Remote Monitoring of Patients using Beaglebone Black

Surakshith K C
M-Tech CNE
T-John institute of technology
Bangalore, India

Nagashree K T
Assistant professor, Dept of CSE
T-John institute of technology
Bangalore, India

***Abstract*— Recently healthcare industry is trying to provide better monitoring of people anytime and anywhere in the world in a more economic, patient friendly and easy manner. The Medical Diagnosis Shield allows Beaglebone Black users to perform medical applications where patient monitoring is needed by using different sensors. Once the information is gathered by using the related sensors, the information is stored, this information can be used to monitor in real time and by this we can analyze the state of a patient and also we can get a sensitive data in order to be subsequently analyzed for medical diagnosis. Information gathered can be wirelessly sent using any of the connectivity options available: Bluetooth, WI-Fi and GPRS depending on the application.**

Keywords — Beaglebone black, sensors, ubuntu,graph

I. INTRODUCTION

The technology has become advanced in electronics and can be used almost in all aspects of day-to-day life, and the medical field is also advancing in the same way by making use of this technology. The people are becoming more conscious about their health problems prior to that the need of well equipped hospitals and diagnostic centers are increasing. In medical fields special units are used, such as intensive care unit or coronary care unit. All of these units are designed to offer the advantage of the low Nurse - Patient ratio and concentration of the equipment and the resources needed, to take care of critically ill or seriously injured units.

The medical world today faces two basic problems when it comes to patient monitoring, firstly the need of healthcare providers present beside the patient and secondly the patient is restricted to bed and wired to large machines. In order to achieve better quality patient care, the above problems have to be solved. As the technologies are advancing it has become feasible to design to patient monitoring system to display, record and transmit signals from human body to any other location. This paper discusses the aspects of Parameters like pulse and body temperature, by using these parameters the information is collectively gathered and the collected information can be wirelessly sent using any of the connectivity options like Bluetooth, WI-Fi, 3G and GPRS depending on the application.

II. PROBLEM DEFINATION

The system proposes an approach that leverages web service to create a loose coupling between the sensor and the main control computer. This loose coupling relieves us from having a complex interaction between the sensor and the control computer. This coupling also allows us to interchange sensors with a minimal effort. This means that a vehicle could be assembled on demand to meet the current mission scenario.

III. EXISTING SYSTEM

- There are a number of technologies that have been proposed, developed and deployed to enable this communication.
- Wireless systems provide a cost-effective option that can be both reliable and scalable.
- The choice of wireless technology Wi-Fi, WiMAX and cellular data service are the present wireless technology.
- In the present wireless technology there are lot of disadvantage is there that are range, cost, frequency bandwidth and maximum data rate is very less

IV. PROPOSED METHODOLOGY

Having known the problem statement and existing situation the idea used for solution of this problem is by using simple embedded processors that are affordable. The processors that are available in the market are Beagle Boneblack.

This project deals with arranging a sensor set up using Beagle Bone Black. The Beagle bone black board is a processor with multiple user friendly pins. The vital signs that need to be noted are attached to the pins of the board. The details of the same readings are sent to the secondary station via Networking

Eventually the board will move to the Sitara AM3358BZCZ100 device once released and readily available from TI. At this time we do not have a date when this happens.

We do not expect any benefit from moving to this device and there should be no impact seen as a result of making this move.

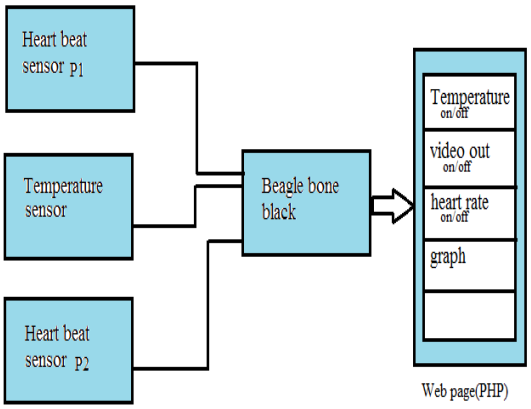

Fig: Beaglebone Black system design

ARM processor is the current trend and ARM Cortex A8 processor is a low power consumption processor with 1GHz frequency. In this project the processor architecture with the operating system and kernel present in it.

