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Assistive System for Remote Accident Patients.

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ABSTRACT

Rural hospitals are hardly worth mentioning. Most of them are horrifyingly under developed. The Indian government is trying to deal with this problem, as these places are often in drastic need of health care, doctors and medicines. Often there is no quick access to medication, sometimes lives may depend on it. There aren't that many options available in highways either, for people driving long distance or other similar situations. We also face a major problem with "expired" medicine, which is overlooked by many people, and which leads to a lot of problems. To deal with this ever-evolving issue, we have come up with the concept of an Automated Medical Machine (AMM). The machine stores essential and frequently used drugs with other medical supplies. It is also connected online to a doctor, on call. The doctor "consults" and "prescribes" the medicines, which is "acquired" and "dropped" to user, like money is dropped from ATM (Automated Teller Machine). The machine stores the records and transactions related to every registered user using cloud thus by avoiding the expenditure spent on physical components to store the data. Instead they are stored on multiple virtual servers. These AMM's are placed at convenient places all around the city, and even in highways and other difficult spots, for easy access.

Keywords: Assistive System, Telemedicine, Automated Medical Machine & Remote monitoring.

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INTRODUCTION

Telemedicine allows patients to contact physicians live over video for immediate care or allows captured videos/still images about patient to be sent to physicians for diagnosis and follow-up treatment at a later time [2]. Telecommunication technologies are found to be effective tools for connecting remote sites. By opening up new channels for communication, telemedicine connects rural and remote sites with health-care professionals around the world, overcoming geographical barriers. This can lead to increased communication between health service facilities, and facilitate cross-site and inter-country collaboration and networking. Telemedicine promises improved outcomes and enhanced life quality for patients; facilitate easier and more regular contact between patients and care providers by reducing the need for in-person consultation; and it can reduce the national cost of health care by reducing unnecessary tests, in-person visits and patient transfers [3, 4]. Through the above technology the doctor can suggest the patients to take prescribed medicine and treatment but he cannot assure immediate consumption of the right medicines by the patients. In case of emergencies, where immediate medication is required, mere consultation with a doctor does not help. Hence availability of medicines to patients serves a great purpose.

Telepharmacy is another developing technology for giving pharmaceutical care to patients at distant places where they may not have physical contact with pharmacists. It includes drug therapy monitoring, refill authorization, patient counselling, prior authorization, monitoring formulary compliance with the aid of teleconferencing or video conferencing [5]. A Telepharmacy dispenses medicine to the patient after the prescription of the patient has been processed by a registered pharmacist from home or from another location. The disadvantage of telepharmacy is that the medicines are reached to the patients by a time consuming process, so it is not useful in emergency situations.

The proposed system provides medicines through online Doctor's prescription at an instant of time with the help of the automated medical machine (AMM). The body area network is connected to AMM to provide various clinical parameters of human body. The overall AMM machine will be connected to a common centralized monitoring station to provide networking facility and to monitor and control the machine. Each system will be connected using wired/wireless network for internet accessibility with constant power supply for its functioning.

To overcome the difficulties faced by the people especially in rural and remote areas.

To provide the quick and easy medication, to enhance the concept of time management and for better and quick medication, to overcome the difficulty faced by the people in daily life for basic hospitalization and to provide enhancing features to improve the medication. Hence we put forth the technique called AMM. This machine dispatches the medicines as per doctor describes. Thus it makes patient to feel convenient and feel better.

MATERIALS AND METHODS

The sensors like Temperature and Heart rate sensors were been used to find the basic parameters like temperature and heart rate in our project we are using LM 35 and Photo diode were used. Camera serves two purposes. One, it recognizes the user who has logged in using face recognition techniques and two, it is used to communicate with Doctor through Video conferencing. To communicate with the doctor, we need microphone to speak and speaker to hear the voice of Doctor and also to know about the AMM alerts. This reads the user's unique finger print by reading them. New users are requested to give their finger prints for secured and authenticated login for future use. Medicine dispenser gives out the prescribed medicine through the door after the payment has been made using swipe card with authentication.

