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Automatic Medicine Vending Machine

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Abstract: ***In Pharmacies inside hospitals we can more often see lots of people waiting in queues to get the most common medicines. This wastes their time. There is also a possibility of human Error, which may become a major problem. So, in order to overcome that we decided to automate the process of Medicine Vending which is much faster and less error prone than Human pharmacist. Before meeting the doctor, the patient is issued a RFID card. After inspecting the patient, the doctor scans the RFID of the Patient in his RFID scanner which is connected with a microcontroller. Now the RFID value is pushed to web app provided to the doctor. The web app will be where the doctor inputs the medicine count in the respective text boxes. Now the prescription will be pushed to database from the web app. When the patient scans the RFID in the Automated Medicine Vending Machine placed at the pharmacy it retrieves the medicine count from the database and vends the medicines to the patient.***

Keywords: Wending machine, Tag, Scanner, Automation.

I. INTRODUCTION

Automation is preferred in every fields. The Automatic Medicine Vending Machine is used to dispose required medicines to the patients automatically without human intervention. Installing a vending machine in the offices. Can be beneficial for companies as well as employees as the time spent for going to a doctor gets reduced. Diagnosis is always a concern of people all of over the world. The time spent for acquiring most generic medicines in today's world is very high. Herewith, the generic medicines are loaded in a vending machine and there is no need for people to stand in queue for long time. JavaScript and HTML plays a vital role in uploading the values to the database. The database used is called for firebase which helps in easy storage of values directly from the front end. The values (quantity of tablets) pushed from the front end plays a vital role in the project. The front end is validated so that the user can enter a maximum of only fifteen tablets. If the user tries to submit more tablets than specified, the form will not submit and will show a popup warning. The objective of the project is to dispense the medicine prescribed in the website by the doctor to the client who uses the RFID. The final objective of the project that is to program the Node MCU to retrieve the values from the database and to dispense the correct number of tablets only when the specific user's RFID tag is detected.

The medicine vending machine provides medical access to places that are inaccessible because of kind of factors. a number of the explanations could also be inconvenience of a 24x7 drug store close, particularly in remote areas. Also, the time spent for going for a hospital and drug store can be avoided. It requires human intervention only during the process of medicine filling and in case of any replacement of parts of the machine or during the repair of the machine.

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II. LITERATURE REVIEW

The project contains four medicines that are obtainable as tending and while not prescription. Majority of the population requires the 4 medicines frequently. They are band aids, Vicks action 500, ORS packets and paracetamol the microcontroller used for the process was 16-bit PIC microcontroller. The input provided by the user is forwarded to the Microcontroller for process. The Microcontroller, with the assistance of the motor drivers, drives the involved cabinet having the medication that the user desires. These motor drivers manage the rotation of the motor that dispenses medicines from the medicine storage box.[1] The machine has been made mistreatment low-carbon steel of sixteen gauge (1.62 mm). This material was chosen for its simple handiness and weldability. Totally 6 motors are used which are 12V DC motors of sixty revolutions per minute. Arduino Uno is used as the microcontroller. The major sensor used is RFID sensor. The drive mechanism is provided by springs and L293D motor driver.[2] Thus finally, the medicine vending machine is designed by considering the positive parameters from above two literature papers.

III. DESIGN DESCRIPTION

MEDICINE STORAGE BOX:

Medicine Storage box is used for storing the medicines. The box is made up of sheet metal. The dimensions are 500*500*500 mm. The thickness is 1. 6mm.It can hold up to 6 different types of medicines. The number of medicines a spring can hold is 50 medicines. Total storing capacity of the box is 300 medicines. The box is welded and a door is given at the bottom of the box. Powder coating is given to the box to improve the appearance.

SPRINGS:

Six springs are used totally. Springs are of 2mm thickness. Springs are made of steel. The design of the spring is done manually as per the requirements. Springs are generally used to store and release energy. Springs used in this project are used to hold the medicines without slipping.

The Distance between two consecutive coils is pitch. The pitch was carefully calculated and made so that the medicine strip is fit perfectly in the spring. The length of the spring is 120mm and pitch distance is 20mm. It is wounded in the lathe machine. To prevent the passage current in the spring it is generally insulated.one end of the spring is free to rotate and another end is attached to the dc motor. As the DC motor rotates, the spring starts rotating and the medicine which is placed on the pitch gets dispensed.
The design is made by CAD software shown in fig 1.

