Pc based Wireless Cardiograph

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ABSTRACT
Heart attack and stroke are life and death emergencies. The cardiovascular system is complex closed hydraulic system, which perform the essential service of transportation of oxygen, carbon dioxide, numerous chemical compounds and the blood cells. Patients suffering from heart attack have to undergo regular check up of their heart functioning. It is highly risk taking job, as the patient has to go to hospital for diagnosis. Also one third of all heart attack victims die before reaching hospital. In this paper we are designing the proposed prototype module, which transmits the heart rate data (Audio and Video) of a remotely located patient, to the hospital using radio communication principles. This kind of systems assists a lot in overcoming the above explained problems.

Keywords
Heart attack, cardiovascular, hydraulic system, diagnosis, radio communication

1. INTRODUCTION
For monitoring the patient it is always required to monitor vital signs of the patient like temperature, blood pressure and heart rate etc. these parameters affects the hole body so it is needed to study the historical background of all

these parameters, so the survey is done for all these parameters as follows.

Measurement of heart rate

The normal heart rate measuring range is 60-90 beats/min; there are two methods of measuring this heart rate: first one is the conventional method which is adopted by most of the doctors and other is the heart rate measure by some electronic device.[1]

Conventionally manual system is adopted by most of the doctors; stethoscope is used for measuring heart rate. Sometimes pulse is so weak that it is not possible to sense it so at that time it is required to hear these pulses near to the heart. To take an apical pulse stethoscope and watch which shows seconds is required. Pulse site is found on the left side of heart, diaphragm of the stethoscope is putted over the apical pulse and the sound is heard which is like lub-dub. The numbers of pulses per minute are count for measuring heart rate.

The project work entitled as 'PC BASED WIRELESS CARDIOGRAPH 'describes. The design and development of computer based bio-medical instrument for monitoring the heart rate. The heart of the project works is 'Ultrasonic transducer' which converts the mechanical function of heart into electric signals. Electrical signals. From the heart characteristically precede the normal mechanical function and monitoring of these signals has great clinical significance. This system provides valuable information about a wide range of cardiac disorders such as pulse rate, electrical wave shape, amplitude, etc. this cardio graph can be used for routine diagnostic applications in cardiology. Although the electric field generated by the heart can be best characterized by vector quantities, it is generally convenient to directly measure only scalar quantities, i.e. a voltage difference of mili volt order between the given points of the body. The diagnostically useful frequency range is usually accepted as 0.05 to 150 Hz. The amplifier and writing part should faithfully reproduce signals in this range a good low frequency response is essential to ensure stability of the base line. Heart sound is diagnostically useful. Sounds produced by healthy hearts are remarkably identical and abnormal sound always correlate to specific physical abnormalities. From the beginning till today, the principal instrument used for the clinical detection of heart sound is the acoustical stethoscope. An improvement over the coastal stethoscope, which usually has low fidelity, is the electronic stethoscope consisting of micro-phone, an amplifier and a head electronic stethoscopes can detect heart sounds which are too low in intensity or too high in frequency to be hearted in a purely coastal instrument. The phony cardiographs provide a recording or the waveforms of the heart sounds. These waveforms are diagnostically more important and revealing than the sounds themselves.

The phonocardiograph is an instrument used for recording the sound connected with the pumping action of the heart. These sounds provide an indication of the heart rate and its rhythm.

- Origin of heart sound

The sounds are produced by the mechanical events that occur during the heart cycle. This sound can be from the movement of the heart wall, closure of walls and turbulence and leakage of blood flow. The first sound, which is longer in duration, lower in frequency and greater in intensity than the second sound. The sound is produced principally by closure of the valves between the upper and lower chambers of the heart, i.e. it occurs at the termination of the arterial contraction and at the onset of the ventricular contraction. The closure of the martial and tricuspid valve contributes largely to the first sound. The frequencies of these sounds are generally in the range of 30 to 100Hz and the duration is between 50 to 100 ms. The second is higher in pitch than the first, with frequencies above 100 Hz and the duration between 25 to 50 ms. This sound is produced by the slight back flow of blood into the heart before the valves close and then by closure of the valves in the arteries leading out of the ventricles. This means that it occurs at the closure of aortic and the pulmonary valves.

The heart also produces third and fourth sounds but they are much lower in intensity and are normally in audible the third sound is produced by the inflow of blood to the ventricles and the fourth sound is produced by the contraction of the atria. These sounds are called diastolic sound and are generally inaudible in the normal adult but are commonly heard among children.

