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Data Acquisition from Heart through Wireless Telemetry

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ABSTRACT:Patients at a disaster scene can greatly benefit from technologies that continuously monitor their vital status and track their locations until they are admitted to the hospital. We have proposed to design and develop a real-time patient monitoring system that integrates vital signs sensors, location sensors, electronic patient records, and Telemetry used to allow remote monitoring of patient status. This system shall facilitate communication between providers at the disaster scene, medical professionals at local hospitals, and specialists available for consultation from distant facilities.

KEYWORDS: ECG Signal, ATmega328 microcontroller, Arduino uno, IOT Algorithm, Serial communication.

I. INTRODUCTION

In this project we are proposing a system which transmits biosignal through wireless telemetry. In this system, with the help of ECG module in which pulse sensor detect the heart beat which will show the reading in BPM (Beats Per Minute) and will directly load data on the LCD screen connected to it. It will also transfer the readings to ThingSpeak server using the WiFi module ESP8266, by this heart pulses can be monitored from anywhere in the world over the internet.ThingSpeak is one of the finest source for displaying the data online and anyone can access the data from ThingSpeak at anytime at anywhere.By help of this project doctor can monitor patient's real time report on his/her phone or computer while sitting in the hospital specially in the case of an emergency and can prepare for the treatment while patient is the ambulance or about to reach to the hospital. So there will be no further delay for the treatment.

II. LITERATURE REVIEW

1. According to the **Nickolas J. La Sorte, et al., (2011)** Numerous variety and technologies of wireless networks are functioning at the same time in the different sectors. All these the same band standards although may be industrial, scientific or medical. As the number of wireless system increased RF devices and other wireless devices like cordless phones, Bluetooth, IEEE 802.11 etc. can obstruct each other. This may causes the signal interference and impairments like blocking and delaying in transmission. Collision of signals may occur in the system due to coexistence of wireless network.

2. According to **the handbook of biomedical instrumentation by R.S. Khandpur**, techniques of measuring heart rate are:

Average Calculation: An average rate is calculated by counting the number of pulses in given time. This method does not show changes in time between beats and thus does not represent the true picture of hearts response to exercise, stress and environment.

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Beat To Beat Calculation: This is done by measuring the time (T) in seconds, between two consecutive pulses, and converting the time into beats/min, using the formula beat/min = 60/T.
Combination Of Beat To Beat Calculation With Averaging: This is based on four or six beats average. The advantage of this technique over the averaging techniques is its similarity with beat to beat monitoring system.

III. METHODOLOGY

Hardware design for this project can be divided into four major parts power supply, ATMEGA328 (microcontroller), ECG sensor, LCD display

