



# Automatic Medicine Delivering System in Rural Areas utilizing IoT and actualizing ERP incorporated with BPM

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**Abstract—** People in rural areas still have no adequate primary health care. They regularly rely upon doctor's facilities which are of incredible separation. Because of this hardship many of them refuse to take primary health care for fever, diarrhea like simple diseases which later gets complicated. In this project, a real time machine is integrated with doctor's Android or iOS application which act a software gateway that provides live consultation to patients. The doctor can instruct the patient to have that specific medicine through the application. There is a bi-directional flow of data in between the doctor and as well as the machine. IoT builds up the productive working of the medicine delivering system which is connected to a server so that the server acts as a gateway to both patients as well as to the doctor.

**Keywords —** IoT, software gateway, Android or iOS, primary health care.

## I. INTRODUCTION

Access to human services administrations is essential to great wellbeing, and it is excessively basic, yet commonplace tenants go up against an arrangement of access preventions. Ideally, residents should be able to conveniently and confidently access services like primary care. Medicinal services is essential for keeping up general physical and societal position, detection and treatment of infections, personal satisfaction and so on. Rural residents are the people who are prone to serious health issues due to lack of healthcare. India as a creating nation, it is particularly vital to guarantee that each and every individual in this nation is getting essential human services regardless of which region they are living.

For such a circumstance I came up with an idea of having an automatic machine which provides free prescriptions to

individuals in the wake of counseling with the specialist. The idea behind this machines is that, current innovations are joined together to frame a helpful item. The machine is having a Screen which demonstrates the point by point portrayal about the heart rate, Blood Pressure, Body Temperature, Medicines accessible, accessible right now to cooperate with patients, ambulance alternative if the circumstance is crisis and furthermore list out the hospitals adjacent. The Doctor on the other end have an android or iOS application installed in his or her phone which allows them to interact with the patient. Notification from the machine is alarmed to doctor's application. At the point when the specialist reacts he can have a live video communication with the patient so he can break down the issues. After consultation, the application can send the demand to the machine, so the particular solution to the patient can be given through the medicine outlet. The prescription provided to patients are of free of cost and the fundamental topic of this undertaking is to give essential primary health care to individuals in provincial zones at free of cost.

## II. EXISTING SYSTEM

According to my disclosures the current frameworks don't have the choice of collaboration with the doctors and also offering medicines to individuals on time of conference. Diverse advancements are accessible that can communicate with the specialist through application, yet for the provincial individuals it's difficult for them to think about the working of the application. The procedure to be connected is to be straightforward and learned to the general population who are utilizing it. Existing frameworks are not giving free human services to individuals and they are not effectively usable to individuals.

In Survey of Health Monitoring Management system using the Internet of Things by Rajvardhini Katake, Bhagyashree Kute, Sharmili Ranjane, Shubham C. Jaiswaln they quoted that patients body temperature, heart rate as well as respiration rate can be noted down using the raspberry pi. The data is stored in a web-based application which can be accessed from anywhere. The system allows the doctor to check their data in different time periods. Information from the patients after storing in the cloud can be called for the further diagnostic purpose. But the system only suggests the patient to have the specific medicine from the shop. In some rural areas sometimes it's too hard to find a medical shop, so it's one of the disadvantages of the existing system. Also in Smart Healthcare Monitoring System for Rural Area Using IoT by M.Ranjith Kumar, Prabu said that Arduino can be were used to generate, compile and upload the code for taking input and output from the sensors and code to connect the hardware with the internet. The data is stored in the web-based application for the doctor to check the heart rate, temperature etc. The data can be taken out anytime as it is stored in the cloud. The disadvantage of this systems is pointed out at the end in which there is no solution to give medicines to patients instantly. The main advantage of this proposed system is to periodically monitor patients.

Whereas in case of IReHMo: An Efficient IoT-Based Remote Health Monitoring System for Smart Regions by Ngo Manh Khoi, Saguna Saguna, Karan Mitra and Christer Ahlund suggested a method of effectively sending healthcare data through existing network infrastructure in rural areas. This paper explains the fact that we can reduce 90% volume of generated data for a single sensor event and up to 56% required bandwidth for a health care purpose. The paper truly defines the successful transmission of data over the server from the machine that can recognize only the useful signal emitted by the sensor. It also describes the need for transmission of important data to cloud as it can neglect unwanted signals, but advancement in healthcare can be done if some more features can be added to this concept.

