24 x 7 Medical Assistance with Medicine Vending Machine for Tribal & Remote Villages

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***Abstract*— A vending machine is a machine which dispenses items such as snacks, beverages, alcohol, cigarettes, lottery tickets, cologne, consumer products and even gold and gems at some places to customers automatically, after the customer inserts currency or credit into the machine. The Medicine Vending Machine as the name suggests is a vending machine that will dispense the required medicine as per the user's choice. It provides an all-encompassing solution to an individual looking for immediate symptomatic relief for trivial health problems. By relieving small symptoms at work, it can completely eliminate both presence and absence in the workplace. It can also decrease the current costs of open medicine cabinets. By having an over- the-counter vending machine in the workplace, work sites without clinics or pharmacies can benefit from increased work efficiency and avoid under performance of ill employees. Moreover, it prevents hours wasted waiting in queue sat clinics for trivial problems like cold and headaches. This situation gets especially magnified when a location is suffering from a localized epidemic or pandemic. ATM-Any Time Medicine, where the device can send out medicines. Device can fetch out the medicines automatically for the basic common symptoms for free of cost, and the medicines provided by the machine are only for the timely relief and in emergency case, where the person has to meet the doctor further. The device is designed taking under concern, such as lack of poverty and illiteracy in India. People at rural places cannot get access to medicines that are providing to them freely by the government. This work presents that people would be able to access the medicines via patient kiosks in public places such as stores, malls, bus / railway stations, on highways, areas where medical stores are limited. Regular replenishment can help in not only tracking usage pattern and thus taking precautionary measures but also ensure availability of medicine 24x7.**

I. INTRODUCTION

Several people in India die due to lack of diagnosis in first place and non-availability of medicine on time. Problem arise when need of some medicine is urgent and medicines to resare not open or medicine is not available in stock, especially during night time. In remote areas, rural areas and places where public turn over is less, the availability of medicines with in the patient's reach is a critical issue. These are some of the main problems that are being faced by the society in present scenario. ATM will help in solving these problems by providing medicines 24*7.

The first vending machine was made in 1st Century by the Hero of Alexandria (a first- century engineer and mathematician) His machine accepted a coin and then dispensed holy water Coin-operated machines that dispensed tobacco were being operated as early as 1615 in the taverns of England, The machines were portable and made of brass• An English bookseller, Richard Carlile, devised a newspaper dispensing machine for the dissemination of banned works in1822.Simeon Denham was awarded British Patent no. 706 for his stamp dispensing machine in 1867, the first fully automatic vending machine.

Now-a-days in this fast moving world, appliances which are completely automatic are preferred. The system is fully controlled by the 8 bit micro controller. Automated dispensing machines decentralized medication distribution systems that provide computer-controlled storage, dispensing, and tracking of medications have been recommended as one potential mechanism to improve efficiency and patient safety, and they are now widely used in many hospitals. There is no doubt that these machines can enhance the efficiency of medication distribution, but their capacity to reduce medication errors is controversial and depends on many factors, including how users design and implement the systems. Still, we are conduct in providing the following reasons and experiences to support our position that automated dispensing machines improve patient safety. Automated dispensing machines provide secure medication storage on patient care units, along with electronic tracking of the use of narcotics and other controlled medicines. Automated dispensing machines enhance rest-dose availability and facilitate the timely administration of medications by increasing their accessibility on patient care units. This been is particularly important in emergency departments and intensive care units, where most hospitals still use a poor stock system because of frequent dose changes and need for immediate access. The present invention relates to automatic medicine vending machine, in particular to a machine that has the capability to dynamically receive input for the user and then dispense the required type of medicine. The input, here means, the prescription by the physician to the user. The system features a machine that is capable of handling a complete range of prescription.

II. LITERATURE SURVEY

Existing problem that the society is facing is Under medicines legislation, General Sale List (GSL) medicines (i.e., those that may be purchased from ordinary retail outlets such as supermarkets) may be sold or supplied from a vending machine.

