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Noncontact Fingertip ECG and Multi Detection System

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ABSTRACT: One of the best ways to obtain health information is from an electrocardiogram (ECG). Through an ECG, characteristics such as patients' heartbeats, heart conditions, and heart disease can be analyzed. Unfortunately, most available healthcare devices do not provide clinical data such as information regarding patients' heart activities. Many researchers have tried to solve this problem by inventing wearable heart monitoring systems with a finger tip system,but their performances were not feasible for practical applications. Thus, the aim of this study is to build a new system to monitor heart activity through ECG signals. The proposed system consists of an embedded hardware in an armband. It is considered to be a reliable, robust, and low-power-transmission ECG monitoring system. The reliability of this system was achieved by the careful placement of sensors in the finger tip. IoT is used as the protocol for data transmission.

KEYWORDS: IoT,ECG monitoring

I.INTRODUCTION

Among the panoply of applications enabled by the Internet of Things (IoT), smart and connected health care is a particularly important one. Networked sensors, either worn on the body or embedded in our living environments, make possible the gathering of rich information indicative of our physical and mental health. Captured on a continual basis, aggregated, and effectively mined, such information can bring about a positive transformative change in the health care landscape. In particular, the availability of data at hitherto unimagined scales and temporal longitudes coupled with a new generation of intelligent processing algorithms can: (a) facilitate an evolution in the practice of medicine, from the current post facto diagnose-andtreat reactive paradigm, to a proactive framework for prognosis of diseases at an incipient stage, coupled with prevention, cure, and overall management of health instead of disease, (b) enable personalization of treatment and management options targeted particularly to the specific circumstances and needs of the individual, and (c) help reduce the cost of health care while simultaneously improving outcomes. In this work, we highlight the opportunities and challenges for IoT in realizing this vision of the future of health care.

II.LITTERATURE SURVEY

The standard procedure in a hospital to measure an electrocardiogram (ECG)is to use a 12-lead ECG. In a conventional 12-lead clinical ECGsystem, electrodes are affixed to specific parts of the chest ,arms, or hands and legs. Even though this promises highly accurate results, it often requires a great deal of preparation and an expert to attach the electrodes to the patient's body.These electrodes also require skin preparation and conduction gel to reduce contact impedance The main problem with this method is that it cannot be used for long-term measurement

Most of these studies have focused onfour main topics: sensor technology, wearable systems, signal processing, and mobile monitoring systems. Researchers havetried to develop sensors that are able to sense bio-signals without generating side effects or distracting users. Next introduced Wearable Noncontact Armband for Mobile ECG Monitoring System by Vega Pradana Rachim and Wan-Young Chung, Member, IEEE

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III.OVERVIEW OF THE PROPOSED WORK

A. INTRODUCTION

This section contain information about the fingertip sensor module used as the main component and the overall hardware descriptions. It is a promising method to measure an ECG in remote areas without inconveniencing or disturbing the user. The advantages of this technique are that it can measure an ECG without direct contact and provides better accuracy than other method.

B.BACKGROUND OF OUR WORK

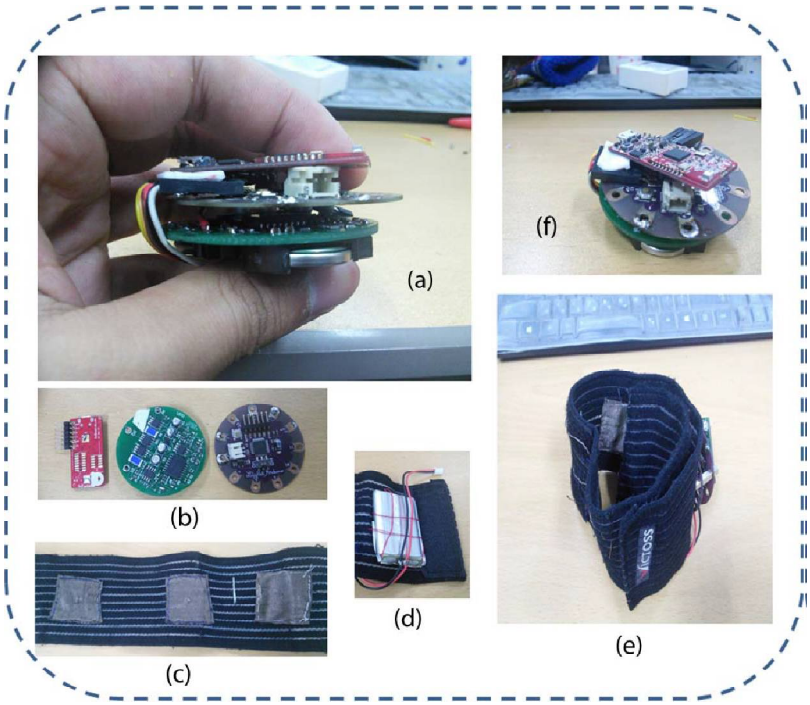

Figure 1. ECG detection through armband

The above figure shows the background work of our work. It uses the wearable armband for the mobile ECG monitoring. Therefore, capacitive-coupled technology is used in the proposed system to overcome these problems. It is a promising method to measure an ECG in remote areas without inconveniencing or disturbing the user. The advantages of this technique are that it can measure an ECG without direct contact and provides better accuracy than other methods, especially for measuring stress. The proposed monitoring system is important for monitoring exercise intensity, estimation of maximal oxygen uptake and energy expenditure and early detection and in helping keep persons healthy by being able to track their heart activities at any time.

