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HEART ATTACK ANALYSING USING SMART PHONE

Adheena Delip[1], Josfin. V.Joy[2], Saju Simon. S.G[3]

[1,2]UG Scholars, [3]Assistant Professor, Department of Biomedical Engineering,
Noorul Islam University, Kumaracoil, K.K Dist (India)

ABSTRACT

A heart attack or myocardial infarction is a permanent damage to the heart muscles and is a global leading cause of death. The symptoms vary from individual to individual occurrence is not always known to us. The most common reason for critical delay in medical treatment is patient unawareness and lack of early warning. It is possible to detect the onset of a heart attack and to inform the doctor or the person concerned. In our paper, we introduce a system capable of detecting the heart beat rate using a sensor placed in a smart phone and using a mobile stethoscope to record heart sound for detecting the occurrence of heart attack. So we can determine this problem earlier to reduce the death rate of heart attack. Emergency calling system calls for medical help at the moment of heart attack. The user does not need any specialized hardware is the main advantage.

I. INTRODUCTION

Heart attack is also called as myocardial infarction that occurs when there is a reduced blood flow and oxygen supply to the coronary artery for a period of time. This reduced flow of blood will leads to condition called myocardial ischemia. It may occur at rest and can even occur in people without significant coronary artery disease. The heart muscle requires enough supply of oxygen rich blood to nourish it. If you have coronary artery disease those arteries become hardened and narrowed. Proteins, fats, cholesterol, calcium and inflammatory cells formed inside the arteries to form plaques of different sizes. When plaque is hard the outer shell cracks (plaque rupture) the platelets that are disc shaped particles in the blood that aid clotting come to the area, and blood clotsform around the plaque. Therefore the heart muscle becomes starved for oxygen. After a short span of time death of heart muscle cells happens, causing permanent damage. This is known as heart attack. The amount of damage to the heart muscle depends on the size of the area supplied by the blocked arteries.

The main reason of death in the world is cardiovascular diseases (CVD) representing 30% of all global deaths. According to world health organization (WHO) about 17.5 million people die of heart attacks or stroke each year worldwide.

1.1 Warning Signs of Heart Attacks

The human death due to heart attack is increasing day by day. Due to today's human lifestyle, irregular daily routines and eating habits the heart attack problem became predominant. The symptoms of heart attack include:

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- Chest discomfort, pressure, heaviness, or pain in the chest, arm or below the breast bone.
- Irregular or rapid heartbeats.
- Indigestion, fullness or may feel like heart burn (choking feeling).
- Discomfort radiating to the back jaw, throat, or arm.
- Anxiety, extreme weakness or shortness of breath.

Heart attack without any symptoms called as "silent" myocardial infarction can also occur in any one but it is more common among people with diabetes.The National Heart, Lung and Blood Institute advice that"Everyone should know the warning signs of heart attack and how to get emergency help".If you can know what is the exactly pain, then you can reduce the accidents. Heart beat can be used to understand the state and condition of heart. There are four types of heart sounds in our heart. Heart sounds are acoustic phenomena resulting from the vibrations of the cardiac structures. Heart sounds have a transient character and are of short duration. The first heart sound "LUB" from the apex of the heart and the second heart sound "DUB" from the left Sternly Adge are audible. Cause of the "lub" sound is closure of mitral and tricuspid valve at the onset of ventricular systole and the cause of "dub" is closure of aortic and pulmonary valve at the onset of ventricular systole. The third and fourth heart sound is not audio able. In abnormal heart additional sounds called murmurs are heard between the normal heart sounds. Murmurs are generally caused by improper opening of the valves or by regurgitation (it results when the valves do not close completely and allow some backward flow of blood.). The basic functions called vital signs measured from a person indicate their physical condition. The four vital signs are:

- Pulse rate
- Respiratory rate
- Blood pressure
- Temperature

Rhythmic expansion and contraction of arteries corresponding to each beat of heart is generally known as pulse. From the neck or wrist we can measure the pulse rate. The eminent sites for measuring the pulses are neck[carotid artery], inside of the elbow[brachial artery], wrist[radial artery], ankle joint[posterior tibial artery], and behind the knee[popliteal artery]. The problems of human body can be determined using pulse rate but diagnosis of problems is not possible. The increased pulse rate shows the availability of abnormality in the body. Anxiety, anger, motion, heart disorders, excitement, asthma etc can also leads to higher pulse rate. The number of breathes per minute or more formally the number of movements indicative of inspiration and expiration per unit time is referred to as respiratory rate. It can be measured by counting the number of times the chest rise for a minute. Respiration rates may increase with fever, illness, and with other medical conditions. Another vital sign is blood pressure. It is theforce of the blood pushing against the artery walls. One cannot take his or her on blood pressure without an electronic blood pressure monitoring device. The normal blood pressure rate is 120 mm Hg during systole and 80 mm Hg during diastole. Blood volume, viscosity and pumping rate can affect the blood pressure of a healthy person. Last vital sign is temperature. The normal body temperature of a person varies depending on food and fluid consumption, gender, recent activity, time of day and stage of menstrual cycle in women. The normal body temperature for a healthy adult can range from 36.5°C to 37.2° C. In the recent years scientists has developed various devices, algorithms and programs to detect heart attacks of patients

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early. But most of them have used conventional method to produce their results and detect heart attack accurately

Age	Heart rate (beats/min)
Newborn	100-160
0-5 months	90-150
6-12 months	80-140
3-5 years	80-120
6-10 years	70-110
11-14 years	60-105
14+ years	65-100

Here we are trying to detect heart attack pain by avoiding conventional methods as they are time consuming so that the patient can have enough time to react. Also we are trying to detect heart attack using smart phone in our paper. The normal heart sound "lub dub" and abnormal heart sound "murmur" will be saved in the database. When the patient heart sound is recorded it will compare with the stored data in the database. If the patient's heart sound matched with the abnormal sound it detects that as a heart attack and immediately within 2- 3 seconds it calls to any concern person or medical emergency automatically.

II. BACKGROUND STUDIES

The motivation of our work includes numerous work related with heart disease diagnosis using various data mining techniques.Heon Gyu Lee et al proposed a novel technique to develop the multi-parametric feature with linear and non linear characteristics of HRV[Heart Rate Variability. Nowadays smart phone can be used in many areas of health care because of its processing capabilities,mobility and connectivity.Apple Computer,Inc. is some mobile stethoscope application that record accurate low noise heart,lung and bowel sounds.Also using microphone or electronic stethoscope a variety of audio signals including heart sounds can be recorded.

III. METHODOLOGY

In our paper,smart phone is used to detect heart attack.Here we introduce a smart phone stethoscope app that can use in a phone as a stethoscope.The heart sound contain a mixture of high frequency and low frequency acoustic signals with low amplitude,it is highly required for the stethoscope or the sensor used in the stethoscope to have a high selective sensitivity.Auscultation defined as the interpretation of the heart sound.It is considered as the most effective and it remains in the primary and only means of cardiac examination due to its minimal equipment requirement.The two phases in auscultation consist of heart sound acquisition and heart sound analysis.Heart sound acquisition includes obtaining the heart sounds by placing the index finger on the sensor fixed below the camera of smart phone. Here it will record 3-10 heart sounds.The default normal heart sound"lub dub" and abnormal heart sound will be saved in database.After 3-10 heart sound user needs to

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withdraw his finger from the sensor. The recorded heart sound will compared with the stored data, which will be stored in database. When comparing if the recorded data could matched with normal sound then a message will display “heartnormal”, else if recorded data matched with the abnormal sound then message will display “heart is abnormal”. This process belongs to heart sound analysis phase. The normal heart rate of a human being lies between 60-100 bpm. In case of abnormal condition the emergency calling system calls for medical help. The smart phone has one medical emergency number (or a number of concerned person) stored in the speed dial number. So when heart attack detects, it wirelessly sends signal to cell phone to call emergency number.

