

Enhancement of Internet of Things (IOT) for Minimizing the Growth Rate of Disease and Cost Reduction

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Abstract

Health Related issues has become a savior diseases as growing rapidly they also causing savior issues if they not cure they lead to even death. Fatal Diseases needed to be controlled at early stages to save the patient lives. The Knowledge related to the disease is also important so that it may be cure as soon as possible and also medicine for the illness is also needed to be supplied immediately so that it can be controlled. Some patients also need a continuous monitoring like aged and someone suffering to some fatal disease .IOT based monitoring system with the application of the Raspberry pi and the usage of the Local Area Network to connect the Doctors, Hospital, and Ambulance service also the pharmacy help to start the treatment of the patient effectively. Also acknowledging the doctors and hospital staff will help to save the life of the patient due to knowledge of the disease. Usage such smart and reliable technology will help to monitor the health condition of the patient at home and also connecting with the doctors through the internet will also acknowledge the doctor about the present condition of the patient. This paper presents the effective use of the smart devices and technology to overcome the disease by using such cost effective technology.

Keywords:

Health , Network , Doctor , Treatment , Acknowledging

1. Introduction

It is to be considered that in future there would be a strong relationship between physical sensors and internet of things (IOT). These IOT devices which consist of networks along with the embedded software network connecting devices and some sensors known to us .All of these thing are used to exchange the data so called the information for finding out the solutions for the problems. Different types of sensors are being used to collect the different type of information related to the patient . The connection of the IOT with the medical field is going to be considered as miracle for improving the quality and availability of effective services .Using sensor of IOT for the medical field to collect data of the disease. It will help most of the elder and old patience which require continuously supervision. The main focus of the Technology is to reduce the cost. Also the better care of the patient which usually disturb due

to human error or irresponsibility etc All such implementations are applicable if we use the intelligent system which can recognize the changing which are occurring in the patient health and also some powerful algorithms so that we get the critical and real data and also analyze such data so that we easily cure the patient within few minutes. Rather than we implement the complete treatment from the very first time. But how such communication will be well proceed effectively so that we can treat the patient according to the disease and diagnose that the subject is suffering in symptoms of different disease or not Many Patients all over the World died due to insufficient availability of time at the sport caring health situations out of control. Also aged patients are also affected by these emergency circumstances due to the lack of proper care and monitoring.

Physiological Monitoring is Compulsory for the critical and aged patient's which are not admitted in Hospital for Long Time. In such circumstances IOT based patient health monitoring system will be used to connect with the doctors to inform them the Current Situation of the Patient .For Such purpose we use the Raspberry Pi Board as a Gateway to check the Condition of the Patient Via Different Sensing Devices Attached with the Raspberry PI Board and send the Physiological parameter value of the patient to the Doctor Via Internet and Give the recommended remedy to the patient .The System will also helpful in such a cases in which it not possible to carry patient to hospital and we implement the IOT based Raspberry PI Device with the Connection of the Sensor Devices to Check the Health Condition of the Patient at home and take the prescribed medicine as a First Aid for Relief and when you reach hospital as soon as possible.The System will also helpful in such a cases in which it not possible to carry patient to hospital and we implement the IOT based Raspberry PI Device with the Connection of the Sensor Devices to Check the Health Condition of the Patient at home and take the prescribed medicine as a First Aid for Relief and when you reach hospital as soon as possible.Using IOT Based Sensors are getting more and

more popularity and value in the Era of Technology because Continuous Monitoring of serious Patients and Sometimes unexpectedly Change in Health Create problems. In such situation Raspberry PI IOT Based Technology is useful to check the Condition and Send the report to the emergency Via SMS or Internet Based Applications for preliminary treatment .Health monitoring of some patients is required to check on regular basis in such circumstances IOT has provided the Raspberry Pi based Technology to make sure the health of aged patient and serious patients at home on regular basis without disturbing everyone. On daily basis routine health monitoring is helpful.In many cases while using medicines many side effects may also occurs due to fake medicines.IOT based system using Raspberry PI technology with sensor devices detect the effects of the medicines on the patient's body like allergy or any other. It will then notify the medicines company to improve the quality of medicine in real time by informing through internet or mobile phone . You may elaborate the Patient Condition .It will be Help Full in timing saving Manners Because We Know will not waste time for Diagnosing Disease from its Early Stages. Many patients die due to lack of treatment or knowledge of disease or delay in treatment But with the Invention of IOT toward the health care industry will help to reduce many such issue to some extent .Many people how cannot afford the treatment of big disease like cancer can be cure at initial stages..With the invention of many RFID and sensors it is now possible to connect the patients with the hospital so the proper treatment can be used to cure them from many fatal diseases.

