one medicine just) and were utilizing diverse cell phone. The general outcomes were truly adequate with a flawed alert age beneath 3%.

[3] Integrating of Hardware modules Node MCU, OLED show, Buzzer, push Button and Mobile application to PILL Box and each module has been put cautiously to give sensible yield, subsequently adding to the best working of the unit. This framework guarantees the security of the general population and furthermore forestalls the wrong doses. It decreases the exertion in recollecting prescription and individuals will get the calendar of the drug containing medication name timing and give the data if individual is crisis. There can be a ton of people out there who need consistent help – may it be our older individuals, relatives, the ones who have extraordinary necessities. These individuals obviously need the sort of consideration which most bustling relatives can't give. A few people may neglect to take the prescriptions at the right time and can overlook the meds which they need to take. So as to assist them with this obligation we have built up this undertaking. The general populations are given a savvy medications box on which there will be a presentation which informs the general population about the prescription. Alongside this we can caution them with an alert and light signs. So that regardless of whether the individual is resting or occupied with some work the caution helps in alarming him to affirm that the individual has taken that prescription or not we can put one catch at the opening end of the pill box so when the individual attempts to open the container the catch is squeezed and the caution will be off just if the signal is squeezed by this information we can tell that the individual has taken the medication. It accompanies one more element that when the individual is feeling uneasy or if there should be an occurrence of some crisis he can inform the general population by squeezing the catch on the gadget. There are various catches, one is utilized to tell the specialist and the other one is utilized to inform relatives about the crisis.

[4] This paper abridged the significant focuses about our SMD. Old patients, particularly ones with incessant and intermittent drug, will profit the most for the SMD, since it will incredibly expand their medication adherence which will safeguard better treatment viability or even spare their lives. Insurance agencies will doubtlessly profit by the SMD since it will assist their costumers with living in a more beneficial way of life far from life threating mishaps brought about by neglecting to take as much time as necessary or with the correct dose, and if there should arise an occurrence of skipped pill, the Caretaker will get cautioned immediately by means of SMS. At long last, the UI which is the equivalent on every one of the gadgets including the machine is instinctive, clear and simple to utilize, notwithstanding for old patients. The structure enables the client to include more compartments or more pills per serving. This paper displays a Smart Medicine Dispenser (SMD) model. The principle reason for this framework is to support the patients, principally seniors, take as much time as is needed in a simple route without the likelihood of missing pills, and furthermore diminish the danger of over or under dosing coincidentally. Not taking drugs effectively can have genuine results, for example, deferred recuperation, disease and even demise. The brilliant medication container (SMD) could take care of such issues by illuminating and cautioning the patients to take the suitable portion at the ideal time. Likewise, it gives direct correspondence between the patients and the parental figures as it will promptly tell the guardian on the off chance that the patient missed his/her pill. What's more, SMD gives the client a touch interface accessible as an application on their cell phone which will enable them to remotely oversee and control pill calendars and use information.

[5] A shrewd pill confine is proposed and executed this paper. It educates the older folks to take prescription. It effectively controls the season of older folks to take prescription. It likewise lessens the proportion that tolerant misses and defers taking prescription. The remote illuminating framework joins with the Skype programming so the parental figures can support the patient. The structure design is likewise reasonable for the medication bundles. Later on, we trust that the vitality sparing and versatile can be considered. Along

these lines, missing and deferring taking medication can be totally killed. Taiwan is venturing into the maturing society. The greater part of the older folks has numerous unending sicknesses, and they use medications to balance out their wellbeing status. Drug specialists Association asked the family ought to be progressively worried taking drugs wellbeing of the older folks. In this manner, this paper structures a canny pill box and its back-end checking framework. The executed pill box can remind the older folks to take prescription in time and can educate the families remotely when the seniors take the medication. The wellbeing structure of this pill box can forestall the medications mishandling. The parental figures can without much of a stretch calendar the ideal opportunity for the older folks to take drug.

