

An IoT based Remote HRV Monitoring System for Hypertensive Patients

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Abstract - In many countries, the important public health issue is that patients with chronic diseases are increasing rapidly. This accelerated many studies on a healthcare system that can whenever and wherever, extract and process patient data. For effective care, a patient with a chronic disease conducts self- management at the hospital environment and particularly at home environment. So it is necessary to provide integrated and personalized healthcare services. A service flow and a new model for personalized healthcare system architecture supporting an at-home and at-hospital environments are proposed to provide effective care for chronic disease patients. The system provides various chronic disease care services considering the different characteristics of at-hospital and at-home environments. The effectiveness of the system is shown by providing a prototype implementation, and a predicted cost model. An at-hospital environment and personalized self-management of chronic disease in an at-home environment that supports cost-effective disease care is proposed at the personalized healthcare system.

Key Words: Chronic, Environment, Healthcare, Personalize.

1.INTRODUCTION

Continuously monitoring and observing the health parameters like glucose content, temperature, heartbeat, etc is very difficult today. It requires manpower to monitor. If In case the human being careless or engaged in different work or tiredness they can't monitor. So in this situation death is also possible. We are living in the 21st century in this century year science and technology evolves a vital role. In this project embedded technology has been used. The health parameters are being measured by using different types of sensors. These values are given to the input of the ARDUINO controller. An ARDUINO controller compares the values from the sensors and takes the necessary action on that.

2.EXSISTING SYSTEM

In many applications, wireless technology has propagated the use of sensor networks. In general purpose computing components, sensor networks join small sized sensors and actuators. Such networks comprise hundreds and sometimes thousands of self-functioning, low power, inexpensive wireless nodes to observe and influence the surroundings. Unlike most of the existing methods with systems, there are many wireless technologies are available to monitor but the range of distance is limited.

2.1 DISADVANTAGES OF EXISTING SYSTEM:

- It requires manpower to monitor
- Continuously monitoring and observing the health parameters like temperature, heartbeat, etc is very difficult.

3.PROPOSED SYSTEM

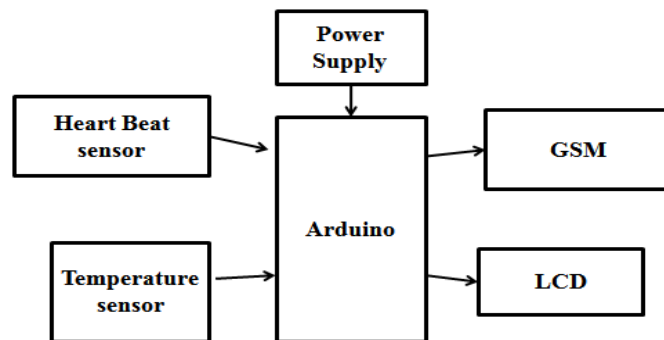
In this session, we are using IOT for monitoring. In IOT there is no limit to distance. We can monitor the patient heartbeat and temperature from anywhere through the internet. Our approach is to monitor real-time temperature and heart rate through the cloud. The collected temperature and heart rate can be stored and analyzed in real time through an IOT technology for prognosis and diagnosis. The proposed hardware system consists of a single chip microcontroller embedded with GPRS to

connect the internet. Results shown at the proposed system could be comparable to medical-grade services. By using thing speak server account we can analyze those signals directly in our mobile phone using the internet at anywhere from the world.

3.1 ADVANTAGES OF PROPOSED SYSTEM:

- Very compatible it is very useful in medical camps.
- Useful in hospitals it reduces the heavy equipment.
- Very use full in taking care of disabled persons.
- Low power consumption, more reliable, more compatible, less cost.

4. MODULES



4.1 Arduino

- The Arduino microcontroller is easy to use. It is a powerful single board computer that has gained considerable traction in the hobby and professional market. It is open-source, which means the hardware is reasonably priced and development software is free.
- The Arduino programming language is a simplified version of C or C++.
- An important feature of Arduino is that we can create a control program on the host PC and download it to the Arduino, and it will run automatically.