2. Literature

The goal of the project is to develop a system that should be low cost and efficient in working so that we detect the disease timely and cure it as soon as possible. Because many of the patients are illiterate they even not recognize in which problem they are suffering and some basic old tactics they use which may result in to some fatal disease. Even they not know the effects of the drugs they are using. This may lead to some fatal results. The use of medicines without concern with the doctor leads to some serious results. The Proposed System of IOT based technology Using Raspberry PI along with the sensors and Local Area Network will help to create a link between the Hospital emergency, Doctors for Recommendations, Ambulance and The Drug houses will help to cure the disease as soon as possible. The sensing devices will detect the Condition of the patients and send the Report to the All the People Connected through the System. To the hospital Emergency, Doctors for Recommendations, Ambulance and The Drug houses. If the disease can be cure at home without visiting the hospital the pharmacy will deliver the recommended medicines to the Patients home using Cash on Delivery

Service so, that the patient will use the recommended medicine not any other medicine. If the condition of the patient is savior then the ambulance will carry him to the hospital and the emergency will already know the Condition and the reasons so they may get ready according to it and treatment from initial stages does not need to be starting to recognize the happen. They will know it and they start the treatment to save the patient life.

2.1 Proposed Methodology Software Components

C++ Programming Language

C++ Programming Language is used for Coding Purpose. Codes For Giving Instructions to Various Health Measuring Sensors Attached With The Device. We Code related to sensors it gives Instructions to that Sensor and it Will Measure the Patient Condition and Show the Results of it.

Python Programming Language :

Python is also the One of the most Popular Language Being Used in The Medical Field .We Write the Code Of the Sensor Which will Perform The Operations in The Editing Window and It will Send Instructions to The Sensor Attach With The Device and It will Measure The Patient Condition and Display Its Results On the Screen.

Mobile App

Mobile App is Also Attached with The System Using IOT Techniques and The Results Will Also Display On the Mobile Screen Regarding The Patient Condition. Alert Will Show On the Screen When any Patient will be treated .At The Same Time Doctor Recommend The Medicine Related to The Disease and If the Serious Condition occur Then treatment does not to be diagnosed from the Start. Treatment will be started immediately

Hardware Components

Raspberry Pi

Raspberry PI is The Hardware Sensitive Device Which May Called the Mini Computer. Its Operating System is Installed in it using the Memory Card .It Works By Attaching It with the System Using Ethernet Cable .It Also Works By The Wi-Fi Technology. Library Files Of the Sensors are Installed in it and All The Sensors are Attached With it at Different Ports and GPIO Pins.

Pulse Oximeter Sensor

Oxygen saturation is defined as the measurement of the amount of oxygen dissolved in blood, based on the detection of Hemoglobin and Deoxyhemoglobin. Two different light wavelengths are used to measure the actual

difference in the absorption spectra of HbO₂ and Hb. The bloodstream is affected by the concentration of HbO₂ and Hb, and their absorption coefficients are measured using two wavelengths 660 nm (red light spectra) and 940nm (infrared light spectra). Deoxygenated and oxygenated hemoglobin absorb different wavelengths Deoxygenated hemoglobin (Hb) has a higher absorption at 660 nm and oxygenated hemoglobin (HbO₂) has a higher absorption at 940 nm. Then a photo-detector perceives the non-absorbed light from the LEDs to calculate the arterial oxygen saturation. A pulse oximeter sensor is useful in any setting where a patient's oxygenation is unstable, including intensive care, operating, recovery, emergency and hospital ward settings, pilots in unpressurized aircraft, for assessment of any patient's oxygenation, and determining the effectiveness of or need for supplemental oxygen. Acceptable normal ranges for patients are from 95 to 99 percent, those with a hypoxic drive problem would expect values to be between 88 to 94 percent, values of 100 percent can indicate carbon monoxide poisoning.

