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Android Based Biosignals Monitoring

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ABSTRACT:

Now-a-days Health care Environment has become technology oriented. Mobile phones based health monitoring allows caregivers a better way to monitor their patients. The aim of the project is to develop an android based application to monitor patient from a remote location as well as within the hospitals with graphical user interface [GUI] display. The basic monitoring system was developed in Laboratory Virtual Instrumentation Engineering Workbench [LabVIEW], which can wirelessly transmit and receive biosignals which is acquired from the patients. Zigbee is used to transmit and receive the data from Arduino Mega board, which is connected directly with an electrocardiogram [ECG] circuit and human body temperature sensor. The device gives many advantages to the patients since they can monitor anywhere and anytime continuously by the doctors, nurses or caregivers. Otherwise, burden cost can be minimized in terms of installation and maintenance of wiring in the hospitals or clinics and the problems regarding the lack of spaces in ward can be settled down by using patient monitoring system using the wireless sensor network. This project also creates the alerts to the doctors when the abnormal value detects. And also it provides database of the patient in which the patient's abnormal values are stored with corresponding time, date, parameter name.

Keywords -ECG, Pulse Rate, Zigbee, Arduino, LabVIEW, GUI, Android, Webserver

I. INTRODUCTION

Health monitoring is the observation of a disease, condition or one or several medical parameters. Health monitoring is vital in operating and emergency rooms, intensive care and critical care units. Continuous health monitoring can reduce the risk of infection, other complications and assist in providing patient comfort. Remote health monitoring [RHM] is a technology to enable monitoring of patient's health outside of conventional clinical settings, which may increase access to care and decrease healthcare delivery costs. Incorporating RHM in chronic disease management can significantly improve an individual's quality of life. It allows patients to maintain independence, prevent complications, and minimize personal costs. RHM facilitates these goals by delivering care right to the home. In addition, patients and their family members feel comfort knowing that they are being monitored and will be supported if a problem arises. This is particularly important when patients are managing complex self-care processes such as home haemodialysis. Key features of RHM, like remote monitoring and analysis of physiological parameters, enable early detection of deterioration; thereby, reducing number of emergency department visits, hospitalizations, and

duration of hospital stays. The need for wireless mobility in healthcare facilitates the adoption of RHM both in community and institutional settings. The time saved as a result of RHM implementation increases efficiency, and allows healthcare providers to allocate more time to remotely educate and communicate with patients.

II. PROPOSED METHODOLOGY

The proposed system consists of ECG circuit, pulse oximeter circuit and temperature sensor, Arduino Mega 2560 board, Zigbee transmitter and receiver. There are three electrodes used to acquire ECG signal from the patient, pulse rate is obtained by placing pulse oximeter on the fingertip and the temperature is obtained by placing LM 35 sensor in hand. Then, the Arduino Mega board read and interpreted the data which been transferred by Zigbee transmitter to the laptop and receive the data using Zigbee receiver. Finally the received data's are uploaded in internet by using web publishing tool in LabVIEW and viewed remotely in doctor's android device.

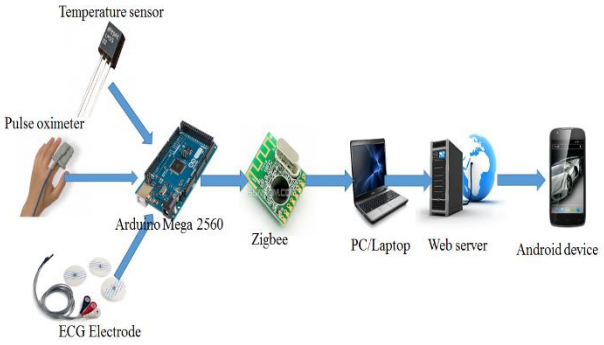


Fig:1. Overview of the Project

III. HARDWARE IMPLIMENTATION

The Arduino Mega 2560 is used here for acquiring the data from the temperature sensor (LM35),ECG,pulse, rate, respiration rate. The physiological parameters acquired from the patient is made available for display in both the display alongside the patient and also the central monitor display in the Nursing station.