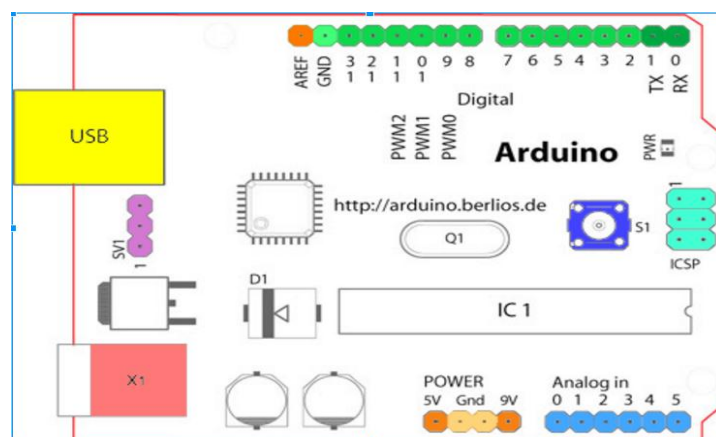


Fig1: Arduino Board Overview

4.2 Heart Beat Sensor

- Heartbeat sensor is designed to give a digital output of a heartbeat when a finger is placed on it. When the detector is working, the beat LED flashes in unison with each heartbeat.
- The obtained digital output is connected to Arduino, directly to measure the Beats per Minute (BPM) rate.
- The sensor works on the principle of Light modulation by blood flow through the finger at each pulse.

4.3 Temperature Sensor - LM35

- We can measure the temperature more accurately than using thermistors. The sensor circuitry is sealed and not subjected to oxidation, etc.
- Possesses a low self-heating capability. The output voltage is converted into temperature by a simple conversion factor.
- The operating temperature range is between -55°C to 150°C. It is a precision IC **temperature sensor** with output proportional to the temperature.

4.4 Power Supply

- Power supply delivers an exact voltage to another device as per its needs. The power supplies available today in the market are regulated, unregulated, variable, etc. The decision to pick the correct one depends on the device we try to operate with the power supply.
- The AC mains are now fed to the transformer, which steps down the 230 Volts to the desired voltage. The bridge rectifier follows the transformer thus converts AC voltage into a DC output and through filtering, the capacitor feeds it directly into the input (Pin 1) of the voltage regulator.
- The common pin (Pin 2) of the voltage regulator is grounded. The output (Pin 3) of the voltage regulator is first filtered by a capacitor, and then the output is taken.

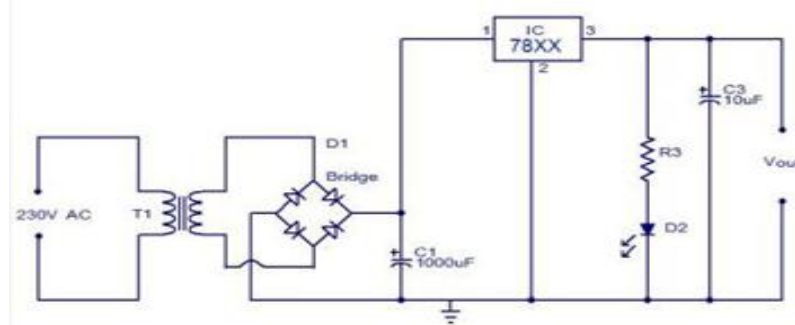


Fig2: Power supply

4.5 GSM

- GSM is Global System for Mobile communication.
- It is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group that was established in 1982 to create a common European mobile telephone standard.
- Using this GSM, the system sends a notification of the patient's condition to the concerned person at an emergency case.

4.6 LCD

- LCD (Liquid Crystal Display) screen is an electronic display module that is used in many applications. A 16x2 LCD display is a very basic module and is very commonly used in various devices and circuits.