3. Electrocardiogram (ECG)

The electrocardiogram (ECG or EKG) is a diagnostic tool that is routinely used to assess the electrical and muscular functions of the heart. Electrocardiogram Sensor (ECG) has grown to be One of the most commonly used medical tests in modern medicine. Its utility in the diagnosis of a myriad of cardiac pathologies ranging from myocardial is chemia and infarction to syncope and palpitations has been invaluable to clinicians for decades. The accuracy of the ECG depends on the condition being tested. A heart problem may not always show up on the ECG.

Blood Pressure

Blood pressure is the pressure of the blood in the arteries as it is pumped around the body by the heart. When your heart beats, it contracts and pushes blood through the arteries to the rest of your body. This force creates pressure on the arteries. Blood pressure is recorded as two numbers—the systolic pressure (as the heart beats) over the diastolic pressure (as the heart relaxes between beats). Access Monitoring blood pressure at home is important for many people, especially if you have high blood pressure. Blood pressure does not stay the same all the time. It changes to meet your body's needs. It is affected by various factors including body position, breathing or emotional state, exercise and sleep. It is best to measure blood pressure when you are relaxed and sitting or lying down.

Glucometer

Glucometer is a medical device for determining the approximate concentration of glucose in the blood. A small

drop of blood, obtained by pricking the skin with a lancet, is placed on a disposable test strip that the meter reads and uses to calculate the blood glucose level. The meter then displays the level in mg/dl or mmol/l. Despite widely variable intervals between meals or the occasional consumption of meals with a substantial carbohydrate load, human blood glucose levels tend to remain within the normal range. However, shortly after eating, the blood glucose level may rise, in non-diabetics, temporarily up to 7.8 mmol/L (140 mg/dL) or a bit more.



Blood Pressure Device

Blood Pressure does not remain the same all the time it changes with the position time to meet the needs of your body. Blood Pressure changes according to the body position including while you are breathing, sleeping, taking exercise or you are emotional. Best way to measure the Blood Pressure is while you are sitting or lying down. High Blood may lead to heart attack, stroke or failure of kidneys. Prominent Reasons for the high blood are not fixed. Best way to overcome this issue is by checking Blood Pressure on Regular Basis. Best Results are obtained by Calculating the Blood of The person at least two to three time and then find the average of it .Its average will give the accurate results



Glucometer Device

Normal Person glucose level changes little bit after eating the meal up to 7 or 8mmol/L .Normal Person glucose level in routine life circumstances remain up to 100 and 120 mmol/L. If you check his/her glucose after eating the meal it shows the little bit change in it. While a person suffering

from the Diabetes has different level of glucose. Aged person suffering from it may normal sugar level high than the normal person. It may sometimes 140 to 160. After eating the meal their glucose level shows 10 to 20 mmol/L difference. Some Diabetes patient's glucose level may also decrease even lower than the normal level. Some Diabetes patient's glucose level remains normal if they continue taking exercise and maintain their diet. While some patient's sugar level increases after taking meal. These patients use insulin before taking meal or uses tablet on regular basis.



4. Conclusion

The proposed paper and the paper already published show some of the similarities. IOT technology including the use of Raspberry pi along with the sensors to measure the condition of the patient. These low cost devices can be used at home to check the body condition of the patients which required continuously monitoring. They just mentioned how we calculate but not performed the calculations. Also not mentioned we recognize that the result is accurate or not. But the proposed system Measure the Blood pressure, Sugar level and oxygen level in the human body and also shows the results on the screen. These sensors measure the accurate condition of the patient and also send the report to the entire connected person using Local area network. Proposed system has joined the hospital emergency, Doctor, Pharmacy and ambulance for the emergency. Sensors generated report is send to all the connected Persons. This will help the doctor to start the treatment instead of wasting timing for diagnosing the reason for such condition of the patient. If the Condition of the patient is stabilize by using just medicine then the pharmacy will deliver the medicine advised by the doctor to the patient by home delivery methodology.

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