[6] A shrewd pill box(SPB)for the older and nursing homes addresses the issues of the market by coordinating electronic innovation and system usefulness. The intelligent SPB, which includes a specific gadget that contains inserted sensors in every compartment that not just transmits identified signs to site when clients are taking their pills yet in addition gets are mind message back to the LCD screen on SPB by showing words and additionally examples, or talking a voice. This investigation utilizes the Webduino module introduced in SPB to accomplish two-path informing with remote relatives through web of thing (IOT). The module first peruses the detecting signal in the unit and utilizations WiFi to transmit the flag to WiFi Router, and afterward sends the medicine data to a remote website page or phone for monitoring(on LCD). Remote relatives can include care messages on the website page or cell phone to send a flag back to the WiFi Router and after that to Webduino module. Subsequent to accepting the flag, Webduino will send it to Arduino for content presentation and voice playback in the SPB. Consequently, the old remaining in their home or nursing home foundation can without much of a stretch deal with their prescription by means of this application. The keen intuitive pill box will be vital for medicinal consideration the board for senior people of this maturing populace or later on.

[7] To improve medicine wellbeing and to maintain a strategic distance from perplexity in taking tablet among the older, this paper proposed a savvy pillbox with reminds and affirm capacities. The proposed pill box can diminish relative's obligation towards guaranteeing the right and auspicious utilization of prescriptions. Since the proposed pillbox containing an alarm sound to the client for a specific time and ongoing clock gives constant time as a yield. This paper proposes a shrewd pillbox with remind and utilization work. Which is utilized to give alert the client to take pills at a specific time and the pills required to take at that opportunity arrives out to the client to dodge perplexity among drugs. Shrewd pill box can lessen old relative's duty towards giving the right and convenient utilization of prescriptions. This framework Get the input about pills from the client and Send buy request to restorative shop.
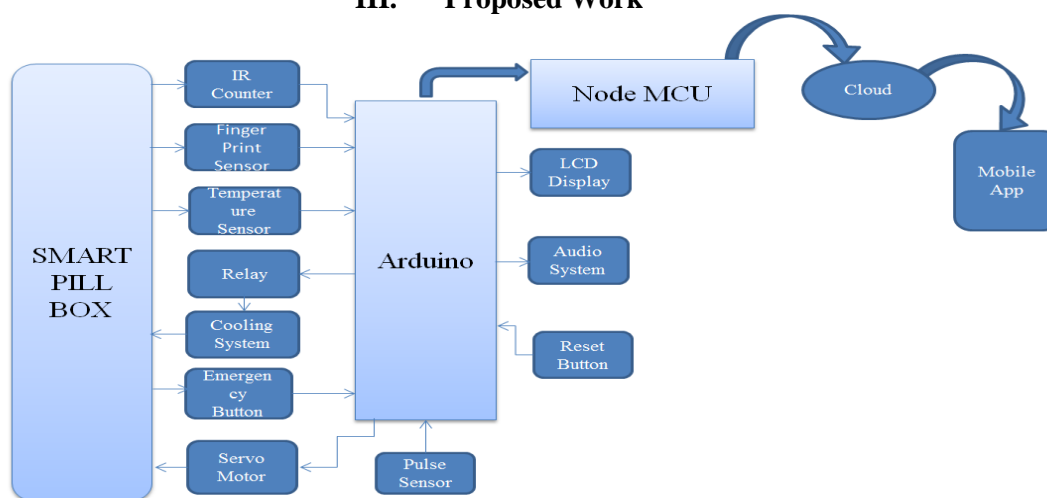
III.   Proposed Work

Fig 1: Block Diagram of System

Methodology

Our propose system consist of mainly smart pill box, Arduino, Node MCU, mobile app. the smart pill box consist of four section for the four different medicine. The system consist of mobile app which is monitor through family member of a patient or any take care person. through which we send the data (time, medicine name) to cloud for which we have internet connection to that device . cloud send the data to finger print sensor through arduino at the Same time Audio system is play and display on the LCD that "Take a Medicine". Then finger print sensor authenticate the finger of that authenticate person and send signal to the servo motor which is help to open smart pill box. This servo motor rotates the cap of smart pill box on right side and we set its position on 90° for closed and 180° for open.If patient taken a medicine then IR sensor cut and decrement the

counter by one then send the data to the arduino, arduino send it to NODE MCU then it send to mobile app through cloud and notification is send to the mobile app. If patient not taken a medicine after some time again Audio system play, display on the LCD and notification is send to the mobile app. After some period if smart pill box is empty then it send notification on mobile app through cloud that medicine is not available please refill the smart pill box. After refill it again it set the counter and detect the medicine.The system consist of more interesting feature that is temperature sensor, temperature sensor continuously sense the temperature of smart pill box if it exceed the certain limit then it send the signal to arduino and then cooling system is on. pulse sensor is connected to the arduino and send the data to the LCD . It consist of one more feature there is emergency button which is connected to the arduino in emergency situation it is pressed by patient and notification is send to the mobile app.

