An IP Based Patient Monitoring Smart System in Hospitals

Likith bhushan H N[1] Niranjan K R[2]
[1]M. Tech. Student [2]Assistant Professor
[1,2]Department of Medical Electronics
[1,2]BMS College of Engineering Bangalore, India

Abstract— Wireless networks are widely deployed in many areas like military, mining, health care, health care etc. These WSN consists of much small, low wireless power, intelligent sensor node and more base stations. WSN networks generally operate in areas to which man does not have access. The distinguishing factor of WSNs is that they operate unattended over a period of time. These features have led to the success of the WSNs in real world deployment. WSNs are typically made of resource constrained devices that are low-cost, low-power and low-bitrate supporting short-range communications. In the project, the concepts of WSN have been applied to health care wherein parameters like temperature and heart rate are measured in remote locations and make it available to the doctors. This allows the doctors to analyze the parameters and determine the condition of the health care system and initiate steps if necessary.

Key words: WSN, IoT, Sensors, Sensor Nodes, Heart Rate

I. INTRODUCTION

The world has shriveled is an expression heard all around. This has been conceivable in light of correspondence. Correspondence is what defines in our everyday every last exercises. Communication technology will encompasses an expansive scope of mediums, from the worldwide web radio to the TV to every remote flag suppliers. It will be utilized as a part of the business circle, in this individual connections furthermore out in the open spaces that are neither principally in business nor in individual, for example, a tram stop that will utilizes TVs to communicate plan changes. Customarily, correspondence innovation is with confinement to equipment, for example, the radio receptors or TVs. In any case, with this prominence of remote advances has correspondingly made with the idea of correspondence innovation marginally more ethereal. Remote Networks is one of the perfect innovation.

II. NEED FOR THE PROJECT

All the things that were previously inaccessible have become accessible due to Wireless Sensor Networks. In these recent times, wireless networks which have been widely deployed in many areas such as military, mining, health care, health care etc. WSN networks generally operate in areas where a man cannot reach for activities such as structural monitoring, environment monitoring etc., and most of WSNs operate unattended over a period.

WSNs operate in complex and noisy real-time, real-world applications. Whatever we thought was impossible before is possible because of WSNs. Home automation systems, monitoring of parameters pertaining to health care, geography, environment etc., at low cost has been possible because of WSNs. Therefore, we have explored WSN to apply to precision health care as well.

This project proposes a novel approach to address all the above listed problems about the health care. The proposed technique involves various steps like Data acquisition, computation, and actuation for the health care. It involves the implementation of network for monitoring the health care unit with parameters like temperature, heart rate and so on using various sensors. The acquired data from various health care units will communicated wirelessly to a remote station, and then interfaced to a Network enabled host computer, wherein all the received data will be displayed real time on a web page. Based on the data available some parameters can be controlled to maintain the unit with some actuators to maintain the parameters at their standard acceptable levels, adding some organic compounds.

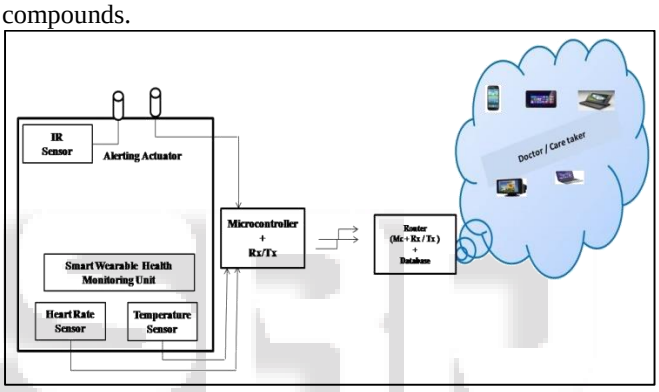

Fig. 1: Block Diagram of the proposed system

III. IMPLEMENTATION

Temperature sensor is integrated with the telos module. This set up is for single parameter measurement. Only body temperature of the patient was measured. Output pin of temperature sensor was connected to the ADC pin of the PCF8591. Output obtained from the analog to digital converter is given to the GPIO pin of Telos. Temperature sensor continuously senses the temperature.

Analog value of the temperature sensor was obtained at the output pin of the LM35 sensor.

Output from LM35 pin was transmitted telos via ADC pin.

Telos module was programmed to perform the wireless transmission of data.