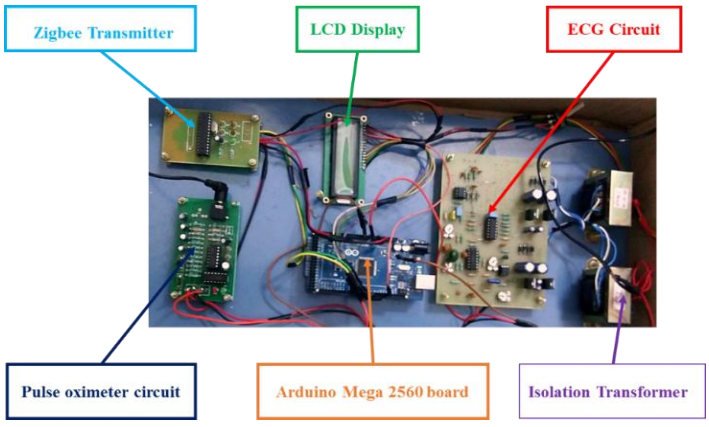


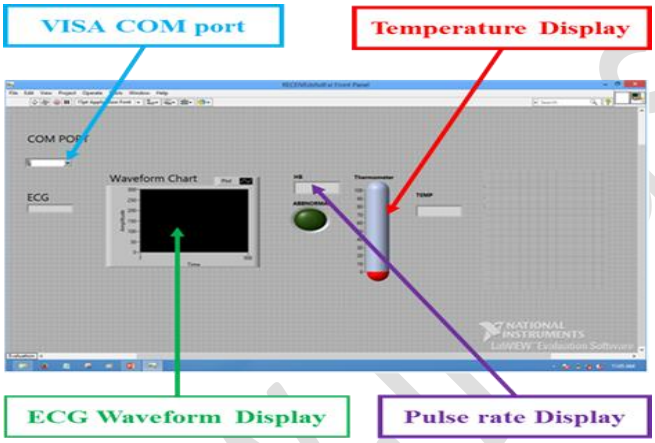
Fig: 2.Hardware module of the project

IV.SOFTWARE IMPLEMENTATION

Eclipse Android Development Tools [ADT] software is used to develop android application to provide GUI based display in android mobile. Meanwhile, LabVIEW software is used to display the result obtained from the project. Finally, the data will be displayed in LabVIEW software and Android mobile which can be monitored continuously by the doctors, nurses or caregivers using web publishing tool in LabVIEW.

V.RESULTS

After completion of all interfacing of hardware and software programming parts, the physiological parameters are continuously monitored in local as well as remote location in android phone and the alert message is sent to the doctor's and patient caregiver's mobile. Also, the abnormal values are stored and viewed for future reference to improve patient's care.. The ECG signals are acquired using disposable electrode, temperature sensor is placed over the skin surface and the pulse oximeter is clipped to the patient's finger. Continuously



the values are transmitted to the mobile application through local and remote server (WIFI or internet).The values are continuously displayed on both LabVIEW and android mobile