It is a place where medicines are kept safely to protect the medicines from external activities such as robbery, weather changes, etc. Medicines are kept inside the cartridge. This is kept inside a vault where others cannot access it without permission of the admin. Medicines are provided to patient from this cartridge through medicine dispenser as money is given to the ATM user. The Wi-Fi can be used to connect each AMM to cloud and it is provided with authentication, message integrity, data confidentiality by making use of IEEE 802.11i standard WPA2 (Wi-Fi Protocol Access). It controls, process and monitors the overall functions of the machine. Operating System and other required Software are installed in the memory of the CPU. Medicine

dispenser consists of Electric eye and sensor. When the prescribed medicines is about to deliver it is checked by an electric eye. It monitors and notifies the journal with the delivered medicines to update the count of medicines in the database.

Thousands of organizations across multiple industries rely on digital persona to create and manage digital identities. Our solutions reflect a deep understanding not only of biometrics technology, but also the rapidly changing environments in which they are deployed. Our scalable, standards-based solutions empower end-user organizations, integrator partners and developers to identify citizens, employees, patients and customers with efficiency and certainty.

Our biometrics-based solutions allow organizations to bind physical and logical identities to create a secure digital identity, ensuring only authorized persons can access systems, data and services. We integrate a range of optical and silicon-based biometrics technologies with other traditional identity elements – including ID cards, PINs and passwords to create strong multi-factor authentication solutions. Organizations turn to Digital Personal, a trusted partner, for identity verification solutions that meet their needs.

RESULTS AND DISCUSSION

Parameters like Heart Rate and Temperature has been measured out using sensors. Finger print and mechanical modules were developed. They were been tested in Trail and Error methods and results came. As per the results were obtained, the basic parameters were measured. In this proposal we included the two basic parameters temperature and heart rate, which is very necessary if any patient attempts for primary medication. The sensors which we used in our research work were highly sensitive and low cost. LM35 is the sensor which we used for measuring temperature, by pressing that sensor it displays the reading in form of degrees. The advantages of this sensor were compared to other sensors is low cost, high sensitive .Heart Rate is measured through IR sensor by transmittance type. Once finger is placed in between the two photo sensors the pulse reading is displayed in LCD here, we used 15 sec for pulse count it means for 15 sec 20 is the heart rate once it is multiplied by 4 we get heart rate for one min. We developed a simple mechanical setup with 3 stepper motors and 3 storage pipes for medicine storage & delivery. We used JAVA platform for software side for finger print access and for medicine delivery. SKYPE is provoked with java for achieving video conferencing, when finger print is accessed; a new TAB will open as video call, as shown in figure 1. Once pressing that video call SKYPE will be opened here we can login and chat with doctor. Once patient consults with doctor through the SKYPE, a medicine will be delivered as per doctor’s instruction to the patient as shown in figure 2.