C.BASIC CONCEPT OF THIS WORK

We have to use this technology that will usable to detect the ECG signals of a patient without any hard electrode attachments. It uses a finger tip module that can detect the ECG signals and also here the heart beat, temperature measure also. Photophlymograph technique using photons as the basic source introduce here.

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D. DESIGN AND MODELLING

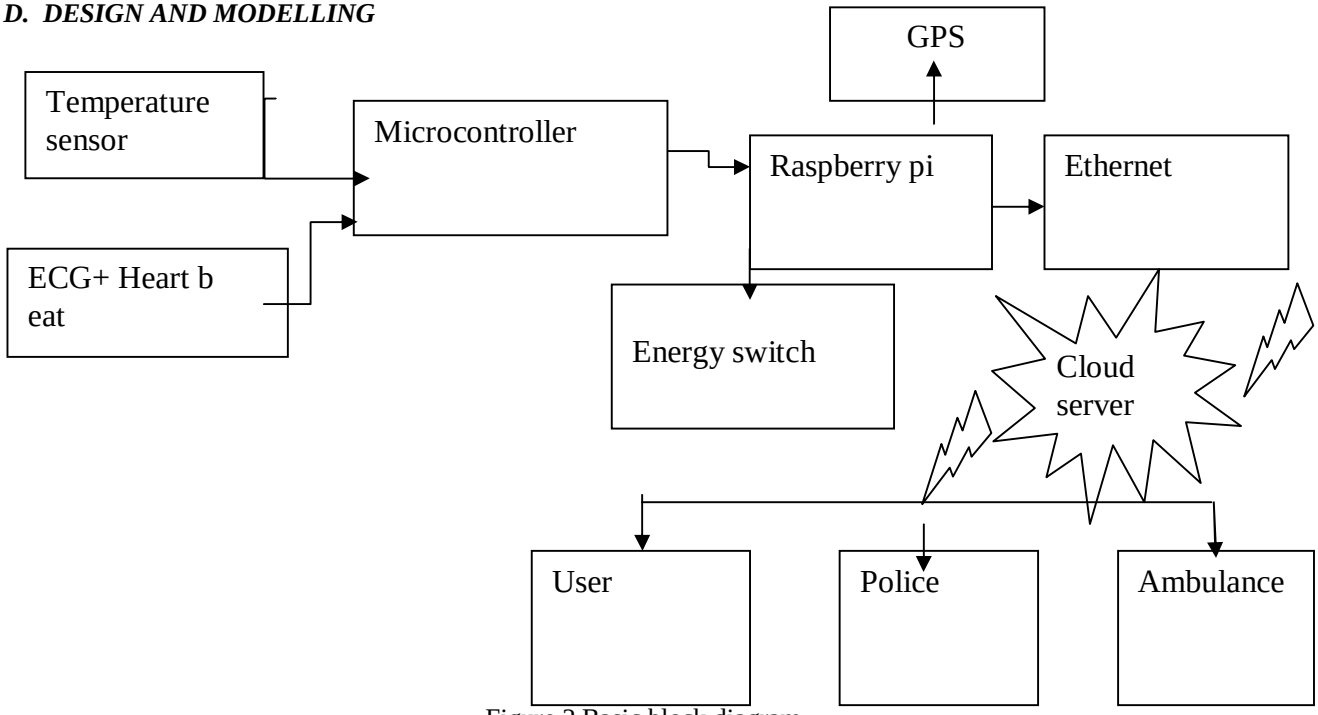

Figure 2.Basic block diagram

Above Figure.2 block diagram contain our basic elements used for these.That can be explained as below

MICROCONTROLLER UNITS: Here we uses two types of microcontroller units. One for the detection of the temperature and ECG+ heart beat then conversion to the digital format and processing. The other for the remaining processing unit that making the signal storing and passes it to the IoT environment.
SENSERS: The sensors are temperature and pulse sensors.They are detect the analog quantities from the body and passes to the microcontroller unit. Bio-signals to analyze health conditions with a mobile device as an interface and an analysis device.
GPS : It used to detect the position of the person who are in our consideration. So we have to helpful as reaching hospitality to him or her. Also calling police ambulance more speedly.
SWITCH :It is a common model switch as for the ON condition when VCC given and in OFF condition when ground is given. It just want to initialize the microcontroller unit. It connects the USB pin of the Raspberry pi.
RASPBERRY PI : The Raspberry Pi 2 delivers 6 times the processing capacity of previous
models. This second generation Raspberry Pi has an upgraded Broadcom BCM2836 processor, which is a powerful ARM Cortex-A7 based quad-core processor that runs at 900MHz. The board also features an increase in memory capacity to 1Gbyte.

