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Medical Dispensary Organizer

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***Abstract*: The project medical dispensary organizer system provide hospitals with medication management system that keeps inventory secure and organized .the chemist will be able to find the medicine tablets in an automated format and deliver medicine without any error, and when a doctor will prescribe to a certain tablet the chemist will be able to get it easily from the dedicated drawers. Automated medication distribution system provide computer-controlled storage, dispensing, and tracking of medications which is one of the potential mechanism to improve efficiency and patient safety.**

***Keywords*: Python, Raspberry Pi.**

1. Introduction

In this project medical dispensary system is a medication management systems that allows hospitals to store and dispense drugs. Our project aims to add in security of patients by bringing in a medical dispensary system for hospitals which involves automated dispensing cabinets which can potentially handle hundreds of different medication. Wrong drugs sometimes led to wrong dose. These errors mainly occur due to improper hand writing of doctors, so for solving this problem we have design our system. The prescription required for patients will be directly transferred to the chemist using wi-fi technology, and then with the help of controller the drawers containing the prescribed medicine will pop out and get highlighted thus improving the accuracy.

2. Objectives

The project medical dispensary system provide hospitals with medication management system that keeps inventory secure and organized. The chemist will be able to find the medicine tablets in an automated format and deliver medicine without any error, and when a doctor will prescribe to a certain tablet the chemist will be able to get it easily from the dedicated drawers. Automated medication distribution system provide computer-controlled storage, dispensing, and tracking of medications which is one of the potential mechanism to improve efficiency and patient safety.

- Secure and organized: The project Medical dispensary system provide hospitals with medication management system that keeps inventory secure and organized.
- To minimize workload and increasing accuracy :
- The chemist will be able to find the medicine tablets in an automated format and deliver medicine without any error, and when a doctor will prescribe to a certain tablet the chemist will be able to get it easily from the dedicated drawers.
- Improve efficiency and patient safety. : Automated medication distribution system provide computer-controlled storage, dispensing, and tracking of medications which is one of the potential mechanism to improve efficiency and patient safety.

3. Literature Survey

1. Tsai, Pei-Hsuan & Chen, Tsung-Yen & Yu, Chi-Ren & Shih, Chi Sheng & W. S. Liu, Jane. (2011).”Smart Medication Dispenser”: Design, Architecture and Implementation. Systems Journal, IEEE. 5. 99 - 110. 10.1109/JSYST.2010.2070970.This paper presents the architecture and implementation of an automatic medication dispenser for users who take medications without close professional supervision. By relieving the user from the error- prone tasks of interpreting medication directions and administrating medications accordingly, the device can improve the rigor in compliance and prevent serious medication errors. By taking advantage of scheduling flexibility provided by medication directions, the device makes the user’s medication schedule easy to adhere and tolerant to tardiness whenever possible. The medication scheduler and dispenser controller do this work collaboratively in an action-oriented manner. An advantage of this design is that new functions can be added and existing ones removed or revised with little or no need to modify the dispenser control structure. [1]
2. H. K. Wu, C. M. Wong, P. H. Liu, S. P. Peng, X. C. Wang, C. H. Lin,and K. H. Tu, “A Smart Pill Box with Remind and Consumption Confirmation Functions,” Conf. Proc. IEEE Consumer Electronics, pp. 658-659, 2015. Population aging is a global issue that affects many developing countries such as Taiwan. The natural decline in physical function with aging leads to an increase in incidences of various chronic diseases in elderly individuals; most patients with chronic diseases need to take medications over a prolonged period of time in order to stabilize their conditions. Ensuring that the patients consume the right medication at the appropriate time

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becomes crucial. 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 bags is used to interact with the pill box in order to perform pill remind and confirm functions [2].