Life will become a little easier with an innovative vending machine that dispenses medicines. Users will be able to get basic Over-The-Counter (OTC) medicine at any time (24x7). Minor illnesses have a strange way of inviting people in the middle of the night when pharmacies are already closed. Over-the-counter (OTC) medicines are a class of medicines sold directly to a consumer without a prescription from a health care professional, as compared to prescription medicines, which may be sold only to consumers possessing a valid prescription. People will able to access the medicine with the help of this machine even at the night time. With this, first aid can be provided in time to the user. Medicines sold or supplied from a vending machine should satisfy the condition laid down by the Medical Council of India. Medicines which these restrictions apply are mainly aspirin and paracetamol. Products containing these substances should not exceed 16tablets in a package for sale.

Figure 2. Conventional MeidcineMedical Assistance System

A few people in India pass on because of absence of analysis in first put and non- accessibility of medicine on time. Issue emerge when need of some pharmaceutical is pressing and medication stores are not open or medication is not accessible in stock, particularly amid evening time. In remote territories, provincial zones and places where open turnover is less, the accessibility of prescriptions inside the patient's scope is a basic issue. ATM will help in taking care of these issues by giving the prescriptions 24x7[1].

Suhail Beg et al. proposed an FSM based automatic dispense machine[2] which has an expiry date feature using VHDL, in this paper the author described Finite State Machine based automatic dispense machine using Xilinx ISE 14.2. This machine accepts money as an input to dispense the products and returns back the money without dispensing the product to the customer if the product is out of date. Thus, it can be useful to ensure the good quality of the product along with quantity and cost.

Singh [3] proposed a touch screen based automated medical Vending machine and in this paper the author described medicine vending machine based on IR Standard touch technology as the input to select different medical facilities like First Aid facility, ambulance facility, and direct calling facility via GSM, dynamic GPS, smart card facility andrestockingmedicinealert.Thesoftwareusedisvisualbasicwasprogrammedsuchthat when the patient selects certain facility, it will be served to that patient. Thus it can be helpful in case of illness, small or big accidents and so can be placed any where.

Steven Woodbine, The Complete Vending Machine. Published on 18 May 2011. There are a large variety of medication administration assistance devices for non-- professional users. Most of them are manual, providing multiple compartments called pill trays. The pill tray has a number of compartments that can be filled with medication. Each compartment can hold different sizes and combination of medicines. The user is required to take the medicine from each tray eachdayforamaximumof28days.Itdoesnotprovide any alarm to indicate the time of taking the medicine.

After hearing the expression "distributing machine", some are shocked to realize that candy machines have started in antiquated Greece. The primary known vending machine was designed by the Greek mathematician and designer Hero of Alexandria around 215 BC. These first candy machines were situated in Egyptian sanctuaries and administered sacred water in return for coins. They are used for different purposes like for dispensing chocolates, beverages, snacks etc. Clients will have the capacity to get essential Over-The- Counter (OTC) solution (24x7). Minor diseases has an interesting method for welcoming individuals amidst the night when medicine stores are as of now shut [4].

Figure.2 shows the block diagram of Medicine Vending Machine. The basic theme of this paper involvesdispensingofmedicinesaspertheuser'srequirements.Asmartcardreader is used as an input sensor. The input provided by the user through the keypad is then forwarded to the Microcontroller for processing and for taking the required decisions in order to proceed forward. The Microcontroller, with the help of the motor drivers, drives the concerned medicine cabinet having the medicine that the user needs. These motor drivers control the rotation of the motor that dispenses medicines from the medicine cabinet. The motor rotates the disk attached to it, which has a cavity.

This cavity when coincides with the cavity of the medicine cabinet, the medicine falls and arrives at the outlet. Thus the medicine dispensing function is fully controlled by the motor drivers. The user can then pick up the medicine from the outlet. This is a fully automatic process as no manual support is needed. This is the biggest advantage of this paper. The other advantage would be the use of smart card instead of coins. The Degrees of social status are closely linked to health inequalities. Those with poor health tend to fall into poverty and the poor tend to have poor health. According to the World Health Organization, within countries those of lower socioeconomic strata have the worst health outcomes. Health also appears to have a strong social component linking it to education and access to information. In terms of health, poverty includes low income, low education, social exclusion and environmental decay. The poor within most countries are trapped in a cycle in which poverty breeds ill health and ill health leads to poverty.

