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AUTOMATIC MEDICAL DISPATCHER WITH DYNAMIC TELEMONITORING SYSTEM USING IOT IN RURAL AREAS

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Abstract - Tracking good doctors for treatment in rural areas is a very difficult job, they have to travel all the way to nearby towns or cities. Therefore, Anytime Medical Machine (AMM) is completely IOT based project and can be even considered as the IOMT (IOT based medical devices) and its primary deployment in rural areas. Using the AMM people will get quality consultation with good doctors on spot without travelling all the way to the cities. The doctor provides medicines and prescription for the patients through AMM which reduces the time consumption and expenses of travelling to the nearby cities. It collects patient data using Temperature sensor, Heart Beat sensor and SPO2 sensor, and sending the collected data of the patient to the doctor through wi-fi module. Interaction between the doctor and the patient is done by using video conferencing, which is secured by the login page with username and password dedicated to each user to avoid the misuse of the AMM. Finally, the Doctor analyzes the patient's health parameters and suggests the appropriate medicine that will be dispatched through AMM. The patient's information is uploaded to the cloud server for future references. Admin re-fills the medicines in AMM.

KeyWords: AMM, Medicine Dispatcher, Telemonitoring, Cloud Storage.

1.INTRODUCTION

Experienced doctor consultation will economize time and effort especially for the rural people because most of the experienced doctors usually reside in urban areas, some websites are available to contact doctors online, but they are not much use in getting appropriate treatment for the patient. Therefore, patient information is collected by using a microcontroller from the temperature, heartbeat and SPO2 sensor. Later the data will be stored to cloud, and when a patient contacts a doctor the data will be shared to the doctor. The interaction between the doctor and patient is achieved by using real-time video conferencing.The patient and the doctor will interact with each other, so the patient can share the symptoms. After the conversation ends the medicine to the patient is dispatched from the Anytime Medicine Machine (AMM) as suggested by the doctor. In case of emergency situations if the patient needs medical attention, then the data which is stored in the cloud can be used to make the analysis of the patient. Cloud Storage is mostly used in day-to-day life for the storage of useful information, nowadays there are many types of Cloud in industries. Mostly everyone prefers hybrid cloud and other services like private and public cloud, where the public cloud will not be a secured because everyone can use it without any user security. The private cloud is secured with user authentication. And Hybrid cloud is the combination of both services. Here we use a private cloud for securely storing patient's information.

1.1 PROBLEM STATEMENT

Tracking the good doctors for treatment in rural areas is very difficult, they have to travel all the way to nearby towns or cities to consult an expert doctor.

1.2 OBJECTIVES OF THE PROPOSED WORK

- To Develop the Anytime Medical Machine with User ID and Login for better security.
- Read vitals from the patient and share it to the doctor using the internet.
- Dispatch the medicine prescribed by the doctor through the dispatching unit.
- Cloud is used for storing patient information for future reference.

2. LITERATURE SURVEY

Chih-Ming Chen, Chin-Ming Hong, Chia-Meng, Huang and Tai-Hung Lee, "Web-based Remote Human Pulse Monitoring System with Intelligent Data Analysis for Home Healthcare", 2011-2019. It employs SOC technique to develop an embedded system for human pulse monitoring system with an intelligence data analysis mechanism for disease detection and long-term health care. The monitoring system always monitors the health parameters of the patient and transmits it to the doctor through the Internet. The concept of monitoring the patient via cloud platforms is taken from this paper [1].

Saravanan. M., and Achsah Mary Marks, "MEDIBOXIoT Enabled Patient Assisting Device", IEEE 4th World Forum on Internet of Things (WF-IoT), 2018. Some of the Internet of Medical Things (IoMT) is connected with IoT network,To monitor the day-to-day health condition of the patients. In recent times there have been tries for new medical devices which is specifically used for elderly persons to monitoring their health parameters. One such device is the MEDIBOX

which is used to help in assisting the patient to take the medicines at the right time. Associated with this the another system is developed in the Host Management System (HMS) which has the unique facility of cloud installation that helps in modification of the existing facilities in the design aspects [2].

Abdullah Kareem, Sulieman, A J Yamen, William Anthon "Smart Medical Dispatcher" April 2018. MECPME conference. An account is provided to the user that is controlled by the web application to set an alarm for the right time to take medicine with the right dosage. The user data about the medicine dispatched and the time at which the medicine is dispatched is recorded and stored in the machine for the future reference and the next appointment with the doctor is can also reminded by using the display unit in the system the concept of medicine dispatching unit are taken from this paper [3].

