DESIGN AND DEVELOPMENT OF INTELLIGENT SYSTEM FOR HUMAN BODY MONITORING SYSTEM USING GUI

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ABSTRACT: This paper indicates the method of monitoring human body parameters like temperature, heartbeat rate, SPO2 using embedded web server and LabVIEW technology. The hardware is developed on Arduino 2560 controller board and Ethernet shield as well as different sensors. LabVIEW is used in software part to provide GUI based environment to user and Ethernet shield is used to generate embedded web server. It can be applied in internet through website or network system so patient's condition and biomedical parameters can be monitor worldwide. It is Low cost and low power system in term of hardware as well as software.

KEYWORDS: Arduino, DS1621, Ethernet Shield, GUI, LabVIEW, Pulse oximeter, SPO2, VISA, Webpage, Web Server

I.INTRODUCTION

This paper consist the basic system for Human body monitoring implementation for a patient in hospitals. Under the critical situation some patients need continuous observation so this type of system really helpful in hospitals or nursing homes. This basic system include biomedical parameters like temperature, heartbeat rate and SPO2 monitoring implemented system by low cost hardware component as well as GUI platform in computer by LabVIEW. This live embedded human body monitoring system may also be included internet website based transmission support by implementing using Arduino and Ethernet shield as base. This project covers live monitoring system for hospital or nursing home for patients under critical condition and need to be carefully checkup in time and their critical biomedical parameters must be supervised in time.

1. HARDWARE IMPLIMENTATION

For hardware implementation different stages are implemented. In this system first stage is different sensor like Temperature Sensor, Heart beat sensor and SPO2 sensor. DS1621 sensor is used as a temperature sensor which gives analog values according to current temperature. This analog value is given to Arduino Mega ADC channel for digital conversion. This sensor gives output in Celsius form but we generally measured human body temperature in Fahrenheit. Temperature readings are converted into Fahrenheit.

This system support live internet web transmission of patient's body parameters as well as GUI based platform in local hospital computers by LabVIEW interface with different biomedical sensors and hardware part.

II. PROPOSED METHODOLY

This complete system requires basic hardware and software requirements for continuous monitoring human body biomedical parameters. For hardware implementation Arduino Mega2560 Development Board, Ethernet shield, Temperature Sensor,SPO2 Sensor, PC with LAN driver installed, Amplifier, Current to Frequency converter etc are require. For software implementation Windows Operating System, National Instruments LabVIEW software, Web Browser, Arduino Sketch Software etc are requiring.

SPO2 sensor is also called Pulse oximeter. It is used to measure oxygen level in blood as well as heart beat rate of human body. Pulse oximetry has become a standard procedure for the measurement of blood-oxygen saturation in hospitals, clinics, etc. Pulse oximeter can directly detect hypoxemia, deficiency of oxygen saturation in the arterial blood. Early detection of hypoxemia can reduce the gas poisoning by CO2 or CO, tissue damage, etc. Thus, the oxygen saturation of the blood can quickly and accurately be monitored non-invasively using pulse oximeter.

Pulse oximeter works on the principal of absorption and reflectance/transmittance of light by multiple components like skin, muscle and blood vessel. Absorption due to tissue, skin or muscle remains fairly constant, whereas absorption due to arterial blood varies. Arteries expand due to the pumping of the heart, expanding the arteries and inturn increasing the tissue between the LEDs and the photodiode, thus increasing the light absorption. Using this principle, heart rate can be detected. Absorption of oxyhemoglobin and the deoxygenated hemoglobin form differs significantly with wavelengths (i.e.) oxygen is transported in the blood by hemoglobin, and, depending on the binding of oxygen to the hemoglobin, absorption of light takes place at two wavelengths but this sensor gives very low power output so output signal must be amplify.

This all data are serially transmitted over serial port for LabVIEW GUI display. In LabVIEW screen live biomedical parameters are displayed. To display current temperature readings in the web-page, web-based protocol HTTP is used and website is designed into simple HTML language. Basically Ethernet Shield is used for interfacing the web-server concept to this project. HTML based website is developed in Arduino programming and transmitted over a LAN or Internet via Ethernet Shield to the PC/Clients.

Ethernet Server is established by Ethernet shield. Internet explorer / Google chrome browser is used to read the biomedical data but proper IP address must require. This webpage is refreshed every particular interval say i.e. 5sec is set, whichever is convenient for monitoring.

III. RESULTS

After completion of all interfacing of hardware & software programming parts, open the web browser in the PC then type appropriate IP address (192.168.1.1) of the server shield and webpage will be displayed.