- Cardio scope

The cardio scope is basically similar to the conventional oscilloscope used for the display of waveforms in electronic laboratories. They have the usual circuit blocks like vertical and horizontal amplifiers, the time base and the EHT (Extra high tension) for the cathode ray tube. However, they differ in two important aspects as compared to the conventional instrument. These are slower sweep speeds and a long persistence screen.

Most of the present day cardio scopes are designed to be used at the bedside. Some of them are even portable and can work on storage batteries. A large screen with about 50 cm screen size instruments are usually mounted in one comer of the operating room at a height at which it is possible to conveniently observe the waveforms being displayed. Small cardio scopes using 3" diameter cathode ray tubes are mounted on anesthesia trolleys. These monitors are used for continuous monitoring of the ECG of anaesthetized patients. Any digital method of waveform recording will have an analog - digital converter, which feeds data corresponding to the input signal in to a digital store in a controlled write cycle. The data is retrieved via a similar controlled read cycle and is reformed via a digital to analog converter for display. As the generated signal is based on a finite number of measurements of the input signal, it is inevitably degraded as compared to the original. Two important factors governing the final resolution are the ample rate and word length. The former must be high enough to provide sufficient resolution on the time axis, while the latter depends on the number of bits provided by the analog to digital converter or store which determines the number of levels between zero and full scale on the vertical axis (Y-axis). In actual operation, the selected trigger signal initiates a scan and writes in sequence.

- Measurement of heart rate

Heart rate is derived by the amplification of the ECG signal and by measuring either the average or instantaneous time intervals between two successive peaks. Average calculation. This is the oldest and most popular technique. An average rate (beats per minute) is calculated by counting the number of pulses in a given time. The average method of calculation does not represent the true picture of the heart's response to exercise, stress and environment.

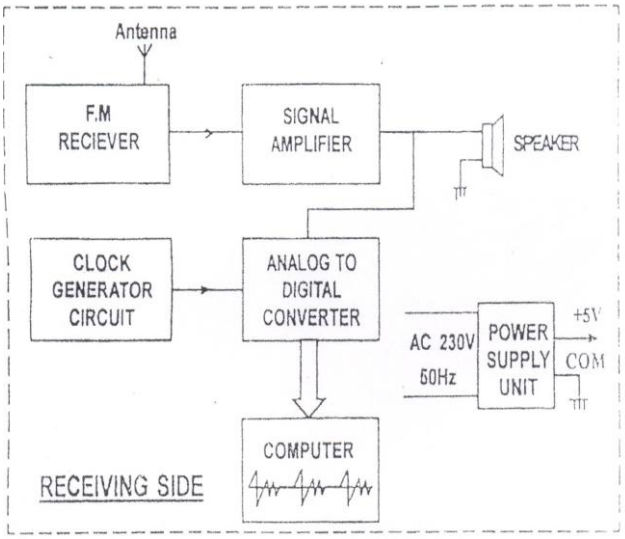
- Beats-to-beat calculation

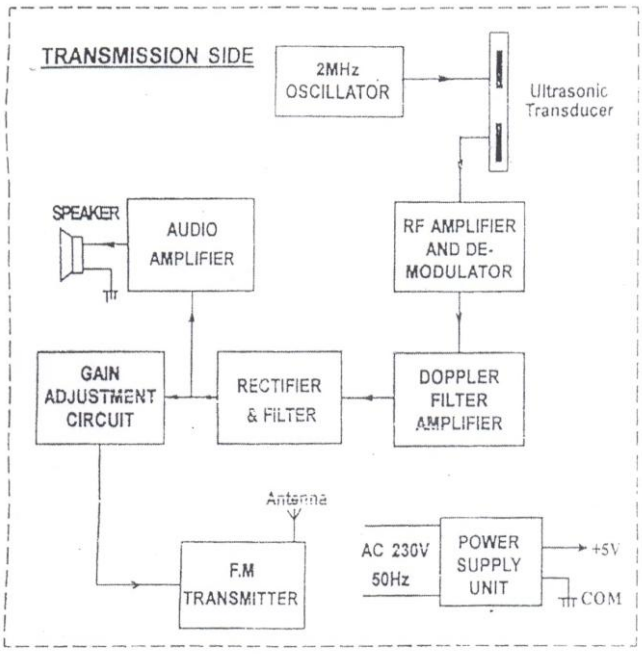
This is done by measuring the time in second, between two consecutive pulses, and converting this time into beats per minute, using the formula beats./min = 60fT. This technique accurately represents the true picture of the heart rate combination or beat-to-beat ca1culation with averaging. This is based in a four or six beats average. The advantage of this technique over the averaging techniques is its similarity with the beat-to-beat monitoring system. The normal heart rate measuring range is 0-250 beats per minutes. Limb or chest ECG electrodes are used as sensors.