Past Trends
- An assistive devices, smart pill boxes (SPB) such as Tricella, Pilldrill, Medfoliopillbox, E-Pill- multiplus, and E-Pill-Medsmartplus, which allow family members of the elderly to monitor whether medication has been taken or not to ensure effective health maintenance.
- Some of the smart pill boxes are just reminding or monitoring devices without any interaction between the elder person and his/her family.
- In some of the smart pill box we set the time like morning, afternoon , evening, bedtime But not as per over 24 hr clock.
- The medication information will be transmitted to the internet (then to the webpage) via WiFi.

Present Status
To ensure the people consume medicines as per schedule time table, here we are going to develop a smart-pill box. In this system we are developing following parameter.
- The schedule data/configuration data is send to the pill box through Mobile app.
- The smart pill box contains Node MCU, LCD display, LEDs, audio system, buttons temperature sensor, cooling system, fingerprint sensor, pulse sensor.
- The LCD areuse for display the commands in pill box by Node MCU.
- Node MCU is inbuilt with Wi-Fi module. IOT technology is use to send The configuration data to the smart pillbox when the configuration is in ON mode. The concerned LED glow with audio system at schedule time.
- The configuration data from Mobile App is send to the EEPROM with an IP address and to cloud platform. The configuration data checks with the automated time and matching data will respond to the glow of LED and audio system.
- By resetting the button the tablet details are uploaded to the cloud platform and excel sheet is provided to know the consumption detailed number of tablets consumed by a person. If the person or elderly people doesn't reset button at schedule time the alert/SMS is send to the user.
- when the person is feeling uneasy or in case of some emergency he can notify the people by pressing the button on the device. There are different buttons, one is used to notify the doctor and the other one is used to notify family members about the emergency.
- Most of the medicine which store at temperature not exceeding 25°C, to store medicine in below 25°C temperature system consist of temperature sensor to sense the temperature if it exceed a certain level then cooling system is on and maintain the temperature.
- system consisting of pulse sensor to count the pulse rate of patient and send data to the mobile app.
- It comes with one more feature that most of medicine box precaution is 'keep out of reach of children' for that we are using finger print scanners to authenticate the person to 100% so that only the person authenticated uses the medicine box and the prescribed medicines.

The main objectives of the project are
Dispense of medicines from pill box at scheduled time

- Medical alerts to care taker
- Online report generation of medicine
- Real-time health statistics monitoring of medicines
- Configuration data is send through mobile app.
- Temperature sensor to maintain temperature
- Fingerprint sensor for security
- Pulse sensor to count pulse rate

Hardware used
- Node MCU
- Arduino
- Audio system
- Pill box
- IR sensor
- Temperature sensor
- Pulse rate sensor
- Finger print sensor
- Cooling system
- LCD
- Stepper motor

Software used
- Arduino IDE

IV. Conclusion And Future Scope

This system assures the safety of the people and also prevents the wrong dosages. It reduces the effort in remembering medicine and people will get the schedule of the medicine containing medicine name timing and give the information if person is emergency as well as maintain pills in required temperature so it cannot reduce efficacy or pill and keep out of reach of children.It also ensures the use of medicines by the right person, the rate of illegal use of prescribed drugs also decreases. Insurance companies will surely benefit from the SPB since it will help their costumers to live in a healthier lifestyle away from life threating accidents caused by forgetting to take their medicines on time or with the right dosage, and in case of skipped pill. Finally, the user interface which is the same on all the devices including the machine is intuitive, clear and easy to use, even for elderly patients. With the help of this system there is no need of continuously monitored the patient so in absences of care taker or family member the patient can take pill. The design allows the user to add more containers or more pills per serving.There are several aspects we need to work on our device in the future. we can add pill popper to remove pills from pill wrapper for pills which wrapped with pills wrappers. These feature addition then will completely standout the demerits of this system.

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