HUMAN HEALTH INTEMATER USING BLUETOOTH & SMART PHONE

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Abstract: *This Project is the design and implementation of Electro-Cardiogram with instant notification and storage of the report. It includes Different Communication Techniques like Bluetooth and LABVIEW for Graphical Interaction. Different Sensors are used to check the Arterial pressure and the pulse is converted into a digital format by using ADC (Analogue to Digital Converter). The value is Intimated or Displayed on The Smartphone specified. This communication is done by using Bluetooth. As well the Graphical data can be seen on the PC with the help of LABVIEW Software. The data acquisition and Storage are the main features in this project, which does not need any additional Storage or Display Device. The Simple Smartphone does all the work. The Smart phone was installed with an android app that helps to check the current Blood Pressure of a Human being as well as reading the data from the data base with simple one touch facility available on the app. The app also helps to intimate the status by forwarding the current report to the specific department or the doctor related to the treatment by accessing the mobile phone sms facility either manually or automatically.*
Keywords: ECG , Blood Pressure, Bluetooth, Smart Phone LabVIEW, MCU, HMI etc.

I. INTRODUCTION

This project is a simple and nice implementation of the present technologies in the field of health. It is able to save the most valuable thing in the whole world that is the human life. Most of the deaths in the hospital are claimed as negligence of the doctor or the observing authority. This project has been evolved to prevent the negligence by the process of simple intimation techniques. No costly bulky devises are required for observation and intimation. The day do day usable Smart phone will do the work of intimation. The regular observation of heart functionality could also be observed on a pc or laptop screen. The LABVIEW software helps for that. It is a microcontroller based circuit which has got various communication sections. It consists of Power supply, ADC (analogue to digital converter), serial driver, LCD (display unit) etc. It has got the input device which is the real ECG/Blood pressure sensor that gives input to the microcontroller. The input data is processed by the microcontroller as per the code dumped onto it. The processed data is the ready data for observation. Thus the data is displayed on the connected LCD by parallel communication. Whereas the same data is transmitted to the PC or Laptop containing labview to get the graphical report. The connected selector switch swaps between the Smart

phone and the PC for monitoring. Once Smart phone mode is selected, the data is transmitted through the Bluetooth device connected. The data is transmitted to the paired Smart phone. By this simple project a human life could be saved by simple intimation technique. The data is not only observed but also could be transmitted through the mobile phone to any other mobile number. By which the data could be transmitted by the GSM technology of the mobile phone to any doctor, nearby department or any observing authority.

II. SYSTEM REQUIREMENT

To implement our current proposal, various modules are required. They are to be connected properly for communication. The whole work is done step by step with care which is being described below.

A. Hardware Requirement

The control unit consists of Pressure sensor, Switches, Display unit, DC motor driver, Serial driver, ADC. Various analog sensors are used which are interfaced through ADC with the MCU unit. For communication with PC serial driver is being used.

B. Software Requirement

All of the hardware are onnected with MC unit. The hardware is interfaced with PC through DB9 connector. The PC has been installed with Lab-VIEW software that is required for the Hardware and Software co-design and simulation as well. Labview provides the graphical interface to communicate with the hardware and PC as well for simulation purpose. KEIL software is being used through which the code for MC unit is generated through embedded C language. It is compiled by C 51 Compiler that is there in KEIL software. Proteus software is used that gives the platform for circuit design, PCB design and layout as well for hardware simulation. The PCB layout is done with ARES feature of Proteus.
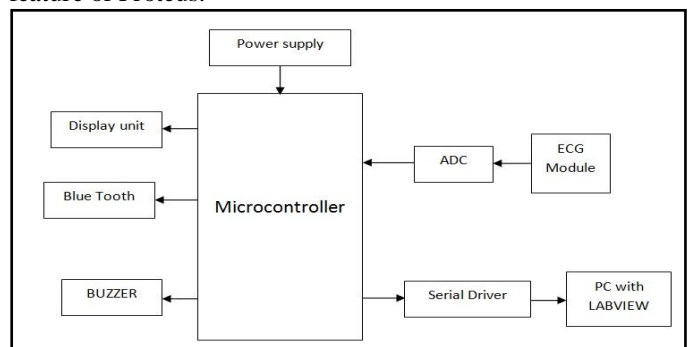

Figure 1 (Block Diagram)

III. SYSTEM DESIGNING

For proper hardware operation different sensors as well as actuators are connected. They are bonded with each other for proper communication with the help of various techniques which is described below.

