IOT BASED MONITORING OF PHYSIOLOGICAL PARAMETERS OF PATIENT

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COLLEGE : KHAJA BANDA NAWAZ COLLEGE OF ENGINEERING, KALABURGI
BRANCH : DEPARTMENT OF BIO-MEDICAL
GUIDE   : DR.RUKSAR FATIMA
STUDENT : MS. SHAZMEEN FATIMA

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Introduction:

According to a Research,we found that the cardiovascular disease is the leading global cause of death, accounting for 17.3 million death per year,a number that is expected to grow to more than 23.6 million by 2030. That's about one of every three deaths in India. This is because various reasons such as non availability of the correct treatment on time especially in rural areas. And because of the careless attitude in urban areas. The main reason behind this project is for the welfare of Humanity i.e to serve people with necessary precautions and treatments on time,thereby saving many lives of the people using the current IOT technology.

Objectives:

1. The sensors are attached to the patients body and the analog values are picked up by the respective sensor.
2. The analog values from the sensors are given to the microcontroller i.e arduino mega 2560 used in this prototype. The signals are processed and converted into digital, which are displayed on the PC or smart phones.
3. Various parameters like temperature, pulse rate and ECG are measured,and digitial values from the analog input can be visualized in the smart phone.
4. The parameters that are displayed are: Temperature in degree Celsius, pulse rate in BPM(beats per minute), ECG digital values of the wave, latitude, longitude.
5. Arduino is an integrated development environment used to create software to be run on IOT based systems. The codes are written , verified/compile, and uploaded onto the microcontroller.
6. The serial data is viewed on the PC using this software.
7. Real time monitoring of patients health based on IOT technology for effective monitoring of patients from various place.

Methodology:

IOT makes our lives easier in every aspect. In this prototype we make use of same technology to increase the efficiency of patient monitoring irrespective of their location. This system provides a solution for measurement of various physiological parameters like ECG, temperature, pulse rate along with the current condition and location of the patient. In this prototype various parameters from variety of sensor's attached to human body are monitored using arduino mega board, which is displayed on PC(connected via the USB) and all the

parameters are also transmitted periodically to the physician. At the receiver end the patients parameter can also been analysed in the smart phones available . GPS technology is used to send the location of the patient. We also make use of an accelerometer for fault rate detection. In critical cases i.e when any parameter value is above or below its Normal range an immediate alert message is sent to the receiver end(physician or care-taker) along with location. The software used in this prototype is Arduino IDE which is an integrated development environment, a program for Arduino may be written in any programming language for a computer that produces binary machine code for the target processor. Atmel provides a development environment for their microcontroller, AVR studio and the newer Atmel studio. 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 inputs and output procedures.

Components:
- Arduino mega board 2560.
- Bluetooth module.
- Temperature sensor.
- ECG sensor's.
- ECG module.
- Pulse sensor.
- GPRS+GPS module.

Results and conclusion:

The effort has done to study various articles research papers and experimental setups and their results. After detailed study of these papers it is found that there is a scope of conducting an experiment on IOT based health-care device. The detailed study of various articles research papers as well as from the experiments carried out by this prototype it reveals the following results:

- Lowered cost of care
- Improved patients outcome.
- Real time disease management.
- Improved quality of life.
- Improved user experience.

The proposed internet of thing in medical devices is not only very applicable to elderly people living by themselves, but should also be found very useful for monitoring hospital patients and persons in long term monitoring.

Final goals of the project are reducing the hospitalization and assistance costs, and increasing patient's and family's quality of life, making them feel inside an organized and efficient community. Furthermore, we believe that other populations of patients, such as elderly people may benefit of the creation of similar networks.

Scope for future work:

The sudden death of solitary living elderly people is now a serious problem in many countries. The main causes are cardiopulmonary cessation and cerebral vascular accident.

Numerous types of human activity recording systems have been developed for recording posture, behavior and activity and for monitoring health conditions and living patterns, such as activity rest time periods, sleep quantity and quality, general activity level and circadian rhythms.

So in this regard there is a scope to develop a prototype model that collects data from the sensors, codes the data into a format that can be understood by the controlling section so that the health monitoring can be done in an efficient manner. And the physians may easily retrieve the previously record data for the treatment from any part of the world.