5.RESULTS



Fig3: Uploading data through heart beat sensor

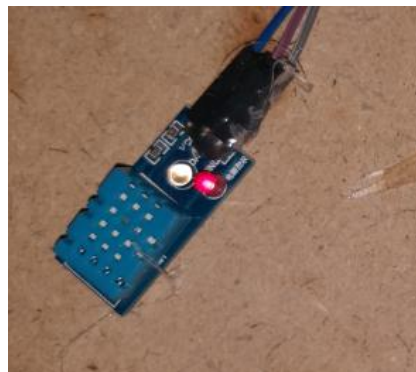


Fig4: Uploading data through temperature sensor

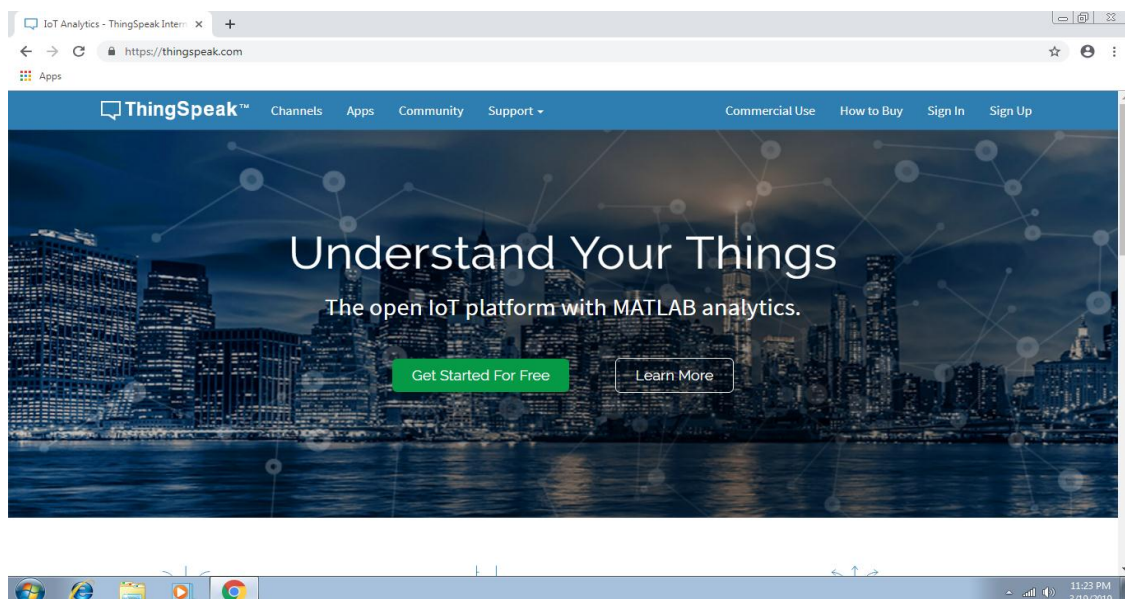


Fig5: ThingSpeak Cloud Server

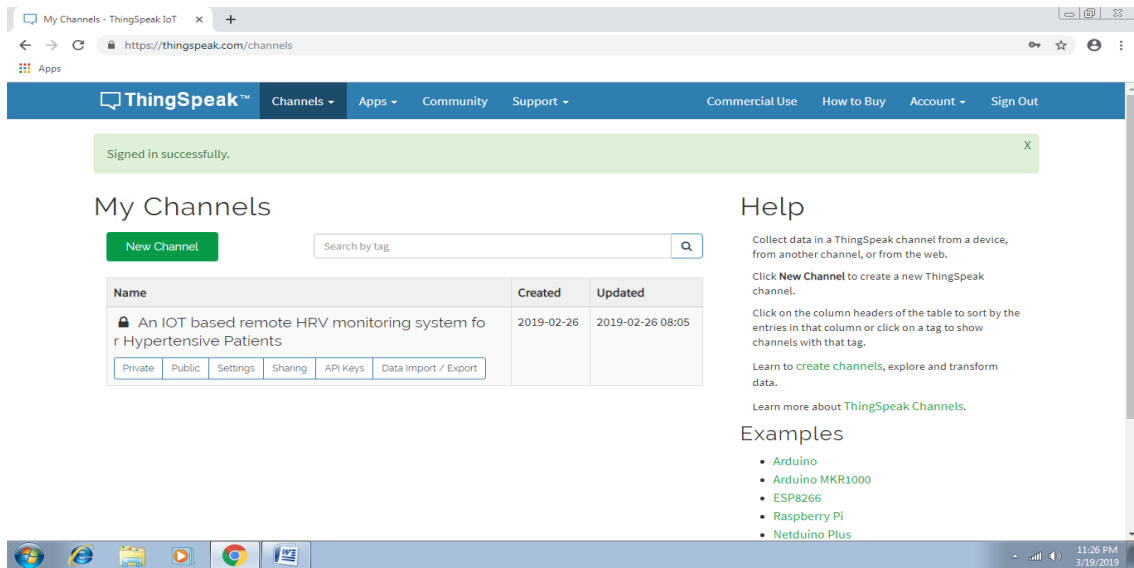


Fig6: Channel created to monitor the system

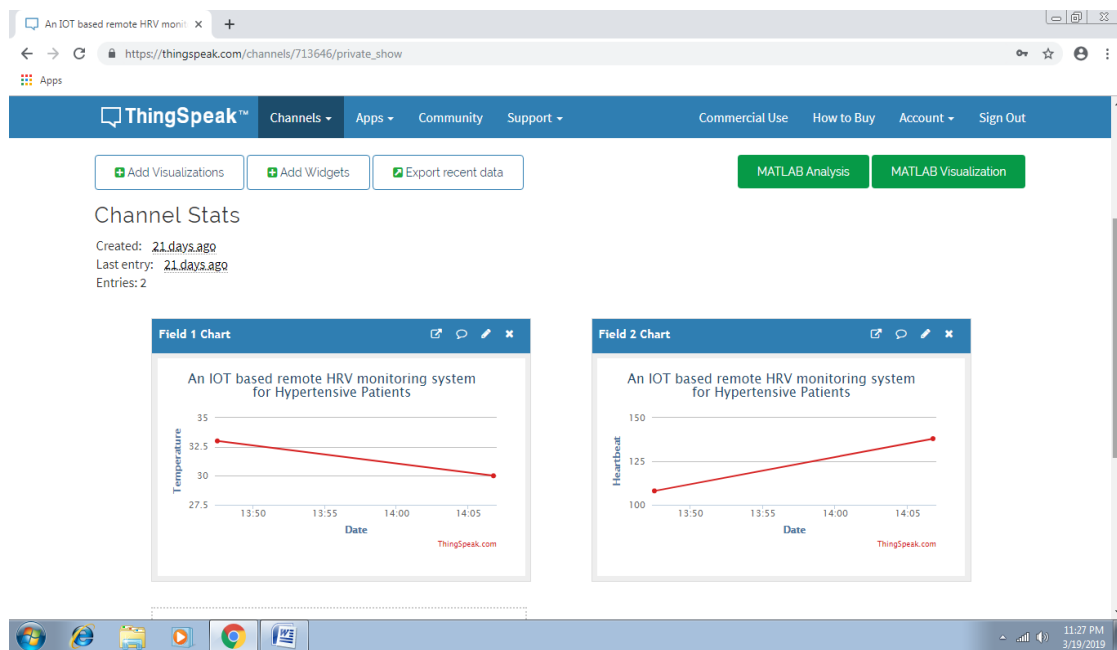


Fig7: Graphs generated