3. N. B. Othman, O. P. Ek, "Pill dispenser with alarm via smart phone notification", 2016 IEEE 5th Global Conference on Consumer Electronics, pp. 1-2, 2016. Medication misuse among the elderly has become a big issue in healthcare industry. Especially for those who have been prescribed several different medications at once, and for a prolonged duration of time, they tend to forget to take their medicine on time, or they easily taking wrong medicine on same time. Hence, we propose a pill dispenser with alarm system to help them taking right medication at the appropriate time. Combination of infrared sensor and Arduino microcontroller control the medication dose. Alarm system is implemented via popup notification on the user's smart phone [3].
4. Y. Zhang and H. Xiao, "Bluetooth-Based Sensor Network for remotely monitoring the Physiological Signals of patient, "in IEEE Trans. On Information Technology in Biomedicine, vol.13, no.6, pp.1048, November 2009: This paper conclude that creating a logger with indicators for people to better store and find components. It also consist of mechanical designs to push the drawers out from the back. People could use an App on their Android phones to connect to the organizer to find components, log new components, clear drawers and open the drawers by sending commands to the organizer using their App.[4]

4. Methodology

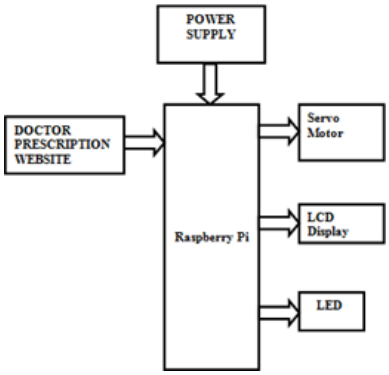

Fig. 1. Block diagram

In the above Block diagram, webpage is connected with the Raspberry Pi USB port, then the Raspberry Pi which is interfaced with 3 sevo motors through the Driver IC (L293D). Based on the website data, the signal is sent to Raspberry Pi to operate the Cabinates. The monitor is connected as local host, using remote desktop. The processing unit (computer) handles multiple tasks: receiving data from Raspberry Pi, and sending instructions to the Raspberry Pi through a Wi-Fi connection. In this project only focused on the automatic operation of the cabinates. The prescription required for patients will be directly transferred to the chemist using wifi technology, and then with the help of controller the drawers containing the prescribed medicine will pop out and get highlighted thus improving the accuracy. In our project prototype we are able to transfer the prescription required for the patients directly to the chemist with the help of wi-fi technology and thus highlight the location of the prescribed medicines and hence reducing pharmacies workload and increasing accuracy.

5. Component Description

A. Hardware Configuration

1) Raspberry pi

The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi 3 range, boasting an updated 64-bit quad core processor running at 1.4GHz with built-in metal heatsink, dual-band 2.4 GHz and 5GHz wireless LAN, faster (300 mbps) Ethernet, and PoE capability via a separate PoE HAT. . It has 1.2 Ghz quad core ARM cortex A53 and RAM 1 GB. It required power upto to 5V, 2.5 amp which is negligible with respect to PC.

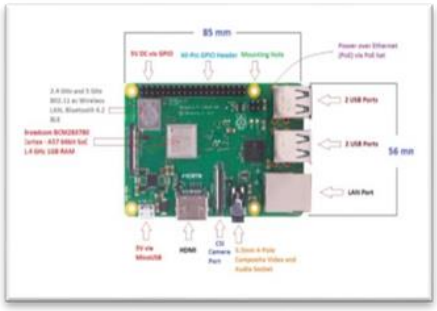

Fig. 2. Raspberry Pi 3B+ Board

2) Motor SG90 (150RPM to 300RPM)

A servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration [1]. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors. Servomotors are not a specific class of motor, although the term servomotor is often used to refer to a motor suitable for use in a closed-loop control system. Servomotors are used in applications such as robotics, CNC machinery or automated manufacturing. This can be used in all-terrain robots and variety of robotic applications. These motor is simple to connect it to the wheels or any other mechanical assembly.

Fig. 3. Servo motor

3) LED

Light emitting diodes are basically tiny light bulbs that fit

easily into an electrical circuit. They can be found in dozens of applications including digital clocks, remote controls, and traffic lights. Unlike ordinary incandescent light bulbs, leds do not have a filament that will burn out, so they have a much longer lifetime. Leds are illuminated by the movement of electrons in a semiconductor material. The composition of the semiconductor affects the wavelength (color) and intensity of the emitted light. Leds also generate much less heat and a larger percentage of the electrical current is directed toward generating light, which reduces electrical power use.