Boopala Krishnan, Sudheer Babu, Sai Prem Shaji, Amar Sainath Reddy Tamanampudi and Siva Sankara Sai Sanagapati in Software Based Gateway with Distributed Flow Environment for Medical IoT in Rural Areas explains the need of a software based gateway for diagnostic purpose. In here with the help of sensors they can read the

blood pressure, heart rate, pulse oximetry and body temperature and store it on a cloud storage as records of each patient. The records are viewable for the doctor at some other location so that he can assist the concerned people to provide specific medicine to the desired patient. A problem can arise in the unavailability of the concerned people who can provide medicine to patients.

In IOT Based Smart Healthcare Monitoring System for Rural/Isolated Areas by A.Yogaraj, M.R Ezilarasan, Dr. Anuroop.R.V, C.S.Sivanthiram, Sunil Kumar Thakur proposed the possibility of getting body temperature, pulse rate and also ECG using Arduino based sensor system. This possibility can be used on other systems as these are the primary components that a doctor need to diagnose certain disease. Advancement of this system can be used in all other devices in the area of healthcare.

### III. PROPOSED SYSTEM

The principle point of this task is to give essential medicinal services to individuals in rural areas and for others. The idea depends on the innovations that are existing and they are joined to frame this endorsed show. The model enables the client's activity of counselling specialist if there should arise an occurrence of essential medical issues to like fever, constipation, diarrhoea, eye infections and so on. The machine furnishes a live interview with the doctor as like we counsel a doctor face to face. Since IoT is a rising stage in the present business, we can make 100% progress rate in this task. It's particularly seen that by the progress in advancement, people must be benefitted progressively and each mind bogging process must be reworked. Through this venture we can give free medicines to individuals who need it and additionally in requirement for a doctor for 24x7. The model portrayed in the journal can make utilization of created innovations that are right now accessible in the market.

### IV. ARCHITECTURE

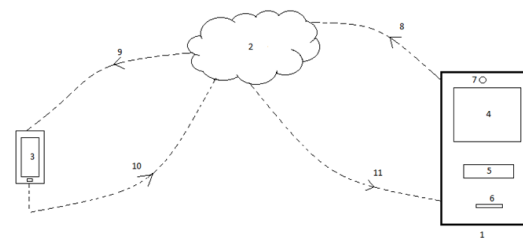


Fig 1: Detailed Architecture of the system



1. **Machine:** - The main concept of this project lies in this machine. From the concept of ATM we can provide medicine from the outlet. The machine consists of a health band for recording initial body parameters which makes the doctor or the machine to analyze the disease. A camera for interaction is also placed at the top.

2. **Cloud Server:** - A cloud server is placed in between so as to provide perfect security as well as to store patient's record. The server decides to give further request to doctor from the machine as well as from doctor to machine. It actually act as an intermediate between the machine and doctor.

3. **Android /iOS Application:** - The doctor's interface is connected by using an android or iOS application in which the app allows the doctor to have a live chat with the patient. The app notifies the doctor if a patient waits for his consultation. After consultation doctor can request the machine to give medicine for the disease he diagnosed. The request is given via cloud server then to machine.

4. **Screen:** - The machine described in the paper will have a screen for showing doctor's live feed to patients. The initial Pulse rate, Blood Pressure and temperature are recorded using the health band. The medicine intake time for the patient is also shown at the screen.

5. **Medicine Outlet:** -The part of the machine which outputs prescribed medicine to the patient as per the doctor's request.

6. **Health band:** - This part of the machine consist of a health band which records the patient's pulse rate, blood pressure and body temperature. The band is wearable at the wrist which sends the value to machine that is shown at the screen.

7. **Camera for Interaction:** - The camera is used to get the live feed to patient using the machine. This live feed is connected to doctor's application.

8. **Request from Machine to Server:** - The machine sends out request to server that the person using the machine currently requires doctor's assistance.

9. **Response to Application from Server:** - The server checks the request and monitors then provides a response to the application.

10. **Request from Application to Server:** - The doctor after consulting with the patient send a request to the server so as to give the respective medicine to the patient.

11. **Response to Machine from Server:** - As per the request from doctor the server provides a request to machine so as to give respective medicine to patient.

#### *A. Working of Medicine Delivering System*

A patient with mild fever comes for consultation using this machine. The machine, utilizing voice acknowledgment trains the client. Firstly it instructs the user to wear the health band, the band reads the Blood Pressure, Pulse Rate and Body Temperature. The readings are shown at the screen for interaction. It likewise inquires as to whether they are confronting some other troubles. In the wake of recording the client's information the machine will attempt to interface with the specialist accessible. If the doctor is not available at that time then the machine shows the unavailability of doctor and asks the user to continue with machine's diagnostic methods in which the machine analyses the problem of the user and provides medicine. On the other hand if doctors are available the request from the machine to connect doctor is given to the server. The server then send a notification to doctor's application that the patient is waiting for consultation. The specialist at that point sends a live bolster in which he can associate with the patient. After consultation, the doctor sends a request to server to output the desired medicine to patient. The server process the request and gives response to machine to output the desired medicine to patient.