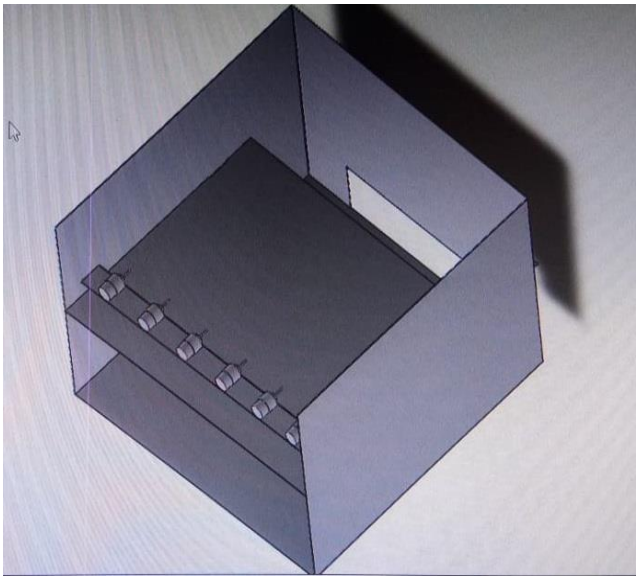

Fig.1. CAD model

IV. APPROACH

The Whole Project can be separated into two separate parts

1.Prescription Uploading:

The patient communicates the doctor about his illness. Every patient will have a unique RFID tag issued earlier. Using the unique tag number doctor will prescribe the medicines to the patients. Doctor enter the quantity of medicines on the webapp. The web app will be where the doctor inputs the medicine count in the respective text boxes. Now the prescription will be pushed to database from the webapp. The medicines prescribed by the doctor is stored in the google firebase database which is then retrieved and delivered to the patient. The block diagram is shown in fig 2

2 Medicine Vending Machine:

Medicine vending machine is made up of sheet metal of thickness 1.6mm and Medicines are stored inside the machine. The machine will have a RFID Scanner. Once the doctor prescribes the medicine, patient scans his corresponding RFID tag in the scanner. After scanning the medicine quantity is retrieved from the fire base database. The Node MCU and Arduino makes a serial communication. Arduino is Connected to 6 dc motors through 2 l293d motor drivers. When signal is received from Node MCU, Arduino sends pulses to Motor driver and it dispenses the medicine through rotating springs. The medicine drops at the bottom of the machine which is then collected by the user. The block diagram is shown in fig 3

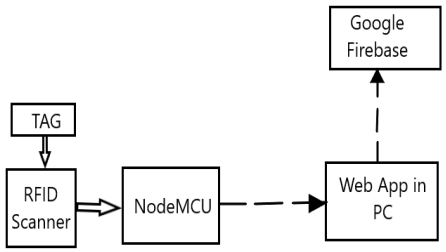

Fig.2. Prescription Uploading

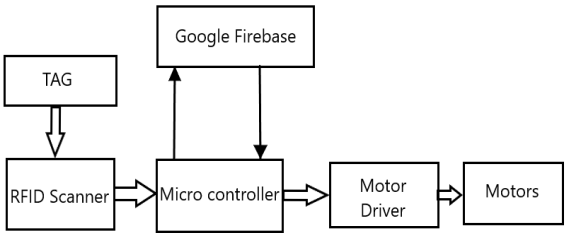

Fig.3. Medicine Vending

V. VALIDATION OF WORK WITH RESULTS

The hardware part (i.e.) the medicine vending machine storage box is designed using a CAD software. After modelling it is then fabricated with laser cutting and powder coating. Then the springs are made separately using a lathe machine and it is inserted into the machine. 12v dc motors are mounted on the separate section in machine and the shafts of the motor are connected with the springs. The overall final hardware is shown in fig 4

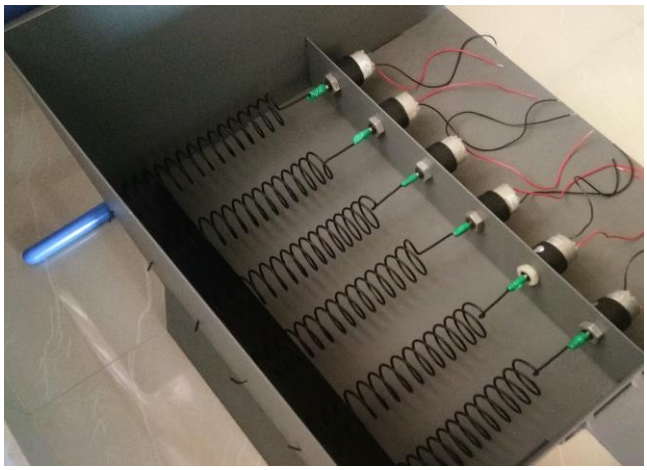

Fig.4.Hardware part with springs.

The Software part consists of two phases. They are

Designing the webapp and Arduino coding.

1. Designing the webapp:

A Web Application or Web App is Software that runs on a Web Server. Unlike traditional desktop applications, which are launched by a Web Browser. It is designed using Visual Studio Software. The doctor prescription form is made using html and CSS forms.

Five fields are provided for Prescribing five different types of medicines. The Fields are validated for so that the doctor enters the correct amount of medicine. Finally, a submit button is given at the bottom of the form. Doctor finally clicks the button after prescribing the medicines. The webapp is shown in fig 5.