IV. SOFTWARE IMPLEMENTATION

A. PYTHON

It is a widely used high-level, general-purpose, interpreted, dynamic programming language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of codethan possible in languages such as C++ or Java. The language provides constructs intended to enable writing clear programs on both a small and large scale.

Python supports multiple programming paradigms, including object-oriented, imperative and functional programmingor procedural styles. It features a dynamic type system and automatic memory management and has a large and comprehensive standard library

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Python interpreters are available for many operating systems, allowing Python code to run on a wide variety of systems. Using third-party tools, such as Py2exe or Pyinstaller, Python code can be packaged into stand-alone executable programs for some of the most popular operating systems, so Python-based software can be distributed to, and used on, those environments with no need to install a Python interpreter.

STATEMENTS AND CONTROL FLOW

- The assignment statement (token '=', the equals sign). This operates differently than in traditional imperative programming languages, and this fundamental mechanism (including the nature of Python's version of *variables*) illuminates many other features of the language. Assignment in C, e.g., x = 2, translates to "typed variable name x receives a copy of numeric value 2". The (right-hand) value is copied into an allocated storage location for which the (left-hand) variable name is the symbolic address. The memory allocated to the variable is large enough (potentially quite large) for the declared type. In the simplest case of Python assignment, using the same example, x = 2, translates to "(generic) name x receives a reference to a separate, dynamically allocated object of numeric (int) type of value 2." This is termed *binding* the name to the object. Since the name's storage location doesn't *contain* the indicated value, it is improper to call it a *variable*. Names may be subsequently rebound at any time to objects of greatly varying types, including strings, procedures, complex objects with data and methods, etc. Successive assignments of a common value to multiple names, e.g., x = 2; y = 2; z = 2 result in allocating storage to (at most) three names and one numeric object, to which all three names are bound. Since a name is a generic reference holder it is unreasonable to associate a fixed data typewith it. However at a given time a name will be bound to *some* object, which **will** have a type; thus there is dynamic typing.

V.RESULTS

Our work will go through a favourable condition that human ECG signals can detect in an easy way.Also in remote area and the sudden informer to the hospital, police and ambulance. It can be done with an IoT enviornment also described below section.

We can also detect the persons temperature value that helps to know any fever to him/her.Other one is that to identify the persons heart beat value.

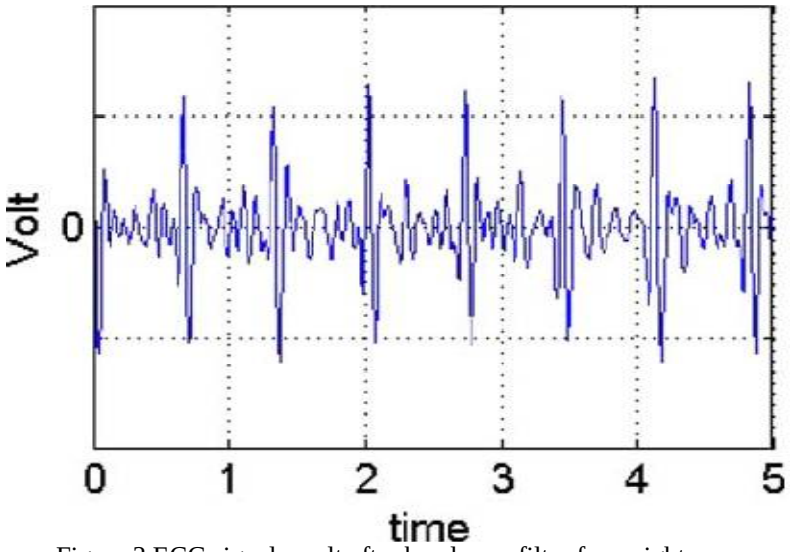

Figure 3 ECG signal result after band-pass filter from right arm

The above figure3. Consists of the ecg signals taken from the right arm for our experiment.

A new wearable device for a healthcare monitoring system was proposed in this paper. The device was implemented in a finger tip to achieve a non-obstructive system. The finger tip was chosen as an alternative to previous wearable devices that are strapped to the chest, which can be inconvenient for some users. The technology used in this system uses photonic motion and it called as photophlymograph.

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The bio-signal that was measured in this system is an ECG signal. Although the ECG signal that is received from the arm is quite small, the proposed system was smart enough to overcome noise and detect useful information from the recorded signal.

VI. CONCLUSION

A new wearable device for a healthcare monitoring system was proposed in this paper. The device was implemented in a finger tip to achieve a non-obstructive system. The finger tip was chosen as an alternative to previous wearable devices that are strapped to the chest, which can be inconvenient for some users. The technology used in this system uses photonic motion and it called as photophlymograph.

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