Figure 1: Holding the index finger on the sensor

IV. RESULT

We develop an android app in the proposed approach. This method gives us how to detect the heart condition using heart beat.Some heart related diseases can also be detected using this approach of recording heart sound. Detecting not only heart attack but also could be detecting heart blockage, abnormal blood and valve circulation. Result of heart sound recording is shown in the following figure.

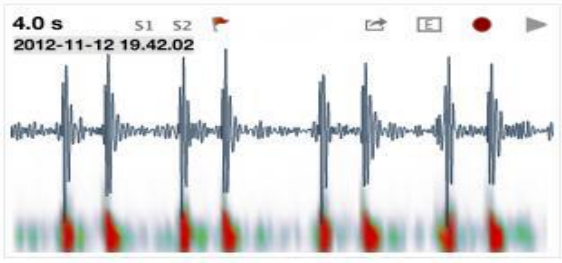

Figure 2: Recorded heart beat sound

This is a result of sound recording from heart beat. It could detect heart conditions now by heart sound. This approach is accurate to detect heart attack as well as heart condition.

V. CONCLUSION

A numerous of heart attack detection techniques have been introduced so far, but they are very expensive and time consuming. Today the mobile phone has become an integral part of human life, so it can be used as an acceptable means to diagnose patients and thus encourage more patient co-operation. Here we have attempted to take a step towards early diagnosis of heart attack by heart beat recording. Thus it helps in providing early heart attack detection thereby the patient can get medical attention within the first few critical hours. The emergency calling system calls for medical help at the moment of heart attack. The user does not need any specialized hardware and he/she can take a measurement in any place under any circumstance is the main advantage of this method. It fits comfortably in a pocket or purse and is always available for use.

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REFERENCES

[1] Harsha C Puranik& S.S Kataria, 'Wireless Walking Stick with Heart Attack Detection'

[2] Md. Ashrafuzzaman, Md. MazaharulHuq, ChandanChakraborty, Md.RafiMojur Khan , ThaslimaTabassum&RashedulHasan, 'Heart Attack Detection using Smart Phone'

[3] Dinkar, P., Gulavani, A., Ketkale, S., Kadam, P., &Dabhade, S. Remote Health Monitoring using Wireless Body Area Network.

[4] National Heart, Lung, and Blood Institute, Disease and Condition Index, "What is a Heart Attack?" August 2014

[5] Dr. S N Pandey. B.Sc., MBBS, "Physiology Shiksha", 12 Editions, 1994

[6] HeonGyu Lee, Ki Yong Noh, Keun Ho Ryu, "Mining BiosignalData: Coronary Artery Disease Diagnosis using Linear and Nonlinear Features of HRV", LNAI 4819: Emerging Technologies in Knowledge Discovery and Data Mining, pp.56-66, May 2007.

[7] Li, W., Han, J., Pei, J.: CMAR: Accurate and Efficient Classification Based on Multiple Association Rules. In: Proc. Of 2001 Internal Conference on Data Mining .2001

[8] Cristiana, N., Shawe-Taylor, J.: An introduction to Support Vector Machines. Cambridge University Press, Cambridge, 2000.

[9] V. Shnayder, B. Chen, K. Lorincz, T. R. F. Fulford-Jones and M. "Sensor Network for medical Care," Technical Report TR- 08-05, Division of Engineering and Applied Sciences, Harvard University, 2005.

[10] Scully, C. G., Lee,J., Meyer, J., Gorbach, A. M., Granquist-Fraser, D., Mendelson, Y., & Chon, K. H. (2012). "Physiological parameter monitoring from optical recordings with a mobile phone". Biomedical Engineering, IEEE Transactions on, 59(2), 303-306.

[12] Hwang, Limsui, Zhao, "Wireless Heart Attack Detector with GPS", ECE445. University of Illions, Fall 2012,

	**Adheena Dileep,** UG Scholars, Department Of Biomedical Engineering, Noorul Islam University, K.K Dist, India
	**Josfin. V. Joy,** UG Scholars, Department Of Biomedical Engineering, Noorul Islam University, K.K Dist, India
	**SajuSimon.S.G,** Assistant Professor, Department Of Biomedical Engineering, Noorul Islam University, K.K Dist, India