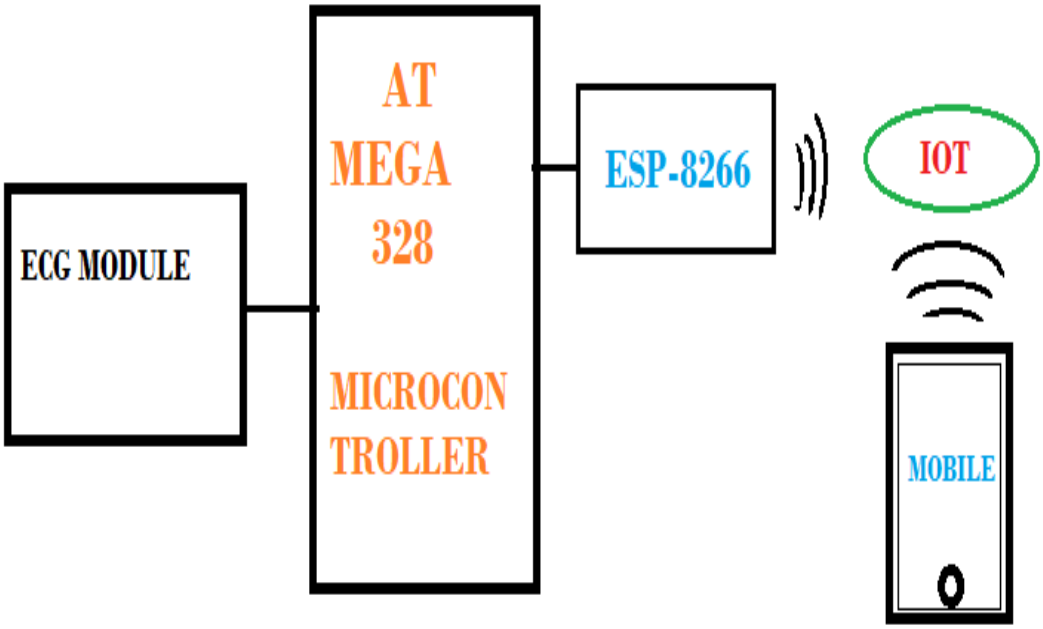

FIG: BLOCK DIAGRAM OF BIOSIGNAL TRANSMISSION THROUGH WIRELESS TELEMETRY

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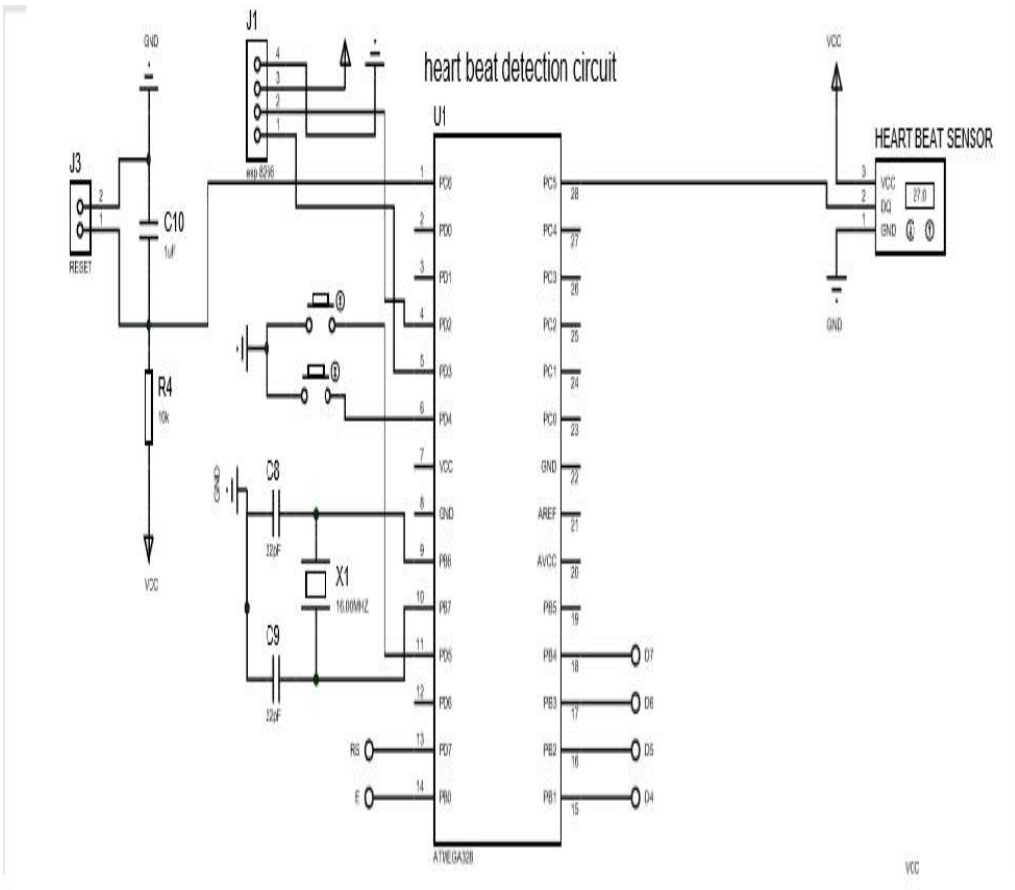

FIG: CIRCUIT DIAGRAM FOR THE SYSTEM

IV. EXPERIMENTAL RESULTS

The results were checked during the condition and pulses boosted up to 100 and gradually settled for 70-73 over 7 minutes. This project is easy to use and fully fabricated. Just switch on the power and put the finger tip on the sensor then press reset button and after this reading will be display on the LCD screen. And with WiFi module the same readings can also display on the ThingSpeak site and as well as on the configured mobile app. This data can be online monitored at any distance and anytime with graphical representation. The smooth frequency and noise removal is obtained with help of crystal oscillator of 16MHz which is crossed with two capacitors of 22pF so that data is having less error. After performing the experiment, we got the result on mobile application and as well as ThinkSpeak site. This experiment is successfully completed.

