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Intelligent Medical Pill Box Assistant for Patients

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ABSTRACT: Many medical complications occur due to person taking care of the patient or the elder people's medication need to sort huge amount of medicines everyday. This system is creation of pillbox prototype to sort out the medicines by itself. And also with it's other advanced features, this device can be intended to be used by hospitals or retirement homes. This medical pill box is mainly focused on patients taking medications frequently or for the attendants taking care of the patients who deal with more patients. The smart pillbox enables caretakers or clients to determine the medicine amount and the time to take the pills for everyday. The smart pill box also contain sub-boxes to set data data for distinct pills. At the point when the time to take pill has been set, The pill box will reminds patients to take medicines using sound and light. Conventional pillbox usually requires attendants to take care of the patients everyday consistently. The Intelligent pillbox would discharge the attendants' weight on much of time preloading pills for patients and overlook measurements must be taken. Intelligent pill box also avoids untimed medicine administration which can show adverse effect on patient's health. The developed system is designed mainly to help patients to take required medicines at right time in appropriate proportion.

I. INTRODUCTION

Diseases are increasing in large amount. Some are temporary diseases whereas many are life threatening permanent diseases. In such situations one need to be in advice of Doctor who tells to take desired pills in desired way. There may be need to take large amount of medicines regularly to overcome disease or to live a better life. So, the patients may face problems like forgetting to take pills at right time and also when Doctor changes prescription of medicines ,patients need to remember the new medicine schedule.The problem of forgetting to take medications at right time or taking wrong medicines or taking expired medicines causes adverse effect on health of the patients. The new awaited feature in this medicine box is our system is sensible that the patient has taken medicine or not and thus patients cannot postpone the time in which they need to take medicine. It is also necessary to take pills from right box in right time otherwise the systemcontinues to make sound until the pill is taken from right box. This notification feature adds years to patient's life which is not available in any other device. In order to make useful smart pill box few things had to considered. It had to be integrated easily with recent smart technologies, it had to fit for elders and their limited knowledge to implement and experience the ease of use and size and portability must also be considered for the ease of use by everyone.Along with aging comes poor eye sight and poor memory which also becomes the reason for the patients forgetting to have medicines at right time. In order to eliminate these complications smart pillbox can be used which is easy, portable and efficient solution that is needed to avoid the existing complications.

II. LITERATURE SURVEY

1. Prediction models for a smart home based health care system
Jakkula V.R, Cook D, Jain G

A prediction model in an intelligent smart home system can be used for identifying health trends over time and enable prediction of future trends which can aid in providing preventive measures. The goal of this experiment is to evaluate a series-based forecasting model which would be a part of smart healthcare systems in smart homes. The expectations from this experiment are better predictive accuracy with a limited data from the smart healthcare system using time series data. These predictions would enable the caregivers and patients to prepare for possible critical situations before they actually occur. The basic idea behind self-projecting time series forecasting models is to find a mathematical formula that will approximately generate the historical patterns in a time series. A time series is a historical record of

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some activity, with measurements taken at equally-spaced intervals with a consistency in the activity and the method of measurement. Box-Jenkins forecasting models are based on statistical concepts and principles and are able to model a wide spectrum of time series behaviors. This system will only operated by offline.

2. Measurements of sit-to-stand timing and symmetry from bed pressure sensors Veledar,A.Arcelus, R. Goubran, F. Knoefel

Measuring and analyzing the sit-to-stand movement performed by an individual when rising from their bed can be used to document health and mobility. This work investigates measuring sit-to-stand timing from young healthy subjects using non-invasive pressure sensitive array technology. First, it describes the pressure sensitive array, the experiment setup and data collection process. Next, three methods for measuring sit-to-stand timing are examined. These include a method based on the combination of bed and foot pressure, an image-based method and a pressure signal-based method. Challenges, limitations and results are shown for each using data collected from 10 young healthy subjects. The pressure signal-based method measures the sit-to-stand time more effectively when comparing to video data. The further development of this method is then presented; this includes analyzing the pressure signal to detect phases that make up the sit-to-stand movement and a sample result for one young healthy subject is presented.