- Measurement of pulse rate

Each time the heart muscles contracts, blood is ejected from the ventricles and a pulse or pressure is transmitted through the circulatory system. This pressure pulse when traveling through the vessels causes vessels wall displacement, which is measurable at various points of the Peripheral circulatory system. The pulse can be felt by placing the fingertip over the radial artery in the wrist or some other location where an artery seems just below the skin. The timing and wave shape of the pressure pulse are diagnostically in1portant as they provide valuable information. The pulse pressure and wave form are indicators for blood pressure and flow Instruments used to detect the arterial pulse and pulse pressure wavefon11s in the extremities are called plethysmographs. Most plethysmograph techniques respond to a change in the volume of the blood as a measure of blood pressure.

II. Block Diagram of the Proposed System





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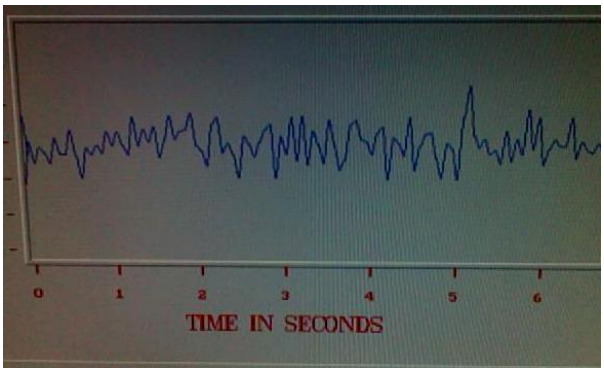
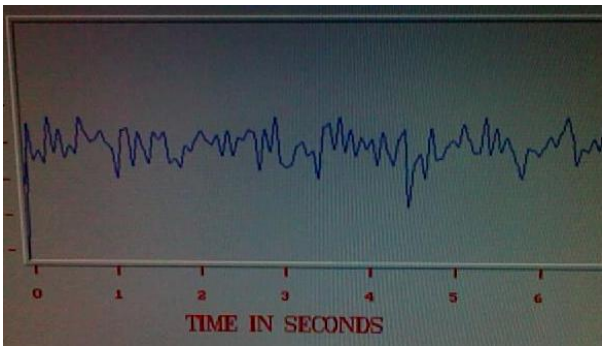
All material on each page should fit within a rectangle of 18 x 23.5 cm (7" x 9.25"), centered on the page, beginning 2.54 cm (1") from the top of the page and ending with 2.54 cm (1") from the bottom. The right and left margins should be 1.9 cm (.75"). The text should be in two 8.45 cm (3.33") columns with a .83 cm (.33") gutter.

2. RESULT

The expected results we are getting from this project work is as follows**.**





3. CONCLUSION

This project work "pc based wireless cardiograph" is completed successfully and the results are found satisfactory.

Since it is a prototype module, it has been thoroughly revised. Taking in to consideration the developments in technology and introduction of new and improved methods of medical. Instruments for proper diagnosis.

The hardware used in this project work were bulky, when this prototype module converted into engineering model, all bulky components can be accommodated into a single chip and a sleek, portable, good looking module can be made.

The use of personal computers in medical instrumentation has resulted in the integration of automation and built in intelligence in medical instruments to a great extent. This has resulted in replacement of long established recording techniques and display systems. The advantages of the PC architecture in terms of its high storage capacity of data and large screen displays have been fully exploited in clinical and research applications of biomedical instruments.

In order to understand linkages between the life sciences and engineering techniques, it is necessary for engineers to have a fair understanding about the anatomy and physiology of the human body. This is innovative project, such that any ordinary computer can be converted as Cardio Scope. These types of designs are very well suited in the field of biomedical instrumentation. Based on this, the other information related to various parts of the human body is also can be displayed using the same AID converter interfacing with different transducers. In addition to the information display, this information can be stored and print outs can be taken whenever we require.

4. ACKNOWLEDGMENT

The authors would like to thank M.H. Nerkar (A.P) in E&TC department at GOVT Engineering college under University of BAMU at Aurangabad for providing the excellent information and guiding us regarding "PC based wireless Cardiograph" used in this study.

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