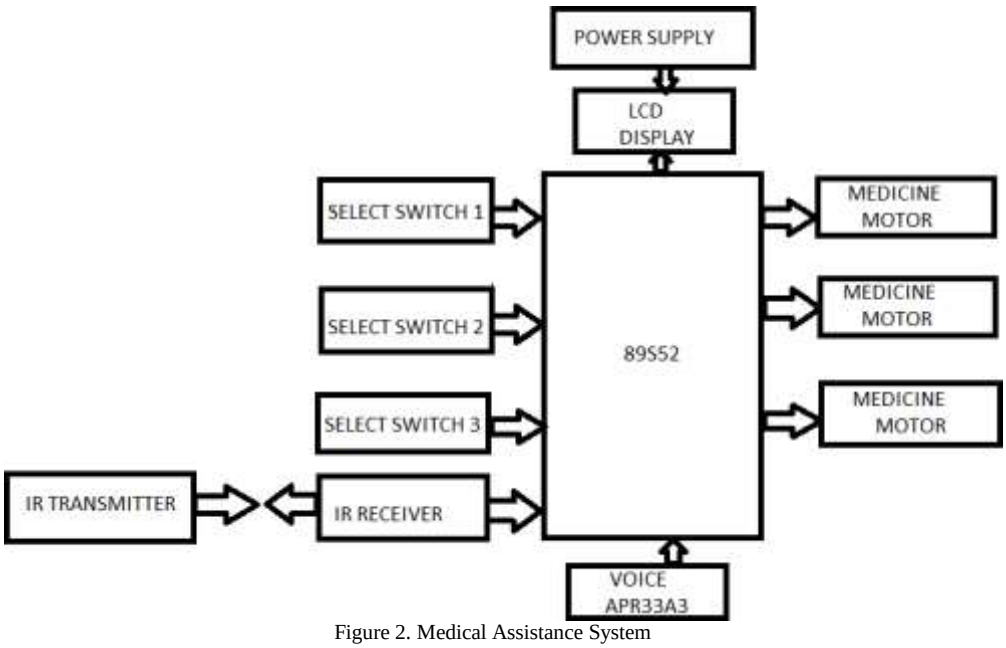

Figure 2. Medical Assistance System

This work although may not be an out of the box idea in its entirety, it still could prove useful. Especially in developing countries like India where there are innumerable numbers of people who are unable to avail medicines. In this work, the system will contain four medicines which are available as first aid and without prescription. They are Band-Aids for minor abrasions and cuts Paracetamol for reducing fever, Vicks Action 500 for common cold and ORS packets for dehydration and other problems involving loss of fluids in the body. Now-a-days in this fast moving world, appliances which are completely automatic are present. The system is fully controlled by a 16 bit PIC microcontroller. Automated dispensing machines decentralized medication distribution systems that provide computer- controlled storage, dispensing and tracking of medications have been recommended as one potential mechanism to improve efficiency and patient safety and they are now widely used in many hospitals. There is no doubt that these machines can enhance the efficiency of medication distribution, but their capacity to reduce medication errors is controversial and depends on many factors, including how users design and implement the system. Still, we are confident in supporting our position that automated dispensing machines improve patient safety.

Automated dispensing machines provide secure medication storage on patient care units, along with electronic tracking of the use of narcotics and other controlled medicines. Automatic dispensing machines enhance rest-dose availability and facilitate the timely administration of medications by increasing their accessibility on patient care units. The people would be able to access the medicines via patient kiosks in public places such as medicine stores, malls, bus / railway stations, on highways, areas where medical stores are limited. Regular replenishment can help in not only tracking usage pattern and thus taking precautionary

measures but also ensure availability of medicines 24x7. The device is designed taking under concern, such as lack of poverty and illiteracy in India.

