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Applications Of Sensors To Detect The Behavior Of Human. A Survey Paper

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Abstract - *A decade years ago, there is a lot of Researches as well as investigation has been conducted in the area of real-time emotion recognition of a humans like Heart rate, Breathing rate, Body Temperature, skin conductance etc. Emotion recognition has a significant applications in education, medicine, technologies and human-machine interaction. The present paper reveals the researches that has been conducted related to the application of sensors, automation, bio-signaling, and controlling ways over to the behavior/feelings of humans.*

Key Words: bio-signaling**,** automation, Sensors, Emotion recognition, human machine interaction

1.INTRODUCTION

In the recent times, there is a lot of excellent sessions has been held at the IEEE which stressed over the design of bio-processed signaling circuits and systems for sensing (e.g. real-time visual, auditory and tactile processing) With the important and crucial steps are taken for the development and design of these systems, there is a lot of integration of techs taken for the design towards mingling of these systems into applications, such as investigation, snooping etc. The main aim of this session is to merges the researchers taken for the automation, sensing and actuation.

2. RESEARCH CHALLENGES

The stressed paper represents the three research reported that are combine expertise both in areas that are covered as a wearable sensory systems, Communication by gesture in emergency and a Kit supporting multiple bio-signals acquisition and a certain areas which are not commonly seen, such as robotics, nanotech, neurotech.etc. [1-3]The survey paper, mainly suppress the three invited papers in the session and then reviews the past work in the escalation of bio-processed signaling circuits and systems for sensing as well as some relatively initial work that has been done to amalgamate these systems into applications for the research works. The relative works explodes the identification of human behavior in certain condition. It leads to understand the feelings which plays important role for knowing the individual.

2.1 A Wearable device Physical and Emotion Health Monitoring.

The author Rubin Dias stressed over Wireless Body Sensor Nodes (WBSNs) [5-6]. The WBSNs was an embedded sensor platforms for bio-signal acquisition. Author offer a compelling solution for long-term monitoring of subject, presenting little discomfort for the subjects and requiring minimal supervision from medical staff. Proposed WBSNs was able to acquire and wirelessly transmit different bio-signals (e.g. blood pressure, pulse and electrocardiograms [7]. In addition to acquisition and wireless transmission of bio-signals, state-of-the-art WBSNs embedded advanced processing applications, able to automatically retrieve diagnostic information from the acquired data.[8] The presented work as shown in Figure.1

Fig-1 Device for physiological signal acquisition.

Device can be attached behind a phone, and the metal pads touched by the user or can be attached using a chest strap .The introduced architecture of a multi-tier telemedicine system comprised of strategically placed bio-sensors on a human body capable of collecting vital medical statistics (such as heart rate and blood pressure) and transmitting them (wired or wirelessly)over multiple hops to a remote medical server at a caregiver's location thereby taking telemedicine from the desktop to roaming.

2.2- Communication by gesture in personal emergency response system.

Data glove was an electrode array embedded glove similar to the conventional glove worn on hands, but made with

stretchable material like lycra. It facilitates in sensing and producing gesture signals from the hand of the user. The typical data glove and its electrode positions are shown in Figure. 2. It was a novel utility device with a new dimension in the field of medicine and healthcare. When the conventional input devices offer limited degrees of freedom the gloves are offering

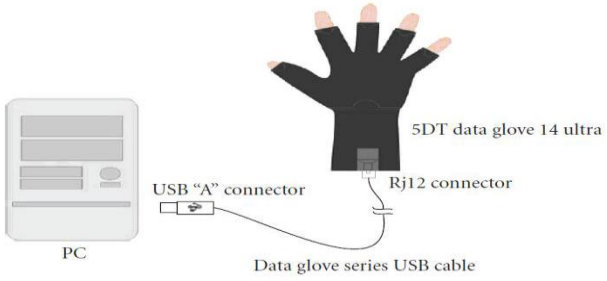

Fig.2 Data glove and electrode position.

multiple degree of freedom for each finger as well as to the hand. It also allows the user to communicate with the computer to greater[12]. The data glove used 5DT model, and was designed for the purpose of modern motion capture and animation professionals. Data from five healthy subjects, including two female subjects, have been taken into consideration, and their average age was 19.5 years

2.3- Smart Transmission Scheme For Emergency Data From A Network Of Bio Sensors On Human Body.

Author Ali Abbas vohra presented a research over a Wireless Body Area Network (WBAN) which was a network of wearable devices (mostly sensors) that collect vital biostatistics (such as heart rate, blood pressure, and ECG). The devices may had intelligent computing capabilities; however, the WBAN needs to interact with a medical practitioner's facility[11]. The paper required necessitates the design of a data communication system that meshes the WBAN with current Wide Area Networks (WAN).