A. Power Supply

This is the main source of energy unit. It distributes the energy to each and every section of the circuit as per the component requirement for its operation. Here it is used to get fix 12V and 5V as well.

B. Microcontroller Unit

This is the heart of our project. It is an artificial intellectual device that works on TTL logic. It has inbuilt I/O ports, Memory unit, Serial port etc. I have used AT89S52 (8051) that is the basic and most simple microcontroller. Due to its compactness and availability it is widely used.

C. Analog to Digital Converter

The real signals in practical are voltages which is analog in nature. But the microcontroller could not understand this. Thus I have used ADC 0808(8 bit 8 input) that converts the analog signal into digital. Here we will convert the signal from the ECG module into digital signal that my MC unit could understand.

D. Bluetooth Device

The most convenient wireless medium for simple mobile communication or any other low distance communication is Bluetooth. It has got the advantage that now a days it is present in almost all modern mobile phones. It is also very simple, low cost and user friendly.
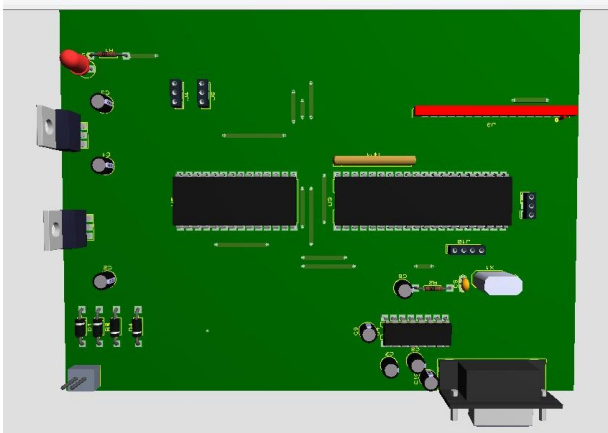

Figure 2 (Interface Card)

E. Smart Phone

This is a part of the advanced modern world. It has got various features in an optimized manner. Various Sensors, actuators, display unit etc. are connected and compressed into a very tiny device. The Android application makes it more comfortable and gives us chance to do some experiments by accessing its internal things.

F. ECG Module

This sensor is interfaced with MCU through serial driver). Whenever it is activated, the internal pressure sensor gives different voltage output as per the arterial pressure change. The analogue output is fed to the ADC to get digital output for observation.

G. DB9 Connector

A 9 pin connector is used for serial communication known as the DB9 Connector. It has got 9 pins but generally 3 pins ate used for communication (Tx, Rx, Gnd).

H. Serial Driver

Integration to PC of the specific interface board is done through serial communication. It used the UART (Universal Asynchronous Receive and Transmit) is used to do so. RS232 protocol is already inbuilt in MCS-52 which used and external driver for logic voltage conversion for the external device interfaces. The external driver is named as MAX232 which converts the TTL logic voltages and does the communication between MCU and PC. DB9 connector is used to connect the card to PC, if incase DB9 port is not present one can use the USB to RS232 converter with the appropriate driver installed on PC.

I. USB to Serial Converter

A module is used known as USB to Serial Connector which helps for the interfacing between hardware and the Universal serial bus of the PC.

J. Display Unit

A 16x2 LCD is used as a display device through which current checked Blood pressure, heart beat etc. could be monitored for user friendliness. It has got 8 data pins for communication through which both data as well as commands are being sent through parallel communication technique.
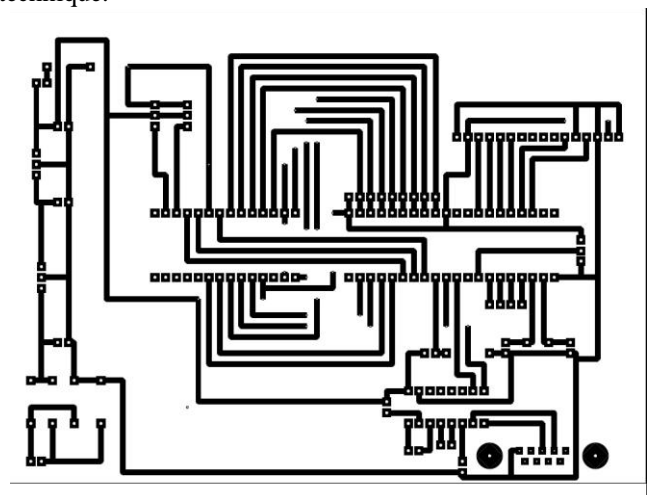

Figure 3 (PCB design of Interface Card)