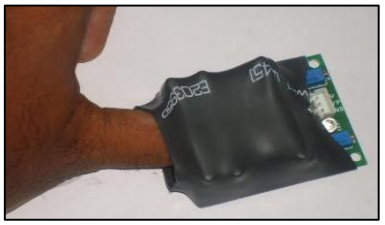

Fig. 2: Heart Rate Sensor

Three healthcare parameters were considered for multiple sensor integration. Heart rate, humidity and temperature sensors were connected to the telos b module

via the GPIO pins. Heart rate, humidity and temperature sensors continuously sense the parameters of human body. Sensed values from the sensors were transmitted to the Telos B module via GPIO pins. Wireless transmission of data was performed

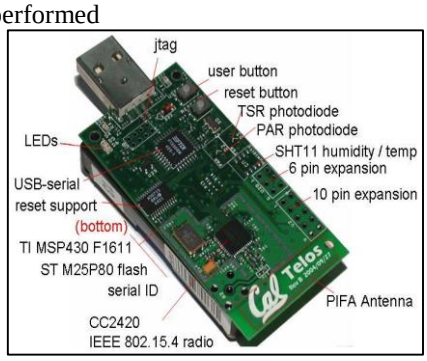

Fig. 2: Telos B mote

The block diagram shows the monitoring of remote health care sensor resources using CoAP. The architecture has two network segments, namely health care field network and Monitoring Network. Field network consist of nodes that are interfaced to health care sensors.

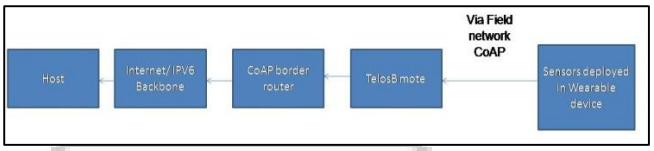

Fig. 3: Flow of Execution

The block diagram shows the monitoring of remote health care sensor resources using CoAP. The architecture has two network segments, namely health care field network and Monitoring Network.

Field network consist of nodes that are interfaced to health care sensors. The nodes run CoAP server managing the monitorable CoAP resources. The sensor resources and onboard sensor resources can be discovered and CoAP methods can be acted on them using the identified CoAP URI. The CoAP application network will be connected to the IPv6 backbone/internet using the CoAP Proxy/border router. The CoAP proxy is the gateway for the field network to connect internet using cellular network.

Monitoring network consists of CoAP client node(s) and web server. CoAP clients can be utilized for real-time access to sensor data, while web server can give access archived data to the farmer and the health care scientist.

IV. RESULTS

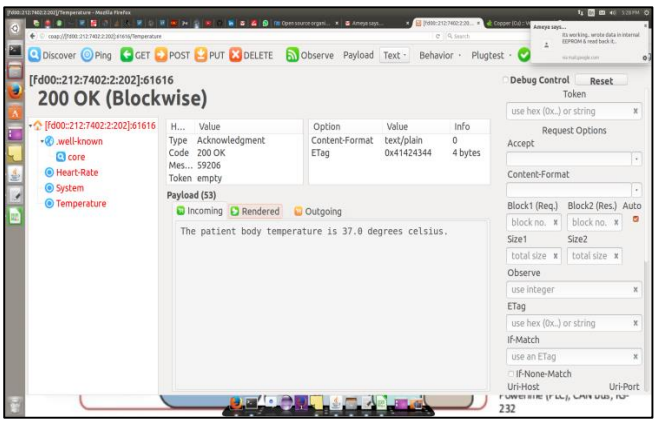

Fig. 4: Temperature monitoring using coAP

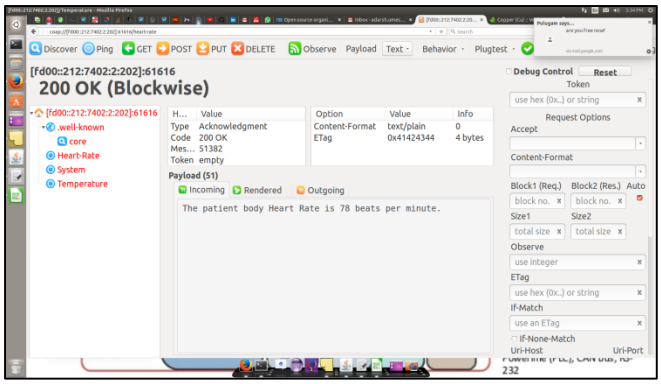

Fig. 5: Heart rate monitoring using coAP

V. CONCLUSION AND FUTURE WORK

The number of devices that will connect to the Future Internet is increasing exponentially. The 6LoWPAN adaptation layer enables assignment of IPv6 addresses to low-power wireless devices making them reachable from any other node on the internet. In this report, CoAP open application layer protocol utilized for real-time monitoring of IP-enabled health care sensors network is observed.

Future work includes the field deployment of CoAP-based health care sensors network and its connectivity to IPv6 backbone for real-time monitoring over the internet. This project can be used in precision architecture where even minute details are important, and has to be accounted to yield desired output. health care provides farmers with a wealth of information to improve decision making and enhance the inherent quality of farm products.

Further, more health care sensors such as pH and wetness can be used to improve the efficiency. In addition to monitoring, nodes can be connected to actuators in order to effect in response to a particular condition. Water can be sprinkled automatically if the acidity levels in the system increases. This reduces the dependability of labour in farming.

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