III. CONSTRUCTION VIEW OF THE SYSTEM

This is a prototype of the real machine and the main components in the vending machine are power supply, microcontroller 89s52, switches, medicine motor, LCD display, IR sensors, voice controller. working procedure is as follows: Firstly when the power supply is switched on the LCD starts working and it gives a message as "Welcome User". Then the user need to select the switch according to his need. For example in this prototype there are 3 slots and each slot consists of 3 different tablets. If a person is suffering from fever then the user need to press the first switch and remaining as the same. When the user has selected his switch then the voice control activates and now the user will be able to hear the guidelines, that is u have selected the paracetmol tablet and the particular amount of the tablet will be heard by the user.

Figure 3. Medical Assistance System -Prototype

Now the user needs to insert the coin ,after inserting the coin the IR transmitter senses the coin and then it transmits it to the receiver. Now the receiver will send the signals to the microcontroller. The microcontroller then sends the signals to the motor drivers. After which the drivers start rotating and the tablet will be received. Lastly after the tablet is received, the LCD again displays as "Thank You Next User".

IV. METHODOLOGY & RESULT

The machine can convey for the most part Over the Counter (OTC) medicines, torment executioner, first-help items and so on. So it will be exceptionally valuable to the general public.

Medication administering procedure is done in four stages.

1. Validation of enrolled client.
2. Determination of required prescription.
3. Installment.
4. Accumulation of asked for prescription.

To start with the client needs to enroll in a specific approved focus with recommended medicines. At that point client will be furnished with RFID Tag and secret word. A mid exchange client must first swipe the card and enter the Personal Identification Number (PIN), so that exclusive approved individual can utilize the machine. Ask for the required solution ought to be made by the client by looking through the menu shown on the screen. The machine will scan for the asked for pharmaceutical in gadget. On the off chance that the medication is available in the machine then the installment must be made for the asked for/accessible amount of the pharmaceutical. At long last the medication is gathered. The Prototype constructed is for detecting general symptoms like fever, cold, headache etc and vend out medicines that does not need doctor prescription. Inventory controller controlling the inventory of medicines is critical to functioning of machine. Not only from low inventory levels but also from misuse or theft cases. Later the inputs from these are used to coordinate with dispensing mechanisms. Based the sensor values the corresponding dosage and corresponding medicine is vended out. In case if the user wants medicine for symptoms like headache that does not need detection will be

vended out based on the input through the keypad. The proposed work is first tested for detecting symptoms using various sensors