Amrutha B, Manicka vasagam B, Alan krit Patnaik and Karthick Nanmaran, "Erection of Comprehensive Wellness Programme for Global Healthcare Monitoring System using AODV Protocol with Data Clustering Schema", Indian Journal of Science and Technology, 2015. Among other systems that have emerged in recent years it is an expert system that is of immense use in diagnosis and reducing the time required for treatment with the help of AODV protocols the vital and critical parameters of a patient is evaluated by WBAN are forwarded to requisition. AODV procedure can be modified according to the patient's condition in the case of any emergency. There is also an improved event Parthasarathy G. Doctor on Net with Effective Medicine Dispatcher in Medical Analysis 65 driven AODV (MEDAODV). This supports the doctor in devising appropriate steps for the immediate treatment of the patients. When there is a need of specialists is felt, the clustered AODV (C-AODV) is initiated. Clustered AODV is a exclusive assistance for the patient in helping the doctor to provide the prescription inspection of the location [4].

Sarah Shaikh M.E Information Technology Vidyalankar Institute of Technology University of Mumbai and Deepali Vora Information Technology Department Vidyalankar Institute of Technology University of Mumbai "Secure Cloud Auditing over Encrypted Data' india journal of science and technology 2018. Thus, the proposed system uses public auditing scheme for data storage security on cloud while protecting the confidentiality of the user's data. ElGamal encryption along with SHA-256 hash algorithm are used to make sure that the TPA should not get access to the outsourced data on the cloud server while performing integrity check thereby increasing the effectiveness of the auditing process [5].

Wilson G. de Oliveira Ju´ nior, Juliana M. de Oliveira1 Roberto Munoz, Victor Hugo C. de Albuquerque "A proposal for Internet of Smart Home Things based on BCI system to aid patients with amyotrophic lateral sclerosis" The Natural Computing Applications Forum 2017. In this work, they presented a proposal to smart home things based on BCI system to aid patients with amyotrophic lateral sclerosis. The proposed application was developed for Android phones and allows the control of low-cost sensors. Based on our results, we can conclude that the ALS Help application can be a tool that supports people with ALS in the execution of their daily tasks without the intervention of third parties [6].

3. METHODOLOGY OF THE PROPOSED SYSTEM

3.1 EXISTING SYSTEM

People living in cities have the facility of a doctor or clinic in their short distance for consultation, taking the necessary tests and getting the prescription of the appropriate medicine. Such facilities are not available for persons in rural areas who have to track a long distance. The process involves considerable time, effort and expenditure. In recent times there has been tries to style new medical devices that are of use specifically for the patient in monitoring their health parameters. One such device is the MEDIBOX which helps in assisting patient to take their medicines at the right time. But it lacks the doctor consultation and the cloud services to store the patient data. It does not follow any standards or systematic concept because there is no standard framework designed for the medical systems that exist today. This system has some Disadvantages

A. Unreliable

The patient goes to the hospital and consults the doctors, then takes all the necessary tests and doctor prescribe the medicine then he needs to travel all the way to the medical shop to buy the prescribed medicine.

B. Time consuming

The patient wants to go to the hospital and take the entire test and wait in queue till his appointment, then buying the medicine from the shop will consume more time

3.2 Proposed system of AMM

IoT is making strong inroads in the medical industry with the introduction of relevant sensors and devices. IoMT is a collection of medical devices connected to healthcare IT systems for different applications. The growth of IoMT has particularly impacted healthcare for the aged and disabled people, but not just limited to them. In the fast-paced world, even ordinary persons need support with their daily activities. In our work Temperature sensor, SPO2 sensor and a Heartbeat sensor are used to collect patient's information and assisting the doctor in the examination of the patient's health condition.Video conferencing is included for useful interaction with the patient.

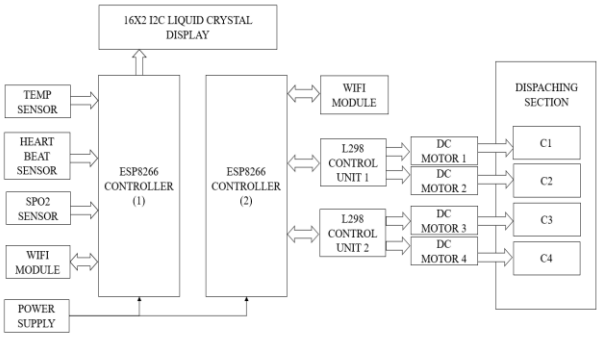

Fig 1: Block Diagram of AMM (Hardware implementation).

the doctor examines the patient and prescribes medicine which is dispatched from the AMM machine. Patient's information is also stored in the cloud. In the event of the prescription being ineffective, a review can be made by using the details stored in the cloud to enable examination of further health conditions. The main objective of our proposed system is to create a user-friendly design that the patients can consult the doctor with video call and the sensor network for the consultation purposes and a dispatching unit for dispatching with a secured cloud to store the patient information to help the diagnosis in the future. The block diagram of the proposed AMM system is as shown above. The AMM incorporates five main parts:

1. Sensor network circuit.
2. Medicine dispatcher circuit.
3. Wi-fi module with Blynk server.
4. Data cloud.
5. Power supply.