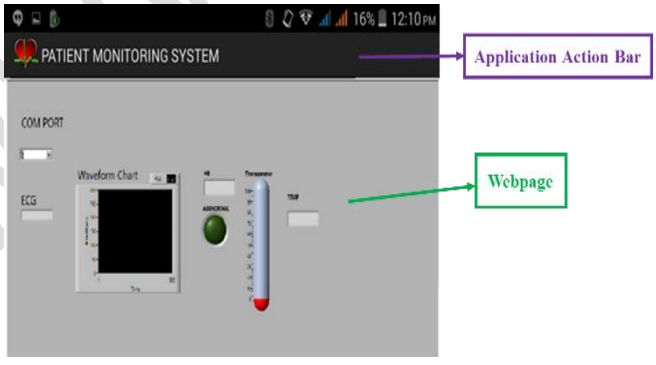


Fig: 3.Results in LabVIEW

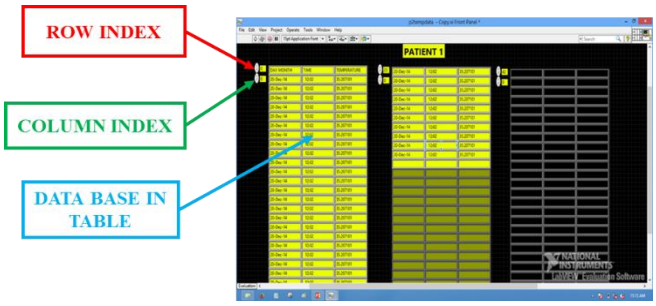


Fig: 4. Results in Android Mobile

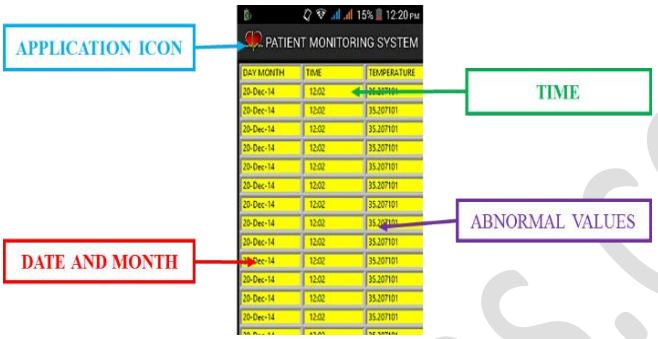


Fig: 5.Database in LabVIEW

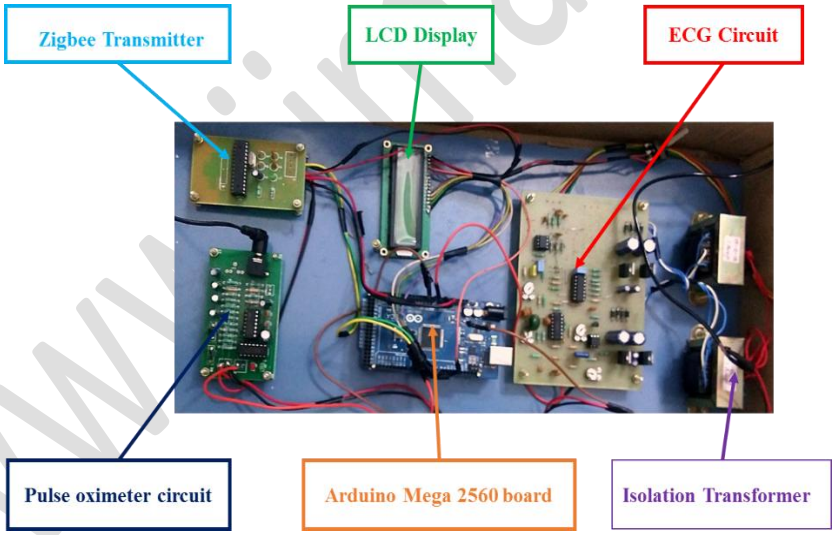


Fig:6. Database in Android mobile

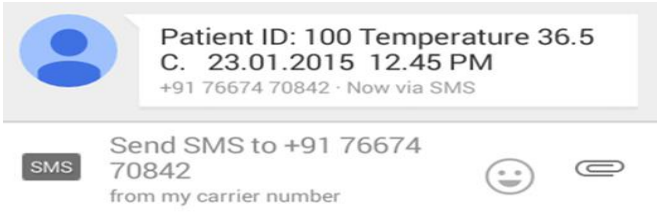


Fig :7. Screenshot of SMS alert

VI.CONCLUSION

There are many applications related to patient's monitoring system with many available sensors including temperature, pulse rate and ECG. This system provides continuous monitoring of patient as well as it provides GUI based environment to users and also storing of abnormal values. The system is designed efficiently and it has met all expectations as discussed earlier. In future more biosignals can be acquired (EMG, EEG) and monitored. The ECG signal is received by the electrode further processed (filtered, amplified, analysed) by different tools like Discrete Fourier Transform [DFT], Fast Fourier Transform [FFT], etc. And also databases are stored in cloud.

VII.ACKNOWLEDGEMENT

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