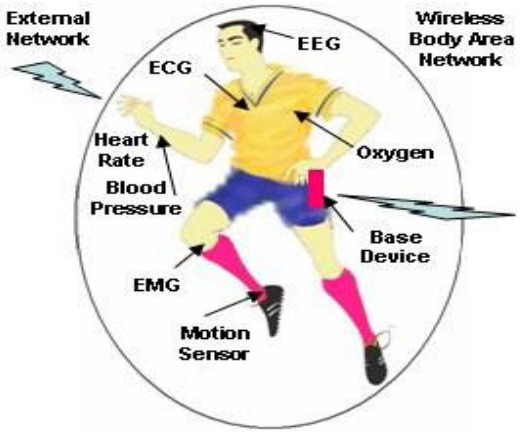

Fig.3 Wireless body area networking.

The WBAN primarily consists of tiny wearable sensors that were capable of continuous data (biostatistics) acquisition. The data transmitted to a local access point which might be co-located with the user's mobile phone from which the data can be transferred through the Internet. In which a two-way communication also be envisioned. An adequate feedback from the medical practitioner could be transmitted via the same route to the sensors or the access point. The paper focused on developing a Medium Access Control (MAC) protocol for the WBAN.MAC scheme facilitates such dynamic behavior by the system.[13] The two primary requirements were: (a) fast and reliable data transmission and (b) low power since the sensors were wearable.

2.4- Homecare Kit supporting multiple bio-signals acquisition and analysis in daily life.

Author Seol young Jeong represented a homecare kit platform that can support the medical care service. In the proposed platform, the homecare kit consists of wearable devices with embedded biosensors: Accelerometer(ACC), photoplethysmograph (PPG)/ blood oxygen saturation level (SpO2), Breathing, electrocardiogram (ECG); the user can easily wear and use the homecare kit for measuring the bio-signal in daily life or while sleeping [14]. The ACC data recognize the user's movement under sleep or when running or walking. Hence, during these activities, Seol young jeong

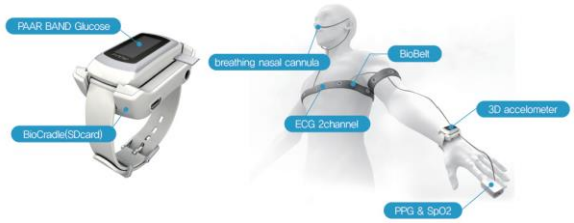

FIG.3 Home care kit and wearing example.

gives a reasonable solution to hold the signal measurement in order to avoid noisy data accumulation. In the paper a sleep apnea subject actually wore homecare kit and polysomnography equipment simultaneously in the hospital[15]. Then it evaluated the equipment equivalence based on the analysis result and acquisition bio-signal. In which author tries, if the breath signal of the patient under sleep was flat for a period of time because of sleep apnea, the SpO2 value of the patient becomes lower[16]. In addition, diagnostic tests were expensive, and the booking was time consuming.

3. PROPOSED SYSTEM

As a continuous changes occur in the circuit architectures for processing data received from the sensors, the next factual step is the implementation of these systems into an embedded systems. The stressed paper reviews the work that has been done in a printed circuit board systems. In a

PCB, sensor and central computing system build with the application of embedded systems. Obstacle avoidance based on visual information has received much attention. Due to the simplicity of circuits based on such type models have been studied for this application. Biologically algorithm for processing systems are more complex systems e.g. face recognition, body motion recognition system. In the current era, it takes lot of attention based tracking, snooping , identify various behavior and feelings. Recently, lot of gadgets are developed specially for identifying various behavior e.g. smart watch developed by apple, Samsung, Motorola [17]l. The stressed paper focused on the device that are monitor the various behavior of human simultaneous. While the present paper focused upon circuits and bio signaling systems for that process data obtained from sensors, it is important to note that the paper represents an embedded systems, which is specified for a particular task though sensors which generate signals to be applied to controller. The demo circuits perform crucial roles in developing appropriate behavior once data is decoded. One of the important part that grasp the attention is the central computing unit and GSM module. By utilizing module the behavioral pattern of a particular subject. All the above processing system perform important role in number of cases i.e. subjects in critical condition or continuous monitoring. As the time changes its role will take place important part in our life.

3. CONCLUSIONS

In this survey paper, we have reviewed past work in bio-signaling system and circuits utilizing sensory data and generating behavioral signals. The four papers in this session represents efforts to indentifying behavior of a subjects. During this session it was observed that the average accuracy achieved for both "happiness" and "normal" emotions was around 83%, and both the emotions manifested same biological characteristics

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