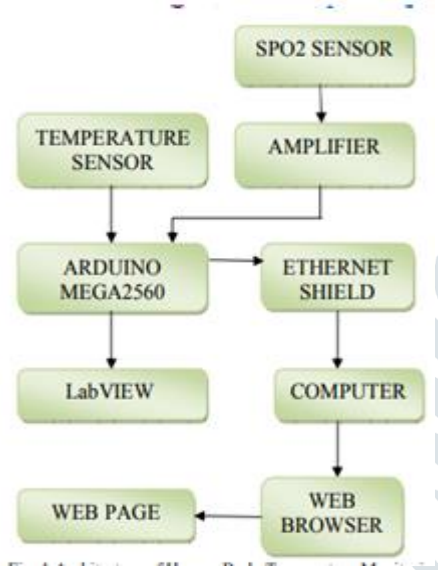

Fig 1:Architecture of human body parameters

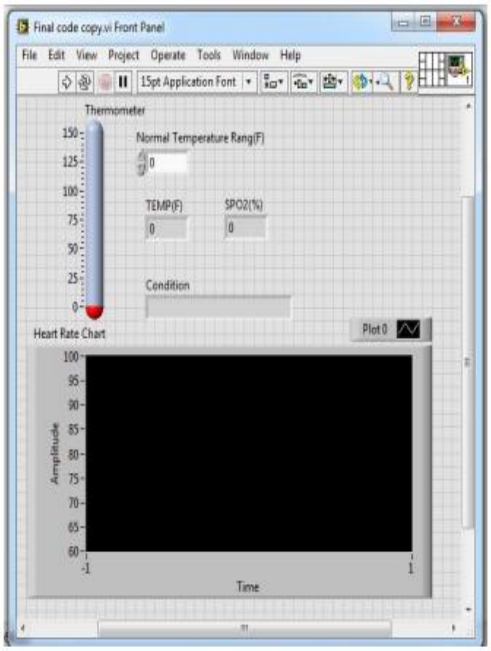

Fig3: Front Panel in Labview

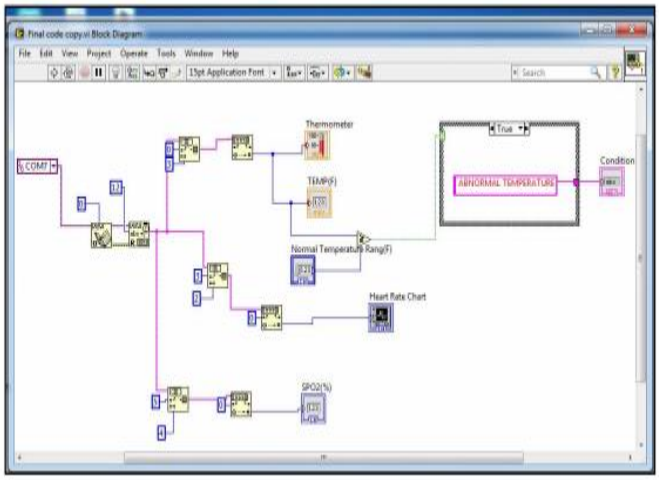

Fig2: Block Diagram in Labview

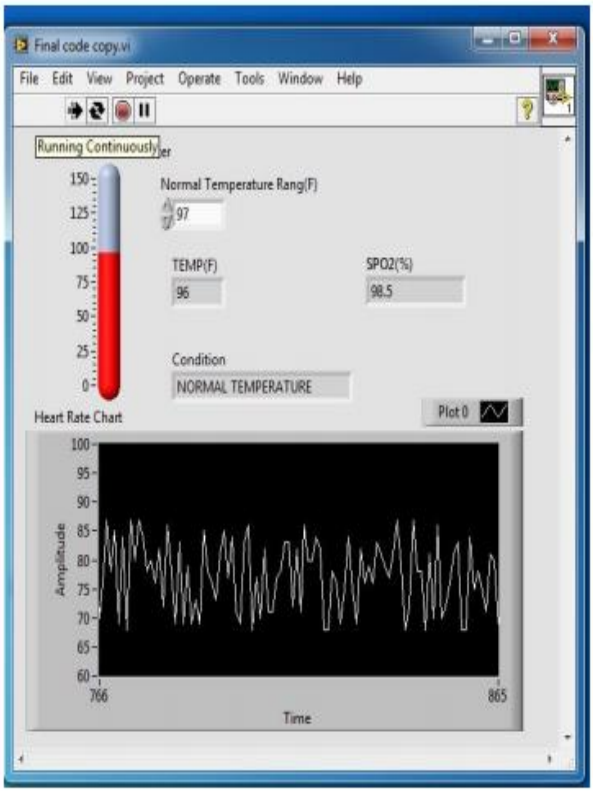

Fig4: Results in Labview

Fig5: Results in Labview

IV. CONCLUSION

These are many applications related to patient's monitoring system with many available sensors including temperature, oxygen saturation level, heart-beat and more. This system provides continues monitoring of patient as well as it provide GUI based environment to Users. The system designed efficiently and met all expectations as set earlier. In future more biomedical sensors can interface with this system.

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