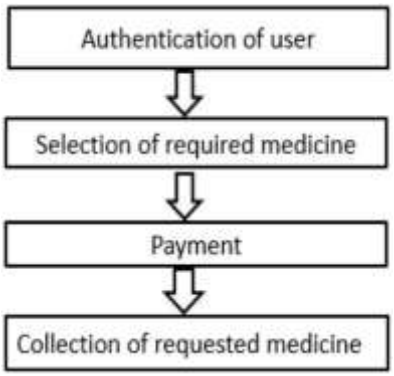

Figure 4. Vending Machine operation

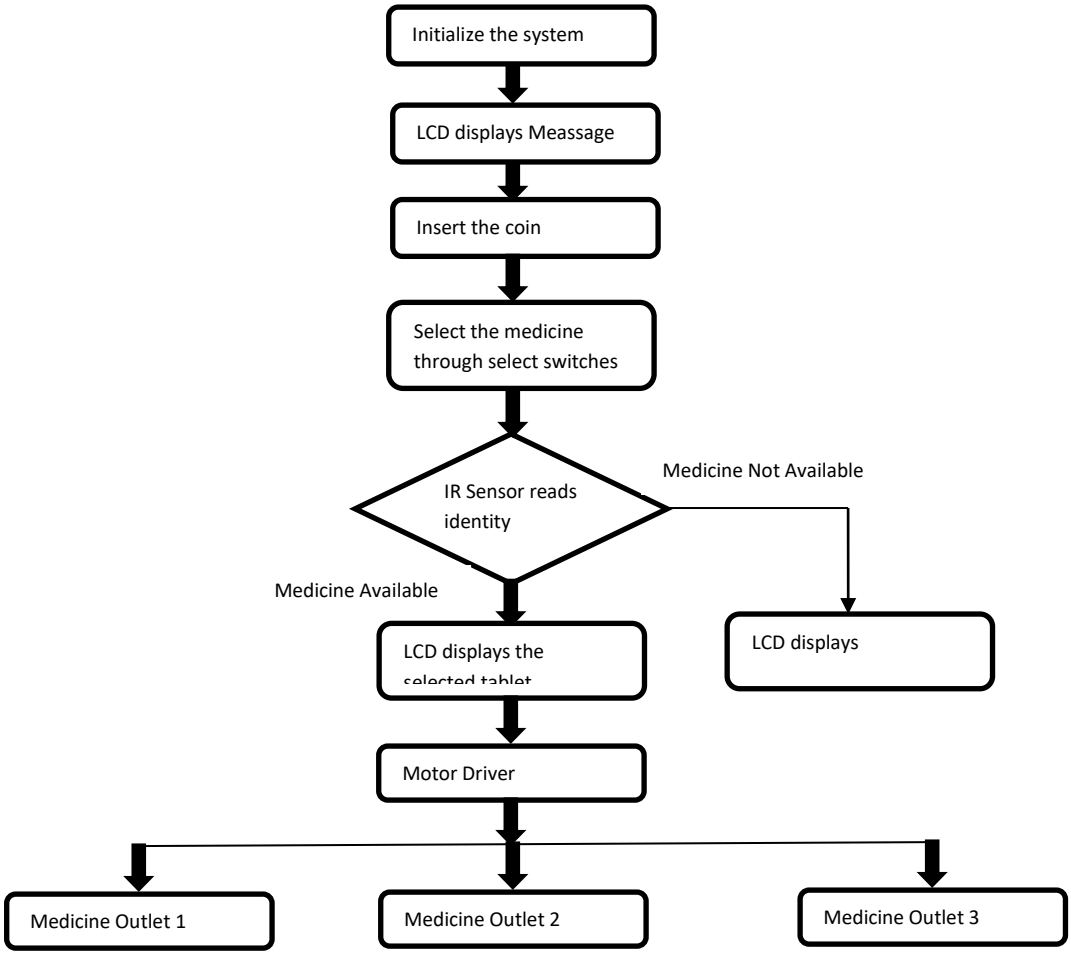

Figure 5. Vending Machine Flow Chart

From this concept, the automatic medicine vending machine is technically feasible to the people. It gives availability of medicines all the time, also in rural areas. it is very helpful. It gives ease of access also. It is sales person-less service which is based on smartcard. As technology is sure to evolve, pharmacists must look toward quality improvement in patient care services. In this changing culture of health care and technology, now is an opportune time for pharmacists to drive the expectations of patients and other health professionals about the value of pharmacist services within the patient care continuum.

This work has presented the machinery and technology involved in the most common vending machines present all over the world. It helps increase efficiency by lowering dependence on man power. The desired outcome is achieved as per the user's requirements in the form of medicines dispensed by the machine. How easier it would make people to obtain medicines from vending machines rather than waiting in queues for long hours..

Figure 6. Vending Machine indicating the dispense of medicine

V. CONCLUSION

By implementing medical ATM, simple medical problems will be diagnosed with an easy reach. This system can be further improved to diagnose the health problem also. A central platform can be provided for patience to interact with specialists of fields through video conferencing i.e. to provide a health ATM service. One more development is that to provide automated e-emergency diazotization and pharmacy for patients which can be meant that at the health ATM, when a card being inserted the whole body of the user will be scanned and the problem will be identified and rectification suggestions will be given. If it is unable to identify, then a specialist will be connected through videoconference. This study focuses on the design and implementation of A NFC Operated MEDICINE Vending Machine that can dispense different medicine through dropping a specified Medicine by taking the reference of keypad. There are different types of medicines in a machine. The machine accepts money through RFID tag and will not accept any other type of money. Once the tag has been detected, the machine automatically dispenses the right medicine. The automatic medicine vending Machine will cater the needs of the customers with no further human intervention required. The machine is user-friendly and is very simple to operate. The customers will only have to deal with the NFC tag to be dropped to the machine which will correspond to the medicine to be dispensed. With this, labor cost will be minimized and it will also give entrepreneurs the opportunity to attract more customers with this innovation.

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