IV. SMART PHONE INTEGRATION

The smart phone makes the project handier. It is connected to the hardware through a blue tooth device. Once the device is paired with the mobile phone, at each time of blood pressure test, the result is being displayed on the smart phone screen through the android app.
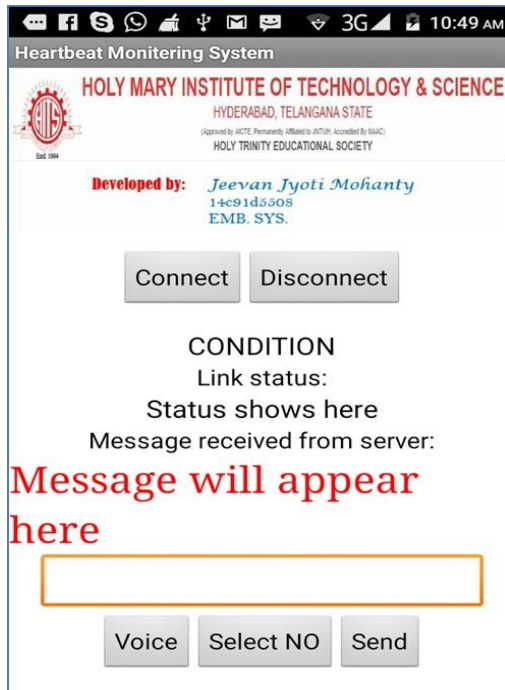
Figure 4 (Android App. On Mobile Phone)

Figure 6 (Block model Backend Lab-VIEW)

V. PC INTEGRATION

The PC is integrated with the physical hardware using special software Labview. Labview is a special HMI(human machine interfacing) software with lot of easy interfacing between hardware and a PC. We can make our own GUI for access using this software. In the GUI we can monitor the functionality of the heart through the plotted graph. It happens as the ECG module gives continuous output which is then fed to the ADC and the output from the MCU is provided to the PC through Serial Communication.
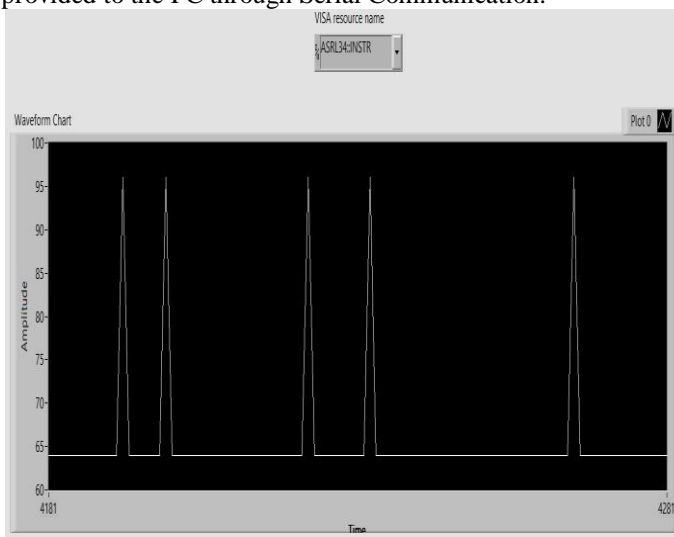

Figure 5 (Lab-VIEW Frontend Design with output)

In the current model the ECG module has been used as the main sensor for observation of the hearty functionality as well as reading of the blood pressure and the instant heartbeat.
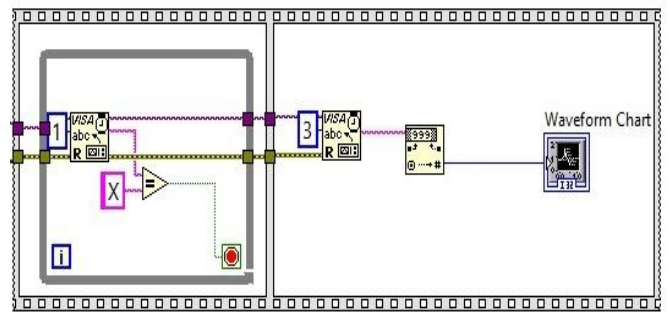
VI. CONCLUSION

This project could save the most valuable thing in the world that is the human life with the help of handy Smart phones. With the implementation of Labview software continuous observation becomes simple. It will reduce the cost of device as the result could be used just with the help of a common PC and a Smart Phone. Graphical interface also makes the system more effective. Various sensors can be more added for further extension. The specific system can be implemented in real time with little or no change in the hardware and software. One needs to have a proper maintenance for the specific product. According to the user requirement the system can be redesigned.

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