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Fig: Output on Mobile App

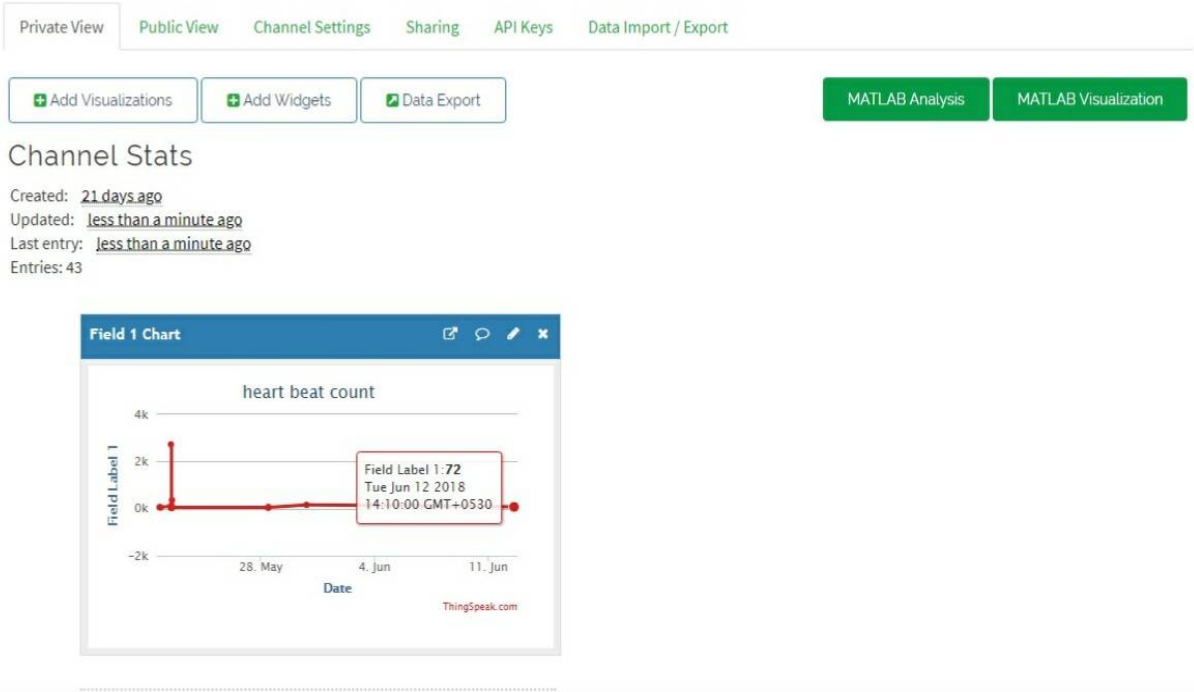

Fig : Output on ThingSpeak Website.

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V. CONCLUSION AND FUTURE WORK

The integration of common medical monitoring devices with wireless connectivity systems and information technology, taking advantage of cellular networks to transmit voice and data have emerged to provide mobility and availability of communication.

1- Low power consumption in order to reduce the size of the power supply to get a wearable device.

2- Low cost due to the price of components used in the implementation.

3- Real-time monitoring in order for the medical stuff to observe the electrical bio signalsinstantly. As advances have taken place in the communications arena these have been equally matched with the advances in the development of medical devices. Modern ECG machines are no longer required to be devices in their own right, but now are miniature machines, smaller and lighter than standard ECG machines used in conventional hospital settings (Daja et al., 2001). It is no longer necessary to connect cumbersome ECG cables and apply electrodes to the patient, as new acquisition devices can have.

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