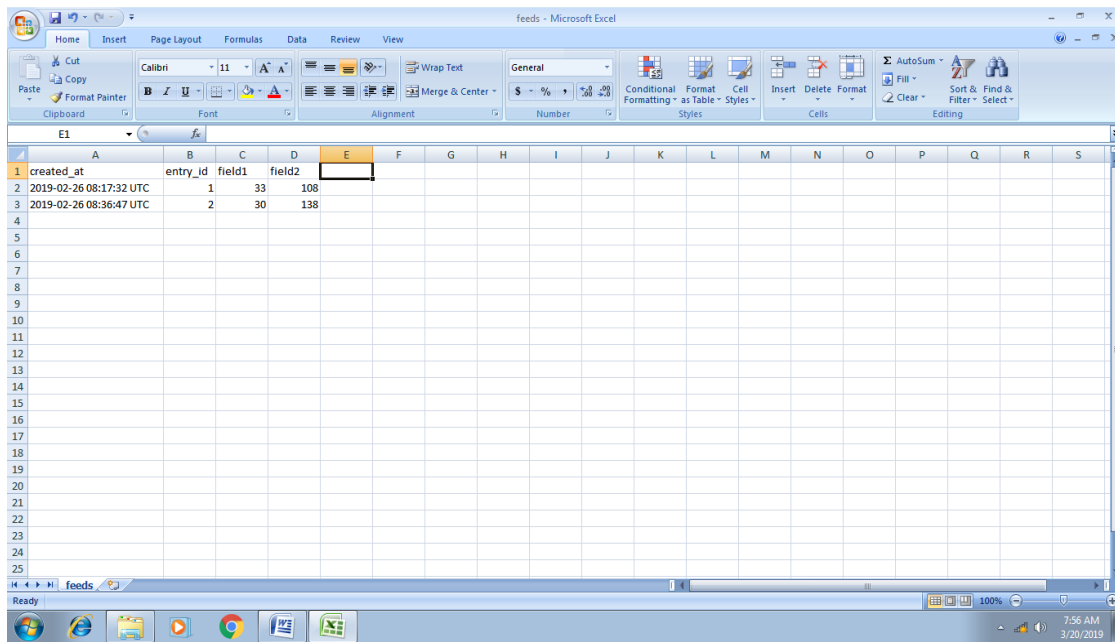


Fig8: Data stored in CSV format

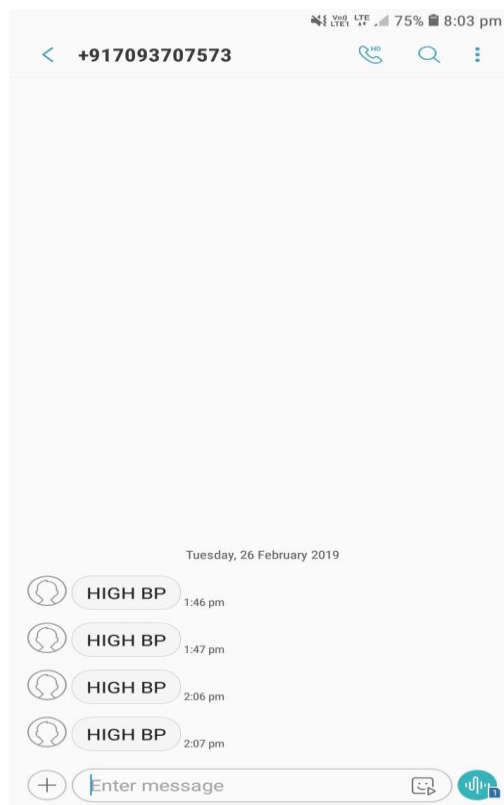


Fig9: Screenshot of messages received to mobile

5. CONCLUSIONS

We have completed the project research by implementing IOT based technology. We overruled the drawbacks caused by the existing technology i.e., RF which is limited distance communication compare to IOT.

6. FUTURE ENHANCEMENT

In the future, An IoT based Remote HRV Monitoring System can be further enhanced to include following features:

- The system can be extended to monitor the patient's temperature rather than room temperature.
- Group: Apart from sending an emergency message to a single person, we are planning to extend this system to incorporate as a group.

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