The proposed model is highly useful and it uses available standards, whereas the primary work is to provide consultation and medicine dispatcher in the design of the system. The architecture of the project starts from collecting the patient information through the sensors, and transfer it to the doctor through IP address using a Wi-Fi module, and dispatching the medicines. After consultation the patient's data is also stored in the cloud for the feature reference.

The sensor network includes one ESP8266 controller with MAX30100 and DHT11 sensors and a dedicated Wi-Fi module to transmit the health parameters to the doctor end. Medicine dispatcher second ESP8266 controller, two L298 motor drivers, each control two DC motors. The container lids are connected to the DC motors and rotation of motor can be controlled by blynk server from the doctor side. Wi-fi modules of both the controllers are linked to the blynk server to create the easy interface at the doctor side.

Data cloud will store the information about the date and time of consultation and medicines that are dispatched from AMM. Here the power supply is taken from the mains and rectified before giving it to AMM.

3.2.1 User Information

User can access the application by entering user id and password by him/her connected with the AMM to establish communication between doctor and patient. the doctor attends to the patients call once the patient is logged in to the website.

3.2.2 Data collection and transmission

Various sensors can be used to collect the health parameters from the patient, most commonly used sensors are heartbeat sensor, height and weight sensor, spo2 sensor, and temperature sensor. Heartbeat sensor, spo2 sensor and temperature sensor are implemented in our project. The microcontroller will collect the data from the sensors and using wi-fi module it transmits the data to the doctor through the internet.

3.2.3 Biomedical Analysis

The bio medical analysis process is implemented and designed in the project. Once the patient has taken the test, the information gets collected and stored in the database. When Patient consulting the doctor at that time the patient information is shown Data cloud will store the information about the date and time of consultation and medicines that are dispatched from AMM. Here the power supply is taken from the mains and rectified before giving it to AMM. to the doctor in the screen, video conferencing that enables voice and video communication between doctor and patient. The doctor examines and prescribes the medicine for the patient. Finally, the patient information gets stored in the cloud storage. Through the use of API with user application and a secret key, the data get encrypted while transforming to cloud. An authorized person for the cloud can view the patient information.

3.2.4 Medicine Dispatch

The machine will dispatch the medicines to the patient using the AMM machine. Where all the medicine details are updated within the storage. After consultation the doctors will prescribes the medicine, according to the prescription the medicines will be dispatched.

3.3 Hardware Requirement

Hardware is best described as devices or components that are physically connected to the computer that we can physically see and touch. Hardware will usually contain a circuit board, Integrated Circuits (ICs), microcontroller board and sensors. The hardware requirements of the system are

3.3.1 Arduino ESP8266

Fig 2: Arduino ESP8266 Module diagram.

The ESP8266 is a small Wi-Fi module built around the ESP8266 chip that can connect your microcontroller to the internet wirelessly for a very small cost. It can be a great option for Internet of Things (IoT) projects, but can be difficult to work with for beginner who do not have prior experience with the module. ESP8266 with an Arduino and perform some basic functions like connecting it to a Wi-Fi network. Highly integrated with built-in antenna switches, power amplifier, low-noise receive amplifier, filters, and power management modules. Engineered for mobile devices, wearable electronics, and IoT applications, ESP8266 achieves ultra-low power consumption through power saving features including fine resolution clock gating, multiple power modes, and dynamic power scaling. Ultra-low power co-processor allows you to do ADC conversions, computation, and level thresholds while in deep sleep.

3.3.2 L298 motor driver

The L298 is an integrated monolithic circuit in a 15-lead Milliwatt and PowerSO20 packages. It is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable inputs are provided to enable or disable the device independently of the input signals

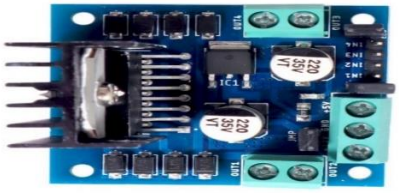

Fig 3: L298 motor driver.

The emitters of the lower transistors of each bridge are connected together and the corresponding external terminal can be used for the connection of an external sensing resistor. An additional supply input is provided so that the logic works at a lower voltage. When the power supply is less than or equal to 12V, then the internal circuitry will be powered by the voltage regulator and the 5V pin can be used as an output pin to power the microcontroller. Both clockwise and antilock wise rotations can be obtained from this controller unit.

3.3.3 DC motor

Fig 4: DC motor.

A DC motor is any class of rotary electrical motors that converts direct current (DC) electrical energy into mechanical energy. A shunt DC motor connects the armature and field windings in parallel or shunt with a common D.C. power source.This type of motor has good speed regulation even as the load varies, but does not have the starting torque of a series DC motor. It is typically used for industrial, adjustable speed applications, such as machine tools, winding/unwinding machines and tensioners. The most common types rely on the forces produced by induced magnetic fields due to flowing current in the coil. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current in part of the motor. We are using four DC motors to control four containers.

