Executive summary of Minor Research Project

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**POCKET SYSTEM ECG**

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Cardiovascular diseases (CVDs) take the lives of 17.7 million people every year, 31% of all

global deaths. Triggering these diseases – which manifest primarily as heart attacks and

strokes – are tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol.

These in turn show up in people as raised blood pressure, elevated blood glucose and

overweight and obesity, risks detrimental to good heart health.

Ubiquitous vital signs sensing using wireless medical sensors are promising alternatives to

conventional, in-hospital healthcare systems. The advent of modern age has shown a

exponential shift in the way humans have worked leading into sedentary lifestyles. Change in

dietary pattern where fresh food is replaced by processed and fast food along with the

increase of stress has led to rise of cardio-vascular disease which is glaringly evident in

developing countries. Especially, Asians are more prone to cardio-vascular diseases

genetically. The ECG device is a diagnostic medical instrument which determines the

electrical activity of the heart. The conventional ECG devices are powered by mains

electricity, thus they are not energy efficient. Transformers used make the device bulky and

expensive. Optimum isolation amplifiers have to be incorporated in these devices for patient

safety, adding to the cost and complex circuit. In this work, a pocket size Bluetooth ECG

sensor is proposed.

The electrocardiogram (ECG or EKG) is a diagnostic tool that is routinely used to assess the

electrical and muscular functions of the heart. While it is a relatively simple test to perform,

the interpretation of the ECG tracing requires significant amounts of training. Numerous

textbooks are devoted to the subject.

The heart is a two stage electrical pump and the heart's electrical activity can be measured by

electrodes placed on the skin. The electrocardiogram can measure the rate and rhythm of the

heartbeat, as well as provide indirect evidence of blood flow to the heart muscle.

A standardized system has been developed for the electrode placement for a routine ECG.

Ten electrodes are needed to produce 12 electrical views of the heart. An electrode lead, or

patch, is placed on each arm and leg and six are placed across the chest wall. The signals

received from each electrode are recorded. The printed view of these recordings is the

electrocardiogram.

By comparison, a heart monitor requires only three electrode leads – one each on the right

arm, left arm, and left chest. It only measures the rate and rhythm of the heartbeat. This kind

of monitoring does not constitute a complete ECG.

The Electrocardiogram (ECG) is a measurement of the electrical activity of the heart over

time, captured and externally recorded as measured by skin electrodes. The signals indicate

the overall rhythm of the heart and weaknesses in different parts of the heart muscle.

This technique is the best way to measure and diagnose abnormal rhythms of the heart , and

is commonly used in hospitals all over the world. It is also used in sports and military

environments for advanced diagnostics of healthy individuals. In recent years, the research

community has been active in pursuit of technologies for a “Wireless ECG” where

patients are no longer required to be attached to a large stationary device while their

ECG signals are monitored. A major motivator behind this trend is the reduced healthcare

costs of remote monitoring, where patients can reside in their homes rather than occupy a

hospital bed. Many systems have been proposed to accomplish this feat, with varying

goals and approaches . Wireless ECG monitoring can be done using 3, 4, 5 or 10

sensors, providing increasingly detailed information to Cardiologists.

The data is captured and monitored by wearable circuitry, and is then wirelessly transmitted

to a nearby receiving device. The nearby receiver can be as simple as a basic logging or

analysis device, or as complex as a large hospital information system that actively

collects wireless data in real-time from multiple patients. Wireless ECG systems may be

loosely grouped into two categories: those with wired sensors and those with wireless

sensors. The first group of systems use physical wires to connect all sensors to a central

PDA-sized device, which then transmits the data wirelessly to a monitoring station. These

systems free the patient from being tethered to bulky equipment. The ECG signals are

typically in the mill volt range, and are hence susceptible to large amounts of interference,

from a variety of sources. The interference sources can be divided into 3 distinct groups:

 a) Noise originating from sources external to the patient.

 b) Interference originating from the patient unwanted potentials.

 c) Interference originating from patient-electrode contact.

The principle solution for this project is to develop a method of wireless ECG monitoring

heart activity for patients with heart disease, pacemakers, and other special heart

conditions so the patient can lead a relatively active life without being confined to a

specific region. Being able to monitor sick patients remotely, peace of mind can be

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offered to extended family knowing that emergency services can be dispatched in the

event of cardiac arrest, or irregular heart patterns.

One of the main goals of this project is to provide maximum convenience to the user or

patient during ECG measurements, especially for prolonged use. Wireless technology is

ability to generate interactive healthcare utilizing modern technology and

telecommunication. The wireless device employed for the efficient remote monitoring

system, using for real time, continuous and accurately information of patient heart

condition. In this project we will design wireless ECG sensor and display its output on

computer screen wirelessly.