#### *B. Process Model*

Resource Planning (ERP) and Business Process Modelling can be integrated with IoT systems. The ERP procedure is an ongoing idea incorporated utilizing Software and Technology. It gives an augmentation system to plan, determination and business handling. The supporting paper by Sonja Meyer, Andreas Ruppen and Carsten Magerkurth on Internet of Things-mindful Process Modeling: Integrating IoT Devices as Business Process Resources expresses that ERP with Business Process Modeling can be



effectively connected to IoT frameworks. In view of this framework a Physical substance, Description Model, IoT Device and IoT benefit go about as the primary column. An IoT benefit subsequently uncovered a standard interface to the usefulness of at least one local programming parts, which in this manner wind up plainly usable in a business procedure. Correspondingly, the connection between the local administration and a physical substance comes about because of acquiring the relations between alternate parts of the model. A physical substance is related with the framework that aides in determination and execution. At whatever point the cost of an element, for example, a sensor gets changed this model adjusts for the rest of the framework as it doesn't influence any piece of the venture. Domain show, then again, coordinates the framework by dealing with the gadgets that don't require any product segment. With the above procedure demonstrate, it's solid to build up an IoT based framework as it underpins every one of the segments in the undertaking.

### C. Cost Estimation

The cost of the framework can be ascertained by drilling down the equipment parts at first required to every framework. For the most part sensors go about as the spine so beginning from sensors we can ascertain the cost of the entire framework. In the paper, Smart Data Pricing Models for Internet-of-Things (IoT): A Bundling Strategy Approach by Dusit Niyato, Dinh Thai Hoang, Nguyen Cong Luong, Ping Wang, Dong In Kim, and Zhu Han expresses a well productive technique to ascertain the entire cost of an IoT based framework. The Smart Data Pricing (SDP) can be utilized as a part of IoT based frameworks with the goal that compelling cost administration can be received. Specifically, with SDP, costs are utilized to pick up profits for suppliers as well as to give instruments to enhance framework and information administration. The SDP strategy guarantees to give high administration quality and high income. The two imperative qualities that make up the SDP are adaptability and motivating force. Adaptability expresses that as opposed to utilizing static valuing, we can utilize evaluating on the request contingent upon the necessity of the client. By this we can diminish a considerable measure of cost as wastage of Money can be lessened. Though if there should be an occurrence of motivating forces we have gadgets that may have a place with various proprietors who may have no enthusiasm for the joint information

administration. In this way, the utilization of SDP can pull in such autonomous gadget proprietors to take an interest in IoT, enhancing the administration quality. The model clarified here is of extraordinary use as with regards to IoT framework we can't anticipate the cost and keep up it until the finish of finishing the item. In this manner SDP can delineate the general cost of the IoT based framework viably.

### D. Project Scheduling

The approach of IoT in project management is appropriate of its web empowered execution yet despite the software for venture conduct and procuring venture supervisors will help us in taking care of the tasks for research or improvement in a better way. What's more, regardless of whether our tasks are not IoT related today, they will be sooner rather than later. For instance in the event that you are burrowing the street or taking a shot at some result of home apparatus or working in the apparel business, how does the web of things impacts venture administration there. IoT is a wide term yet we can limit it down to improve our understanding they say essentially it's a system's administration thing that have something implanted which permits to accumulate and share information. Beginning from wellbeing care, it can even aware of medicinal services issues emerging. The greater part of this simply in view of one dress. Another point is that this dress can even alert the person from some dangers. Like they don't know about an auto coming up from behind them and they may get hit shape that auto. It doesn't fundamentally incorporates wires hanging all around or enormous things leaving the dress only some specialized things installed as a string or whatever stuff the dress is comprised of. As said, IoT will change the way we drive our plans of action, it may change the way we work together, computerizing things that are done physically today or in the close past. Same things will be altered by the utilization of IoT. It will have constructive outcomes upgrading proficient efficiencies and operational efficiencies.

## V. CONCLUSION AND FUTURE WORKS

The undertaking altogether rely upon IoT and through this task specialists can spare part of time in their discussion and in addition it makes them simpler to counsel a patient for little illnesses. People at rural areas are highly benefited by this machine as it's hard for them to consult a doctor as in some areas the availability of doctor is beneath. When in case of emergency the machine can checks the available machine nearby or give information to nearby hospital. Day



by day advancement of IoT in healthcare can also be used in this project so that everything will be easy and useful to common man as well as for poor people. As technology advances we can make this model some more efficient and simple. Primary proverb we can attract from IoT is to make something that is useful to ordinary citizens which makes their regular work simpler.

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