Fig.5. Webapp for Doctor prescription

2.Arduino Coding

Once the doctor prescribes the medicine in the webapp. The medicine count is stored in the Google Firebase database. Then coding is done using Arduino IDE for retrieving the amount of medicines from database and based on the count the motor driver turns on the respective motors.

Final Stage of the Project is Integration of hardware and software. The Circuit Connections are made on the bread board. The 6 dc motors are connected to 3 motor shields (i.e.) 2 motors in each shield. Motor shields in turn are connected to Arduino Uno. Then Node MCU is used to retrieve the medicine count from database. It is connected with RFID reader and Arduino. So, When RFID Tag is scanned in the reader Node MCU retrieves the medicine from database and give it to Arduino. Based on the count, the motor is turned on using motor driver and finally the medicines are dispensed and patients can collect it from the machine. The circuits and the overall project are shown in fig .6

Fig.6. Project Prototype with Circuit Connections

VI. RESULTS AND DISCUSSION

Automatic Medicine Vending machine project deals with a RFID tag Operated machine that can dispense different medicine. There are different types of medicines in a machine. Once the correct tag has been detected, the machine disposes the correct amount of medicine to the user. The automatic drugs slot machine can cater the wants of the purchasers with no any human intervention needed. The machine is easy and is extremely straightforward to control. In future the project can be extended with addition of few more modules. Camera module is critical to identification process in case of previous offenders / black-listings, etc. Correctly accepting coins, currency notes, credit cards and debit cards would be vital. Rejection of incorrect & short-value transactions, faux coins / notes, etc. is important. So, cash collector and debit card reader module can be added in future. Whenever the medicine is out of stock, the person has to come and load the medicines which sometimes can be delayed. So, GSM is linked which continuously monitors the stock and when stock level decreases, a message can be sent to the corresponding authorities. So, inventory controller module can be updated. That way, replenishment is easy and the tracking too. Thus, the project can be updated in future with these above modules.

VII. CONCLUSION

As pharmacists wanting to our future, we have a tendency to should take into account quality services that hold worth to our patients and different health professionals. The people expect the medicine field to be technologically updated and free of medicinal errors. Therefore, automated product deliveries are required in the medical industry. To implement the machine, we have a tendency to interface software package and hardware elements and take a look at to create it easier in addition as compact, so that it can be carry or place anywhere. At an equivalent time, the utilization of Arduino UNO microcontroller builds the system additional versatile. There are many benefits for automatic medicine vending machine which includes availability of medicines 24*7 and no human intervention is required It is based in Arduino microcontroller and RFID tags. Therefore, the machine is less expensive. Since most of the components of this project is static, it requires less maintenance. Thus, by implementing this project time spent by the patients for going to clinics for common problems like cold, fever can be avoided. In future for effective delivery of the medicines, the machine can be updated with modules like camera and inventory control module.

REFERENCES

1. Sarika Oundhakar1, Department of Instrumentation Engineering, RAIT, Nerul, Navi Mumbai, India.," Automatic Medicine Vending Machine" Published by IJETSR,www.ijetsr.com ,ISSN 2394 – 3386 Volume 4, Issue 12, December 2017.
2. Vishal Tank,Sushmita Warrier , Nishant Jakhiya "Medicine Dispensing Machine Using Raspberry Pi and Arduino Controller" Published at Proc. IEEE Conference on Emerging Devices and Smart Systems (ICEDSS 2017) 3-4 March 2017, Mahendra Engineering College, Tamilnadu, India.

3. Shrikant Bhange, Kaveri Niphade, Tejshri Pachorkar, Akshay, "Automatic Medicine Vending Machine" , Published by IEEE computer society", Volume 4 Issue 3, Mar 2015
4. Xiaolin Jia, Quanyuan Feng, Taihua Fan, Quanshui Lei," RFID Technology and Its Applications in Internet of Things (IOT)", Published at Researchgate, April 2012.
5. Sunil Kumar, Richa Pandey," Design Of A Simple Vending Machine Using Radio Frequency Identification (RF-ID)", published in "ELK Asia Pacific Journals – Special Issue ISBN: 978-81-930411-4-7".

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Dr.B.Sabitha, has done her B.E Electronics and Instrumentation in Tamilnadu College of Engineering, Coimbatore, M.E in Power electronics and Drives in Government College of Technology, Coimbatore and completed her research in the area of MEMS. She started her carrier in karpagam college of engineering, Coimbatore in 2005 as Assistant Professor and continued her career as senior grade Assistant Professor in Kumaraguru college of Technology, Coimbatore in 2007 to till date. Her research area of interest is BIOMEMS.Micro cell counting, Microfluidic Analysis. She has published many papers in National, International, IEEE conferences and journals.

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