3.An ambient agent model for monitoring and analyzing dynamics of complex human behavior - Bosse Treur Jan

In ambient intelligent systems, monitoring of a human could consist of more complex tasks than merely identifying whether a certain value of a sensor is above a certain threshold. Instead, such tasks may involve monitoring of complex dynamic interactions between human and environment. In order to enable such more complex types of monitoring, this paper presents a generic agent-based framework. The framework consists of support on various levels of system design, namely: (1) the top level, including the interaction between agents, (2) the agent level, providing support on the design of individual agents,(3) the level of monitoring complex dynamic behavior , allowing the specification of the aforementioned complex monitoring properties within the agents. The approach is exemplified by a large case study concerning the assessment of driving behavior , and is applied to two smaller cases as well (concerning fall detection of elderly, and assistance of naval operations, respectively), which are briefly described. These case studies have illustrated that the presented framework enables developers within ambient intelligence to build systems with more expressiveness regarding their monitoring focus.Moreover, they have shown that the framework is easy to use and applicable in a wide variety of domains.Using this system we will trace the patient living pattern by it leads to build wrong pattern. System is needed lead a patients activity.

4.An Interactive Pill Box using IoT - Harshitha V, Sandeep K, Swasthika Jain T J

As the population on the earth is growing, the long-ranging planning of health and medical facilities are affected. Especially with old-aged people, health issues are more compared with other aged people. The medication given by the doctors to old age people to those health issues is not rememberable. People need to take the pills with a specified dose at a recommended time and frequency especially in case of diabetes and high blood pressure. To overcome the problem an IoT device is designed to remember about their medication time to the old people and their caretakers. The IR sensor present in the system will be continuously monitoring whether medicines has been taken properly by the patient or not. By using the GSM, the caretakers have been notified to their smart phones and watches. So, we design a pillbox which acts as a safety net for patients.

5.A Smart Medicine manager delivering health care to the networked home and beyond -Martín López-Nores, José J. Pazos

Misuse of prescription and over-the-counter drugs is a growing problem that impinges heavily on the wellbeingof people and the economics of public health systems. Most commonly, misuses arise from forgetfulness or lack of information about drugs and their interactions, hence there is much place for solutions to automatically monitor medicine intake, issue reminders and deliver medical advice. This paper presents a system that accomplishes these tasks by harnessing recent advances in smart medicine packaging, residential networks and semantic reasoning. Such a combination yields a medicine manager featuring great precision in drug monitoring, plus unprecedented capabilities to reach the users and provide them with valuable information.

6. An IoT based Intelligent Medicine Box -P. Raga Lavima

A modern health care and in addition to this intelligent home monitoring, controlling embedded system capable of taking care of the patients from all aspects,covering personalized medication, vital signs monitoring. The project gives an experimental idea of patient's health condition and monitor environmental conditions and controlling. The platform involves an openplatform-based intelligent medicine box with enhanced connectivity and interchange ability for the