The reading of patient heart beat and temperature, graph of analog values are collectively gathered and by using the Beagle Bone black the result is read. The pins of the Beagle Bone Black are configured to read the values, the read values are send to remote area through the Php web page.

Having an establishment wireless topology has the benefit of speeding up the location of a fault or failure in the network using this architecture. Such capability enables immediately reporting any event and its geographic location in any matter of seconds.

KEY COMPONENTS

- The Sitara AM3358 is the processor.
- 512MB DDR3 is the processor dynamic RAM memory.

- Serial Debug is the serial debug port.
- PMIC provides the power rails to the various components on the board.
- DC Power is the main DC input that accepts 5V power.
- 10/100 Ethernet is the connection to the LAN.
- Ethernet PHY is the physical interface to the network.
- USB Client is a mini-USB connection to PC

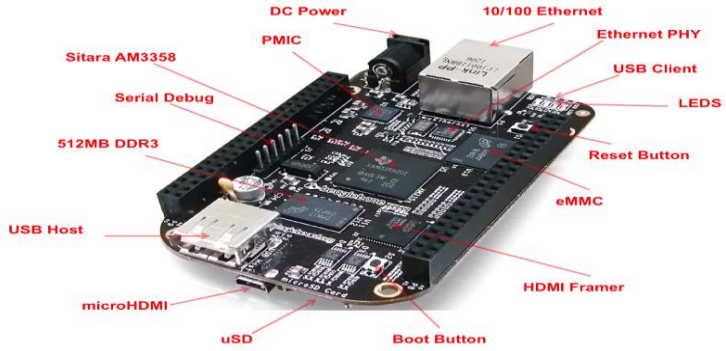

Fig: Beaglebone Black board

V SOFTWARE SPECIFICATIONS

Beagle Bone Black supports almost all the software languages that includes C, C++, Java- scripting, shell – scripting, Python, PHP etc. Installation of PHP and testing of PHP is Requirement Specification. HTML is also used for coding. C, Shell scripting, PHP are the main coding are mainly used as software language in this project. File System is the unique feature that this project focuses on. The objective here is to retrieve the data from the files.

VI POSSIBLE OUTCOME

Web page "main.php" is accessed by typing the IP address in Fire Fox web browser. Once the web page appears on the screen, if the sensors are working as expected, which is as explained earlier, the next thing is to retrieve these values in the created web page. The result is displayed. Depending upon the results graph is plotted.

The monitoring program shows the records of sensing values and patient's information like temperature and heart rate. the server PC can share the measured signals any internet connected client ,such as desktop, a laptop, a tablet, PC, or mobile device.

REFERENCES

[1] "Smart embedded medical diagnosis using Beaglebone black and Arduino" Ch Srikanth, D S Pradeep M,Sreeram Charan 2014.
[2] "Body sensor network – A wireless sensor platform for pervasive healthcare Monitoring " Benny P.L. Lo, Surapa Thiemjarus, Rachel King and Guang-Zhong Yang .
[3] "A Mobile-phone-based health management system" Yu-Chi Wu,National United University, Taiwan 2008
[4] "Microcontroller Based Heart Rate Monitor" Mohamed Fezari, Mounir Bousbia-Salah, and Mouldi Bedda Department of electronics 2008
[5]"Development of a Device for Remote Monitoring of Heart Rate and Body Temperature" Mohammad Ashekur Rahman, Atanu Barai, Md. Asadul Islam, M.M.A Hashem 2013
[6]"Remote patient monitoring system" Sherin Sebastian, Neethu Rachel Jacob, Yedu Manmadhan, Anand V, Jayashree 2012.

[7]"Temperature sensors and voltage references implemented in cmos technology" gerard c. m. meijer, senior member, *ieee*, guijie wang, and fabiano fruett

[8]"Real time health monitoring using gprs technology" Shubhangi M. Verulkar, Maruti Limkar department,K.C.College of Engg.,Nerul. Mumbai University.Electronics department,terna college of engg,nerul 2012.

[9]"Embedded patient monitoring system" Ramya, B.Palaniappan, Anuradha Kumari 2011.

[10]"Feasibility, Challenges, and Performance of Wireless Multi-Hop Routing for Feeder Level Communication in a Smart Grid" Babak Karimi Visvakumar, 2009.