3.3.4 16X2 LCD display

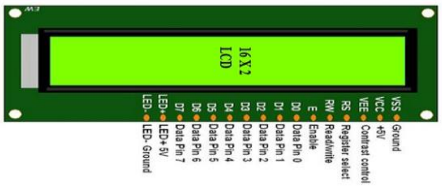

Fig 5: 16x2 LCD display pin diagram.

This is I2C interface 16x2 LCD display module, a high-quality 2-line 16-character LCD module with on-board contrast control adjustment, backlight and I2C communication interface. For Arduino beginners, no more complex LCD driver circuit connection. The real significance advantages of this I2C Serial LCD module will simplify the circuit connection, save some I/O pins on Arduino board, simplified firmware development with widely available Arduino library. Compatible with Arduino Board or other controller board with I2C bus. I2C Address:0x38-0x3F (0x3F default), Supply voltage is 5V, Interface is simple I2C with 4-bits LCD data and control lines. Contrast is Adjustable by changing the value of built-in Potentiometer. Backlight is also controllable and the typical board Size of 80x36 mm.

3.3.5 MAX30100 sensor

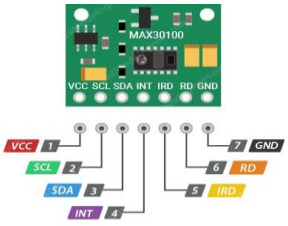

Fig 6: MAX30100 Sensor pin diagram.

The MAX30100 is an integrated pulse oximetry and heartrate monitor sensor solution. It combines two LEDs, a photodetector, optimized optics, and low-noise analog signal processing to detect pulse oximetry and heart-rate

signals.The MAX30100 operates from 1.8V and 3.3V power supplies and can be powered down through software with negligible standby current, permitting the power supply to remain connected at all times. The SpO2 subsystem in the MAX30100 is composed of ambient light cancellation (ALC), 16-bit sigma delta ADC, and proprietary discrete time filter. The SpO2 ADC is a continuous time oversampling sigma delta converter with up to 16-bit resolution. The ADC output data rate can be programmed from 50Hz to 1kHz. The MAX30100 includes a proprietary discrete time filter to reject 50Hz/60Hz interference and low-frequency residual ambient noise.

3.3.6 DHT11 temperature sensor

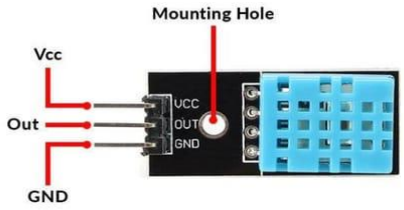

Fig 7: DHT11 Sensor pin diagram

DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital signal output. By using the exclusive digital-signal-acquisition technique and temperature & humidity sensing technology, it ensures high reliability and excellent long-term stability. This sensor includes a resistive-type humidity measurement component and an NTC temperature measurement component, and connects to a high-performance microcontroller, offering excellent quality, fast response, anti-interference ability and cost-effectiveness.

3.4 Hardware implementation

- Here we used two ESP8266 controllers one for sensor data collection and the another one for the dispatching unit control.
- First ESP8266 controller is connected to both temperature and heartbeat sensors and the prime function of this controller is to collect the data, and displays the data on LCD display and forward the data into the blynk interface.
- Second ESP8266 controller is interfaced with two motor drivers and further two motor drivers interfaced with four DC motors, two for each motor driver control unit and it is used to dispatch the medicine by controlling the open and close operations through the blynk platform.
- Blynk is used as the software platform for both controllers to display, control and access the data of the patient over day, week, month and year basis.
- Blynk is also used to plot the graph of the health parameters for make analysis simple.

3.5 Software requirement

A software requirement specification is a description of software tools used to develop the system. Since it is an IoT/ Embedded project, we can use of below specified software tools to program the functionalities of the hardware components. The software requirements of the system are.

3.5.1 Arduino IDE

The Arduino integrated development environment (IDE) is across-plat form application that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution.

3.5.2 Blynk server

While handling the processor boards like Arduino and Raspberry Pi, it has to be control by using the applications. Blynk is an open-source application with IOS and Android platforms which will make this possible. Here by simply dropping widgets on mobile screen we can create graphic interface and digital dash board for controlling the project using Blynk and it is very simple to use. Whenever the processor board is connected to internet through Wi-Fi or Ethernet, Blynk will get online and ready to use.

3.5.3 Login page

The login page is provided in our project, so that the patient can login to his/her registered account. Logging in is very simple, the patient has to enter his/her registered id and password and click on Login button to enter the video conferencing webpage. Here also an option given which is named as “Forgot password”, in case a patient forgets his/her password it can be recovered by clicking on this option.