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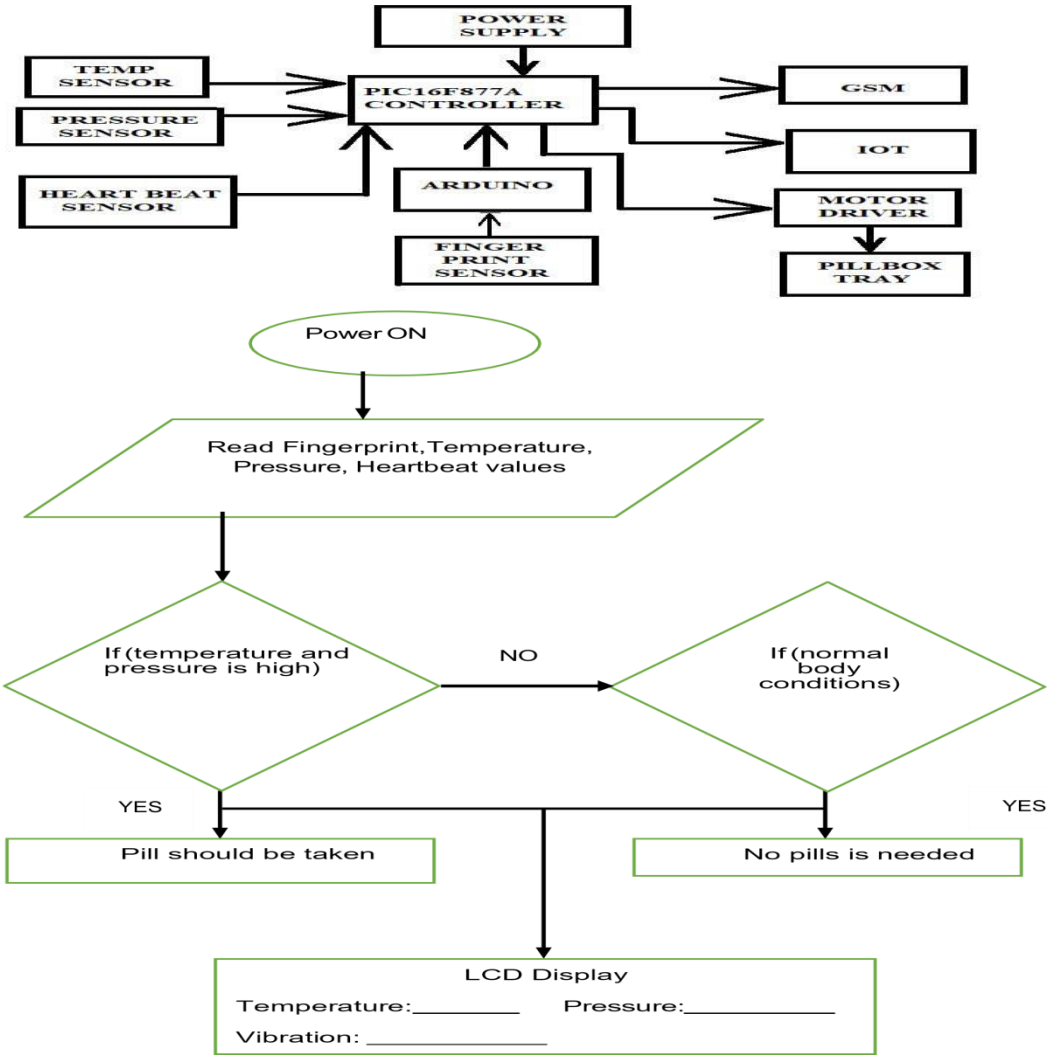
integration of devices and services, Intelligent pharmaceutical packing with communication capability enabled by Zigbee and actuation capability enabled by functional materials and, flexible and wearable bio-medical sensor device enabled. The proposed platform devices with inhome healthcare services for improved user experience and service efficiency. The feasibility of the implemented Health platform has been proven in field 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

III. METHODOLGY

Forgetting to take medicines on time amidst our busy schedule is a common problem. Mainly aged people get affected by this issue which may cause adverse impact in their health. So this developed system reminds patients at the appropriate time to take medicines. This also reduces the responsibility of family members or attendants taking care of the patients as there is no need for them to consciously check or remind the patients at appropriate time to take medicines, since it will be done by the pillbox itself. In this system user first will register their fingerprint and add their medicine timing. The purpose of finger print is to help multiple patients to use same system. It also contains sub-pillboxes which can be used by other patients or can be used by same patient for alternate medicine. If the fingerprint matches , only pillbox of that particular patient opens. This system also checks health parameters and if there is any abnormality in health condition pillbox containing alternate medicine of that particular patient opens.

BLOCK DIAGRAM:



Proposed system Flowchart

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The flowchart as shown in describes the software implementation of the proposed system. In order to reduce the responsibility of family members of dividing the medications in the pill box, we assume that the medicine the patients need to take at particular times has been packed into the pill box. In this system we register 2 members finger in sensor. Based upon the patients we have to set the pill time for required medicine by using input system. We can set the different time for different pills. If the more than one pill is required at a time, give the box nos. to the system to get required pills. We also set the no. of pills we are inserting in the system.The real-time clock gives continuous time as an output. Monitor the time continuously using a Real-time clock to identify the pill time. If the system time matches with pill time, the system shows that that it is time to take a pill.