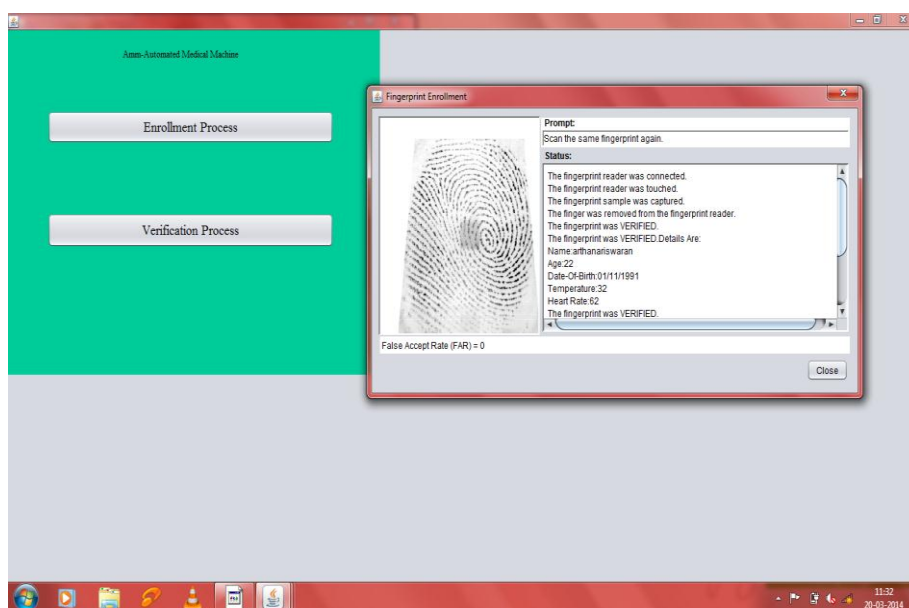


Figure 1: Initial Patient Enrollment system

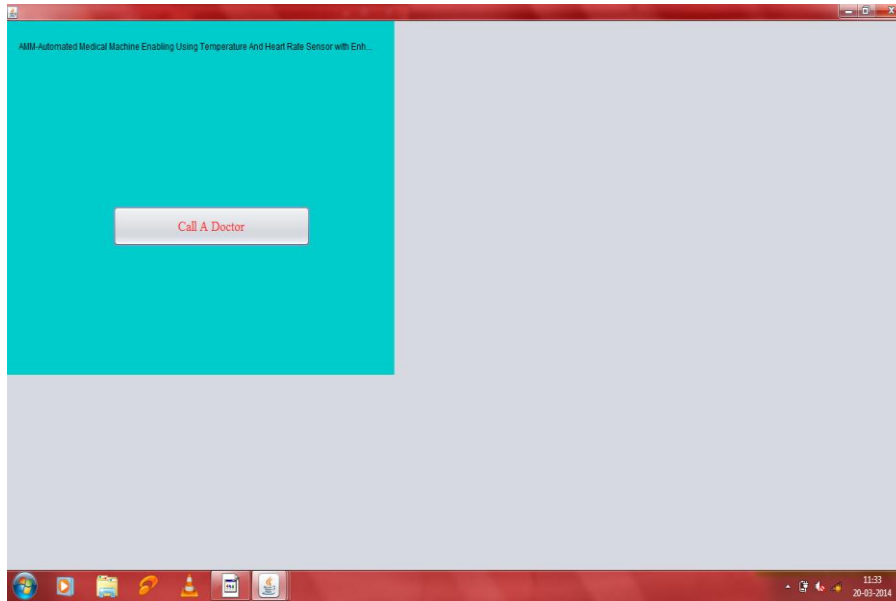


Figure 2: Connecting to doctor

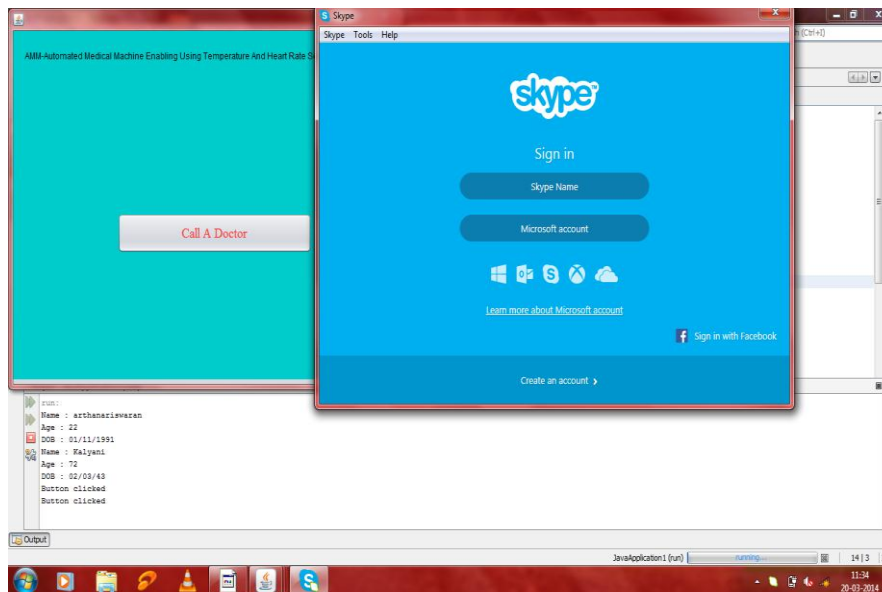


Figure 3: Patient doctor conversation using Skype

The user will login with the user ID and the password given. After logging in, the and the finger print is recognized by the sensor and this information of the user is stored in the virtual servers using cloud computing technology, the initial display of the AMM will have the options such as new user, login, more info, first Aid and help. If it is a new user then the face and the finger print is captured and stored in the database. A random user ID and password will be generated for the new user and it will be given through printed paper by the printer. Then the user can login with new user ID and password. If he is an old user then he can log in using his username and password, which exist already. In case if an existing user forgets his user id and password, he can login and give his face and finger print and a search is made in the database. If the face recognition and finger print biometric matches, then the user ID and password, which already exists will be given to the user for login as shown in figure 2. The user can call a Doctor by choosing "call a doctor" option in touch screen to communicate with Doctor through video conferencing. The call will be forwarded to all the Doctors available and it can be attended by anyone who is able to consult the patient. Even the user can choose "More Info" for Google maps to know about the hospitals nearby, symptoms for diseases, the ways to prevent diseases, healthy food for healthy living, instructions to do First Aid, etc. During emergency situations, first Aid medicines are provided to the user without Doctor's prescription. The user can select the essential first aid

medicines available in the AMM. Medicines will be dispensed through the medicine dispenser from the cartridge after money has been paid using swipe card. All the information regarding medicines, users, doctors are stored in the cloud. All AMM from different parts are connected using cloud. Thus any additional feature to the AMM can be made and updated periodically. All the information in the database is stored in the cloud using cloud computing technology.