3.5.4 HTML coding language

Common markup language for building a webpage's basic framework and adding features like text, graphics, tables, forms, and so forth. Every front-end developer should also be proficient with HTML to create webpages. But before getting started with HTML, it's crucial to understand that since it doesn't use loops or other conditional statements or variables, it is not a programming language.HTML is a powerful coding language for creating websites. It is combined with CSS while designing and constructing

websites. Therefore, it should go without saying that learning HTML is a necessary first step if you want to succeed in the field of Web development.

3.5.5 CSS coding language

Cascading Style Sheets, fondly referred to as CSS, is a simple design language intended to simplify the process of making web pages presentable. CSS handles the look and feel part of a webpage. Using CSS, we can control the color of the text, the style of fonts, the spacing between paragraphs, how columns are sized and laid out, what background images or colors are used, layout designs, variations in display for different devices and screen sizes as well as a variety of other effects. CSS is easy to learn and understand but it provides powerful control over the presentation of an HTML document. Most commonly, CSS is combined with the markup languages HTML or XHTML.

3.5.6 PHP coding language

PHP is a general-purpose scripting language widely used as a server-side language for creating dynamic web pages. Though its reputation is mixed, PHP is still extremely popular and is used in over 75% of all websites where the server-side programming language is known.

3.5.7 GOOGLE cloud service

Google Cloud Platform (GCP), offered by Google, is a suite of cloud computing services that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search, Gmail, Google Drive, and YouTube. Alongside a set of management tools, it provides a series of modular cloud services including computing, data storage, data analytics and machine learning. Registration requires account details. Google Cloud Platform provides as a service and platform as a service. Here the google cloud is very important to store the patient information and details about the dispatched medicine with date and time.

3.6 Software implementation

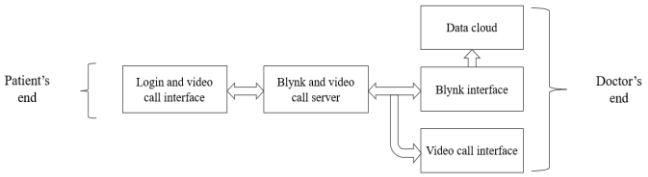

Fig 8: Block diagram of AMM (Software implementation).

- Login page is designed by using the HTML and CSS programming to create a simple user interface to enter the username and the password to get access to the AMM service.
- Video conferencing website is designed by the HTML, CSS and PHP to create the smooth video conferencing system, the video conferencing domain name is also used to locate the sending node and receiving node on the internet.
- The Arduino software programming is used to write the code for both the controllers and certain libraries are included to make the data transfer easy between the devices and across the internet to connect the blynk interfacing website.
- Blynk website is an open-source website used to collect, access and analyze the data from anywhere anytime and this interface is also used to control the medicine dispatching system.
- Google cloud platform is used to store the complete patient details for easy access.

3.9 Flow Chart of AMM

The flow chart describes how a system work under different circumstances. A flow chart includes the decision points of a system and it also shows the outcomes of the decision that has been made. The flow chart of AMM is shown in the figure 9. the detailed explanation of the flow chart is as follows.

- Step 1: First the patient should enter the user id and password to initiate the videocall.
- Step 2: If the entered user id and password is matched then the video call will be initialized.
- Step 3: If the entered user id and password are mismatched the it again gets back to the second step and asks for other user id and password.
- Step 4: After logging into the video conference, patient's health parameters like heart-beat, temperature and spo2 levels are measured and displayed on the LCD screen.
- Step 5: Measured parameters will be transmitted to the doctor end through the wi-fi module. The data received at the doctor end and displayed on the blynk interface.
- Step 6: If the test has to be retaken then user must press the reset button and it will reset the controller to take another sample of the parameters
- Step 7: Now doctor and patient can start to interact through the video call and diagnosis can be made by the data fetched from the sensors and symptoms shared by the patient.
- Step 8: After consultation doctor will dispatch the medicines by operating on the blynk interfaced switches which is directly connected to the dispatching controller. We used four switches, each controls DC motor attached to the lids of the containers.
- Step 9: To open the container lid the value of the switch is written as 1 (high) after dispatching to close the container lid the value of switch is written as 0 (low). After medicine is dispatched patient will logout from the website.

- Step 10: Doctor will update the patient information and details of medicines dispatched to the data cloud. Then he can consult the next patient.