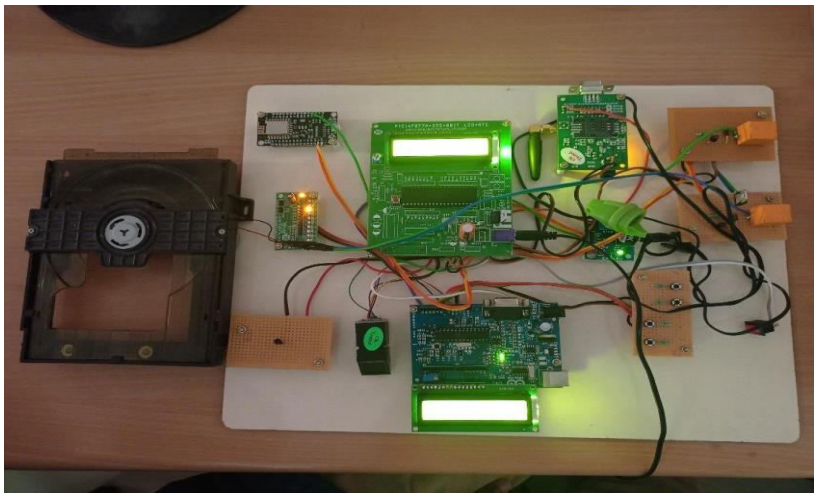
WORKING PRINCIPLE

The patients using the pillbox need to register their fingerprints and set the time for taking medicine. Fingerprint sensor is used to register patient's finger print . The real-time clock gives continuous time as output. So monitoring time continuously using real-time clock helps to identify the pill-time registered by patients and reminds them at that particular time. Temperature sensor (LM35) is used to monitor body temperature of the patient. Similarly pressure sensor and heartbeat sensor monitors blood pressure and heartbeat of the patient respectively. If there is any abnormality in the parameters then through GSM module the patient's family members will get notified. And also if there is any alternate medicines should be taken at such instances ,then the pillbox containing alternate pill opens. Each and everytime when the patient's health parameters are sensed by the sensors, the information gets updated updated in IoT website which can be used by the doctors for future references to know the patient's health condition better.

IV. RESULT

Many individuals with memory/cognitive issues and physical disabilities are required to take a complex daily schedule of medications. The goal of this project is to help elderly or disable patients be able to take their medication in an efficient and timely manner. In addition with this system, our proposed method will monitor the health parameters and patient body movement.The smart pillbox with remind and consumption function which is used to give alert the user to take pills at a particular time and the pills required to take at that time comes out to the user to avoid confusion among medicines. Smart pill box can reduce elderly family member's responsibility towards giving the correct and timely consumption of medicines. The heart beat, blood pressure and temperature of patient is sensed by respective sensors.Whenever the heartbeat, temperature or blood pressure is not normal the alternate pillbox opens in which the medicine to be taken during abnormal health condition will be available.The message will also be sent to the GSM when patient's health condition is abnormal.

Connection:



Experimental setup

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LED output for normal condition

LED output for abnormal condition

V. CONCLUSION

"The Intelligent Pill Box" thus helps to remind elder patient to take medicines at appropriate time.The temperature sensor, pressure sensor and heart beat sensor also updates the data of the patient in IoT(ThingSpeak) and when the patient's blood pressure, temperature or heartbeat is abnormal,then the message is sent to GSM and the pillbox opens to take the alternate pills which is to be taken during abnormal health condition of the patient. Thus this project will be useful to monitor the health of an elder patient.

FUTURE WORK

This project can be developed to monitor the health of the patients using IoT and when abnormality occurs message can be sent to nearby health center ,so that health of the patients can be monitored by health center and avoids the situation of unnoticing the messages by family members during their busy schedule.

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