Ideation Phase
Literature Survey

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Project Name	Personal Assistance for Seniors Who Are Self-Reliant

LITERATURE SURVEY

PAPER 1: A Smart Pill Box with Remind and Consumption Confirmation Functions

PUBLICATION: **2015 IEEE 4th Global Conference on Consumer Electronics (Huai-Kuei Wu1, Chi-Ming Wong, Pang-Hsing Liu1, Sheng-Po Peng1, Xun-Cong Wang1, Chih-Hi Lin1 and Kuan-Hui Tu1)**

This paper proposes a smart pill box equipped with a camera and based on the medicine bag concept. The matrix bar code printed on the medicine bag is used to interact with the pill box in order to perform pill remind and confirm functions. The pill box will use the information contained in the matrix bar code of medicine bag to ensure the correctness of the medicine bag, thus ensuring that the patient takes the right medicine appropriately. If the patient does not take the medicine, the pill box will remind the patient later, and the remind period can be set using the user interface on the pill box. Furthermore, if the patient picks the incorrect medicine bag, the pill box will alert the patient to pick the right medicine. The proposed pill box can reduce family member's responsibility towards ensuring the correct and timely consumption of medicines. Because the proposed pill box is based on the medicine bag concept and the matrix bar code printed on the medicine bag simplifies the operational procedure. This reminds and confirm functions work well even if internet service is not available, thus reducing implementation costs.

PAPER 2: Smart Medicine Box System
PUBLICATION: IEEE International Multidisciplinary Conference on Engineering Technology(Hiba Zeidan, Khalil Karam, Roy Abi Zeid Daou, Ali Hayek, Josef Bolercsoek)
YEAR: 2018

This paper presented a safety-related and low cost medicine box that can assist and monitor patients concerning the accurate intake of their medication. Two main functionalities characterize this system: safety which assures the wellbeing of the patient and the good functioning of the system by duplicating the electrical components and the security that helps keeping the medication out of the reach of the children by automatically looking the medical box whenever the patient takes his pills. This system is able to detect the faulty dose of pills taken, the missed medications and the unavailability of pills in the medical box. time. Alarms are being generated with medication box and via a mobile application that can be installed on the patient relative's phones in order to help monitoring him. Although this system was well operating, several adjustments can be made in order to increase its use and ameliorate its behaviour. A major drawback of this system is that it can contain only one type of medication.

PAPER 3: Design of Docker-Based Cloud Platform for Smart Medicine Box
PUBLICATION: International Conference on intelligent Green Building and Smart Grid (Benbin Chen, Kun Zhou)
YEAR: 2019

This paper uses Docker technology to design a cloud platform. Through the Docker container technology, the cloud platform device registration, database storage and back-end programs are implemented in the form of micro-services, which effectively improves the platform's own expansion capabilities. Experimental tests show that the platform can effectively monitory smart medicine boxes and have certain development capabilities. with the framework of microservices, the entire management business is split into multiple applications and the images of the applications are built by Docker file. Finally, the applications are combined into a complete cloud platform service through the Docker-Compose. The results show that the cloud platform application has certain expansion, low program coupling and perfect network communication, which provides a better solution for the construction of cloud platform for smart medicine box.

PAPER 4: Internet of Things (IoT) Based Smart Health Care Medical Box for Elderly People
PUBLICATION: International Conference for Emerging Technology (Obaidulla-Al-Mahmud1, Md. Kausar Khan, Rajdeep Roy, and Fakir Mashuque Alamgir)
YEAR: 2020

A smart IoT based healthcare system has been proposed here, which contains an intelligence medicine box associated with sensors and server for regular health monitoring. This smart medicine box with wireless internet connectivity helps the patients to get regular health care and create easy communication between doctor and patient without meeting physically. The proposed medicine box helps the patient to take the right medicine at the right time along with an email which will help the patient to take the medicine. A laptop is used as a server where detailed information about doctor and patient are stored along with prescription and appointment date. Both doctor and patient have IDs' and password for accessing the server. Also, the data of medication and temperature of patient are stored on the server for doctor's ease. The Doctor can change the patient's prescription, if necessary, which will also be notified via email. Moreover, the doctor can take immediate steps in case of an emergency. The objective of his project is focusing on proper medication of a patient. Older people who need regular monitoring of their medication will be benefited through this project. Server for storing medication time and other information, mail transferring protocol, temperature sensor for proper monitoring of patient body temperature has been integrated in this project.

PAPER 5: Enhancing Healthcare using m-Care Box (Monitoring Non-Compliance of Medication)
PUBLICATION: International Conference for Innovative Mechanisms for Industry Applications (Aakash Bharadwaj, Divyank Yarravarapu, Sadiparala Charan Kumar Reddy, Thirumalaraju Prudhvi, KSP Sandeep, Obulam Siva Dheeraj Reddy)
YEAR: 2017

The proposed model of smart medical box is a single board computer based assistive device for people who suffer with short term memory loss. It is an alarm-based device that helps in reminding patients about their medication. The use of Internet of Things (IoT) concepts and health sensing technologies make diagnosis easier and convenient for the doctors as well as the patients. This paper presents an overview of an assistive device for monitoring non-compliance of medication by providing a single platform and a closed loop connection between patients, doctors, and pharmacies. This work gives insight into mechanical design, system architecture and design of android application, information security and integrating the physical system to cloud. The architecture used is a secure one as it uses end-to-end encryption for sending sensor data. This device helps in maintaining one-time medication to the patients and helps increasing the life expectancy.

PAPER 6: The Design of a Smart Medicine Box
PUBLICATION: 26th Iranian Conference on Electrical Engineering (R Al-Shammary, D. Mousa, S.E. Esmaeili)
YEAR: 2018

In this paper, the design of a smart medicine box has been introduced. The SMB contains separate compartments that can be programmed for different user's needs. SMB helps the user or caregiver by specifying the required pill quantity, the exact time to take the pill each day, and the need to refill some pills. An application has been developed to support different categories of users such as patients who have either chronic diseases, old people who have scheduled medications, or nurses who take care of those patients. A database is used to store the information of each compartment. The following are the main fields stored in database table; pill name, expiry date, number of pills to be taken per day, time of dose, and the total number of Pills. The database is hosted using PHP apache server. A SMS message notification and emails are used to inform both the patient and the care taker with the time to take a certain pill. It will alarm the user by sending the message "It's time to take your medicine".