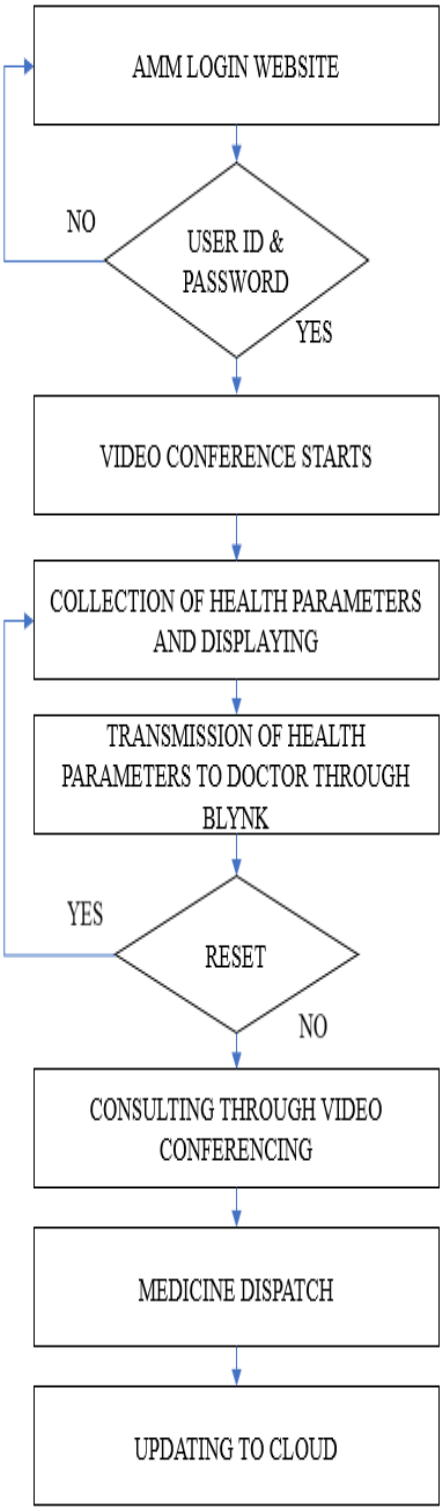

Fig 9: Flow Chart of the AMM.

4.RESULTS AND DISCUSSION

4.1 RESULTS

We have covered all the objectives that are aimed at the beginning of this project from video conferencing to medicine dispatching system. The main goal of our project is to create a medical platform that benefits the rural people with good medical care and we have achieved it by designing the AMM with minimum complexity and user-friendly interface. The main drawback of the existing IOT based medical projects is the lack of standards and framework to design or create medical applications. Here we have tried to develop a standard framework that can be used in future IOT based medical projects.

Fig 10: Login page snapshot.

The login page can be seen in the fig 10. This interface is used at the patient side to login into the AMM. If the username and password are correct then the patient can use AMM to consult the doctor through video conferencing. Background of the website can be changed by slight altering of HTML and CSS source codes.

Video conferencing screen snapshot is as depicted in the fig 11. The video of both patient and doctor can be viewed side by side at both ends. Mic and Camera permission to the website must be given by both doctor and patient side. Domain name and IP address keeps the video call real time and continuous. Size of the video screen and background can be altered by changing the piece of source code

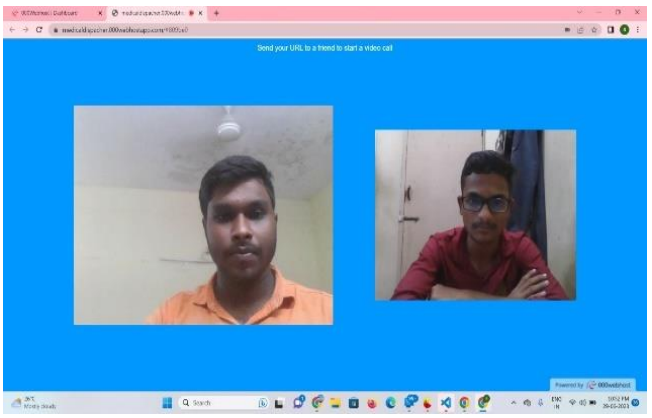

Fig 11: Video conferencing screen snapshot.

Connection diagram of the AMM is shown in the fig 12 as we can see it contains all the components required to work efficiently. The sensors read the parameters and transmit it to the doctor. The clockwise rotation of the motor will open the lid of tablet container and anti-clock wise rotation will close the lids container.

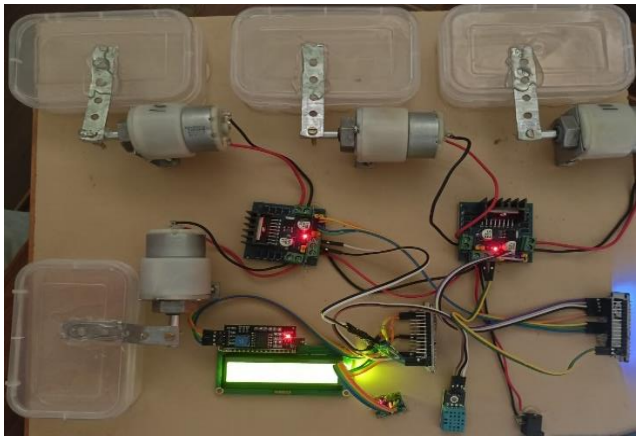

Fig 12: Sensor network with controllers and dispatching section.