The call made by the user will be forwarded to the doctors who are available in online. After getting connected with Doctor, one can visually communicate using camera, microphone and the speaker. The prescribed medicines are printed with the total cost using the Record printer. The user can pay using any swipe card (credit or debit). After the payment, the Doctor delivers the prescribed medicines to the Patient. Doctor's display is shown in figure3; Doctors get connected to the AMM network through their personal computer or laptop. The Doctor should get authorized by registering his details like name, qualification, experience, area of specialization and other personal details. The authorized Doctor will login with user ID and password. The Doctor will login into the AMM network only if the password and the face recognition match the Doctors list in the database of cloud. Once the doctor logs in, he is connected with all the AMM's in his network. Any patient who wishes to consult him contacts him through videoconferencing and medicines are prescribed. The physician is provided with the details of the medicines available in that particular machine with its expiry date too. After the patient makes the payment for the prescribed medicines, the Physician delivers the medicine to the patient. The expired drug in that particular machine will be notified to the physician to avoid delivering it. Even doctor's Consultation fee can be paid while paying for medicine, if needed. These are monitored and controlled by cloud service providers (infrastructure cloud) such as amazon, google. They update the database of medical transactions in AMM by regularly checking the expiry date and availability of medicines in each system. The expiry date for each medicine is stored. By using that detail an alert is given to the concerned authorities in the monitoring station before the expiry date. Host processor monitors the machine in remote area and provides details to the base station as shown in figure 3.

CONCLUSION

The drastic need for health care, doctors and medicine will be satisfied by automated medical machine. This device can be placed in highways, rural areas and even around the city for the easy access of medicines with help of Doctor's prescription in an effective way. It uses telemedicine and cloud computing technology for its functioning. Since cloud is emerging technology in providing services in many areas, research and improvement can be made in AMM using cloud and its services. Thus AMM will make access to medicine easy, quick and simple, which in many cases, may even save lives.

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