B. Software Description

1. *PHP*: PHP is a preprocessor hypertext, server-side language. A server-side language means that all of the processing is done on the server rather than inside of the browser. The server processes the Web page before it is displayed to the user. PHP code can be embedded inside of a regular HTML document or used as a stand- alone file. Both instances require the server to have one of the latest PHP platforms installed.
2. *HTML*: Hypertext Markup Language (HTML) is the standard markup language for documents designed to be displayed in a web browser.
3. *JavaScript:* JavaScript resembles more traditional computer programming languages but allows Internet users to perform certain actions on a website and interact with the content. The scripting language uses function calls and supports object-oriented elements. It can be used outside of the Web, for example, in PDF documents. This language should not be confused with the similar sounding language, Java compared with other languages like C, C++or java.
4. *Raspbian OS:* Of all the operating systems Arch, Raspbian available for Raspberry Pi, Raspbian comes out on top as being the most user-friendly, best range of default software's and optimized for the Ras Pi hardware. Raspbian is a free operating system based on Debian (LINUX), which is available Raspberry Pi website.
5. *Python:* Python is a widely used general programming language. Its syntax allows the programmers to express concepts in fewer lines of code when compared with other languages like C, C++or java.

6. Results

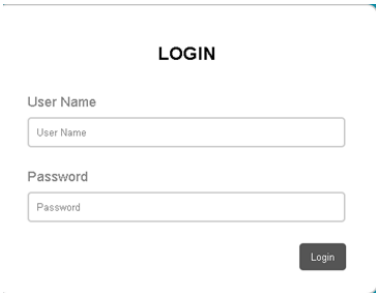

Fig. 4. Login page

This picture a login page is developed to ensure the safety .if user enter correct user name and password then and then only he can access the system.

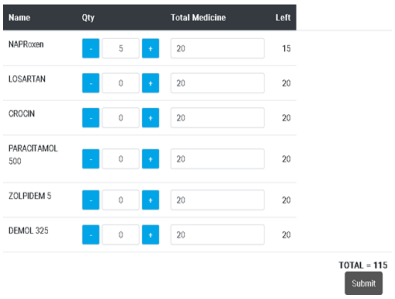

Fig. 5. Web interface

This picture a website interface by which the user gives command to the Raspberry Pi for further operation. When user select the medicine then the information is given to the Raspberry Pi .then Raspberry Pi gives command to the respective Servo Motor where the medicine is stored and that cabinate automatically get open and LED blinks.

7. Conclusion

We aims that creating a logger with indicators for people to better store and find medicines. It would also consist of mechanical designs to push the drawers out from the back. People could use an App on their Android phones to connect to the organizer by sending commands to the organizer using their webpage.

8. Future Work

It is recommended to add more designs of the medicine container so that all sizes and shapes of medicine capsules or tablets and also liquid can be dispensed. The medicament cabinet according to the invention comprises an electronically controlled storage device for identifying medicaments supplied to the medicament cabinet and for automatically storing the identified medicaments in the medicament cabinet, wherein the storage device interacts with a storage means of the medicament cabinet such that storage information concerning the quantity and the identification during storage of medicaments .We could further reduce both time and medication errors if the ADS was interfaced with our computerized order physician entry &ADS is improved communication between nurses and pharmaceutical staff.

References

[1] Tsai, Pei-Hsuan, Chen, Tsung-Yen Yu, Chi-Ren Shih, Chi Sheng and W. S. Liu, Jane. (2011). Smart Medication Dispenser: Design, Architecture and Implementation. Systems Journal, IEEE. vol. 5. pp. 99 - 110, 2011.

[2] H. K. Wu, C. M. Wong, P. H. Liu, S. P. Peng, X. C. Wang, C. H. Lin,and K. H. Tu, "A Smart Pill Box with Remind and Consumption Confirmation Functions," Conf. Proc. IEEE Consumer Electronics, pp. 658-659, 2015.

[3] N. B. Othman, O. P. Ek, "Pill dispenser with alarm via smart phone notification", 2016 IEEE 5th Global Conference on Consumer Electronics, pp. 1-2, 2016.

[4] Y. Zhang and H. Xiao, "Bluetooth-Based Sensor Network for remotely monitoring the Physiological Signals of patient, "in IEEE Trans. On Information Technology in Biomedicine, vol.13, no.6, pp.1048, November 2009.