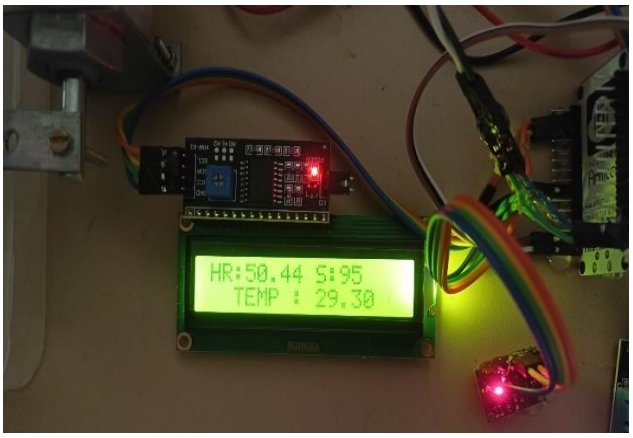

Fig 13: Sensor data displayed on the screen of LCD display.

Above fig 13 shows that the health parameters are displaying on the 16X2 LCD screen after collecting from the sensors. in the figure we can see the heartrate, temperature, and spo2 levels of the patient.

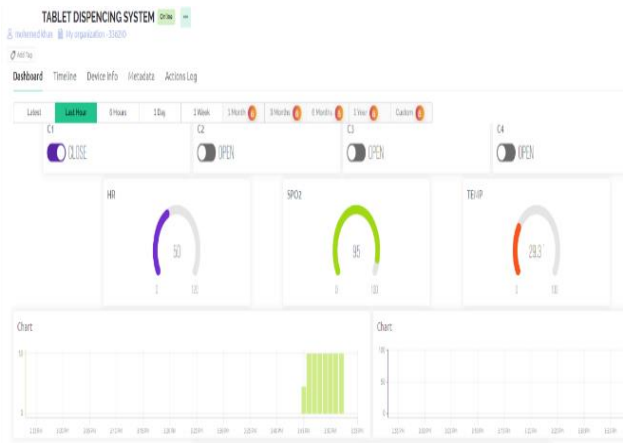

Fig 14: Blynk interface with display of gauges and dispatching control.

From the above fig 14 we can see the blynk interface snapshot, where all the health parameters are linked to gauge and the value, these values changes when the sensor data varies. In the above figure switch button is used to control the direction of the DC motors, and gauge is used to plot the graph of the health parameters.

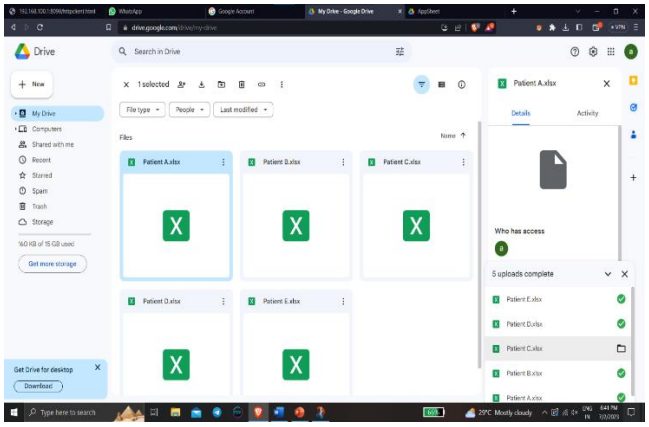

Fig 15: Cloud interface snapshot with multiple patient spreadsheets.

The fig 15 shows that cloud can be accessed through the specific user mail id and password so that the information stored in the cloud can be protected from the unauthorized access.

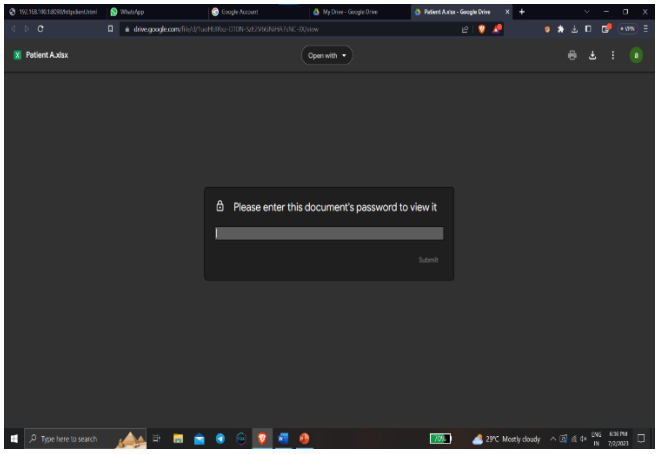

Fig 16: Snapshot of the password protected cloud file asking for authentication.

Every file saved in the data cloud is encrypted with double security. It requires two passwords to give access, one for cloud sign-in and another password to view the file as shown in fig 16.

Snapshot of cloud spreadsheet is shown in the above fig 17 Here doctor can save every detail such as consultation like date and time, parameters recorded, medicines dispatched, prescription and the comments on the patient's health condition.

PATIENTS DETAILS CLOUD

PATIENT'S NAME: Prakash
PATIENT'S AGE: 23
PATIENT ID: 4KSP14

	Heart rate	Oxygen level	Temperature
Target parameters:	75-80	90	36-37

Physician phone number **********

Date	Time	Heart	Oxygen	Tempertui	Medicines dispached	Comments
13/1/2023	Morning	76	96	36		
14/1/2023	Evening	84	90	34		
15/1/2023	Morning	75	86	39		
14/1/2023	Evening	80	93	34		
16/1/2023	Morning	96	84	42		
17/1/2023	Evening	68	94	36		
18/1/2023	Morning	75	98	28		
19/1/2023	Evening	98	85	41		
20/1/2023	Morning	81	93	36		
21/1/2023	Evening	83	91	35		
22/1/2023	Morning	97	83	45		
23/1/2023	Evening	76	94	34		
24/1/2023	Morning	98	80	31		
25/1/2023	Evening	80	89	31		

Fig 17: Cloud spreadsheet to store health parameters and conclusions.

Fig 18: Graph of health parameters vs time for Analysis.

Above Fig 18 shows the graph plotted as parameters vs time. It gives clear picture of the patient's parameter variation over days, weeks and month. It can be visualized by plotting the data stored on cloud spread sheet.

5.CONCLUSION AND FUTURE SCOPE

5.1 Conclusion

In this report, we proposed an Anytime Medical Machine (AMM) with dynamic telemonitoring system completely based on IOT. Which includes video conferencing facilities, various sensors like temperature sensor, heartbeat sensor and SPO2 sensor with dispatching unit. The proposed application is developed with windows operating system using Arduino programming and Arduino cloud. We have tested our project that produced good results. Thus, outputs confirm that the efficiency and performance of the application is up to 90%. Based on outputs of our project, we can conclude that the AMM application can be a tool that supports people in rural area as an effective telemedicine. This project has the capacity of replacement for unreliable online fake websites and the better health care and consultation to the people who are in need especially for the rural people. The confidentiality in storing the patient's data is also the priority, so that the data is kept protected from the unauthorized persons. Making cloud storage completely for proper way of maintaining the patient data.

5.2 Scope of the future work

- In Future, the nearest hospital suggestion for the non-solvable causes can be incorporated in the design.
- The AMM set up helps GPS to tracking the nearest hospitals and calling the ambulance for patient in case of emergency.
- The AMM can be incorporated to specific health diagnosis with some modification in hardware and software components.
- With proper help of the government this system can be manufactured with proper standards to place them in the rural areas.
- A mobile app can be developed to track the details of the previous treatments becomes handy to both the patient and the doctors for analysis.

REFERENCES

[1] Abdullah Kareem, Sulieman, A J Yamen, William Anthon "Smart Medical Dispatcher" April 2018, MECPME conference.

[2] Saravanan M., and Achsah Mary Marks, "MEDIBOX-IoT Enabled Patient Assisting Device", IEEE 4th World Forum on Internet of Things (WF-IoT), 2018.

[3] Sarah Shaikh and Deepali Vora, "Secure cloud auditing over encrypted data", International Conference on Communication and Electronics Systems (ICCES), IEEE, 2016.

[4] Amutha B, Manicka vasagam B, Alan krit Patnaik and Karthick Nanmaran," Erection of Comprehensive Wellness Programme for Global Healthcare Monitoring System using AODV Protocol with Data Clustering Schema", Indian Journal of Science and Technology, 2015.

[5] Chih-Ming Chen, Chin-Ming Hong, Chia-Meng, Huang and Tai-Hung Lee, "Web-based Remote Human Pulse Monitoring System with Intelligent Data Analysis for Home Healthcare, Expert Systems with Applications", 2011, 38, 3, 2011.

[6] Eric Johnson M, and Ajit Appari, "Information Security and Privacy in Healthcare", Current State of Research, International Journal of Internet and Enterprise Management, 2010.

[7] Albalawi U, Joshi S (2018) Secure and trusted telemedicine in internet of things IoT. In: 2018 IEEE 4th world forum on Internet of Things (WF-IoT). IEEE. https://doi.org/10.1109/wfiot.2018.8355206.

[8] Arthur KC, Calvo A, Price TR, Geiger JT, Chio` A, Traynor BJ (2016) Projected increase in amyotrophic lateral sclerosis from 2015 to 2040. Nat Commun 7:12408. https://doi.org/10.1038/ncomms12408.

[9] Wilson G de Oliveira Junior et. al, "A proposal for Internet of Smart Home Things based On BCI system to aid patients with amyotrophic lateral sclerosis, Neural Computing and Applications", Springer, 2018.