Automatic Recognition using Heartbeat Authentication

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Abstract - Automated security is one of the major concerns of modern times. Secure and reliable authentication systems are in great demand. A biometric trait like the electrocardiogram (ECG) of a person is unique and secure. In this paper, we propose an authentication technique based on Radon transform. Here, ECG wave is considered as an image and Radon transform is applied on this image. Standardized Euclidean distance is applied on the Radon image to get a feature vector. Correlation coefficient between such two feature vectors is computed to authenticate a person. False Acceptance Ratio of the proposed system is found to be 2.19% and False Rejection Ratio is 0.128%. We have developed two more approaches based on statistical features of an ECG wave as our ground work. The result of proposed technique is compared with these two approaches and also with other state-of-the-art alternatives

1. INTRODUCTION

Biometric trait like Electrocardiogram (ECG) of a person is unique and secure when compare to iris and fingerprint which cannot be spoofed or faked. Biometric authentication is the process by which the physical characteristics of human beings are used to prove the identity; it allows access to cell phone, bank account or doors. Heartbeat authentication is the latest biometric that is going to be executed in the digital world. Secure and reliable authentication system is in great demand like heartbeat authentication. Only authorized person can access his/her data.

In this project, we propose an authentication technique. Here, ECG wave is considered as an image and is applied as a password. In the proposed project, we are going to use patients' heartbeat patterns to protect their electronic medical record which is a new method of biometric authentication. Correlation coefficient between such two features vector is computer to authenticate a person.

1.1. HARDWARE USED

NodeMCU is associate degree open supply IoT platform.. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espress if Systems, and hardware that relies on the ESP-12 module. The term "NodeMCU" by default refers to the computer code instead of the event kits.

As Arduino.cc began developing new MCU boards supported non-AVR processors just like the ARM/SAM MCU and utilized in the Arduino Due, they required to switch the Arduino IDE in order that it would be comparatively simple to alter the IDE to support alternate tool chains to permit Arduino C/C++ to be compiled for these new processors. They did this with the introduction of the Board Manager and therefore the guided missile Core. A "core" is that the assortment of package parts needed by the Board Manager and therefore the Arduino IDE to compile associate degree Arduino C/C++ supply file for the target MCU's machine language. Some ESP8266 enthusiasts developed associate degree Arduino core for the ESP8266 local area network SoC, popularly referred to as the "ESP8266 Core for the Arduino IDE". This has become a number one package development platform for the various ESP8266-based modules and development boards, including NodeMCU`s.

Fig 1.1: NODE MCU

1.2 HEART BEAT SENSOR

Two ways to measure heartbeat

- **Manual Way**: Heart beat can be checked manually by checking one's pulses at two locations- wrist (the **radial pulse**) and the neck (**carotid pulse**). The procedure is to place the two fingers (index and middle finger) on the wrist (or neck below the windpipe) and count the number of pulses for 30 seconds and then multiplying that number by 2 to get the heart beat rate. However pressure should be applied minimum and also fingers should be moved up and down till the pulse is felt.

- **Using a sensor**: Heart Beat can be measured based on optical power variation as light is scattered or absorbed during its path through the blood as the heart beat changes.

Fig 1.2: HEARTBEAT SENSOR

2. EXPERIMENTATION & RESULT

The hardware is interfaced with all the sensors in the board. The hardware components include the Node mcu, a power supply and the heartbeat sensors interfaced. The board is fixed with an electroplate which is used to communicate with the user and the recorded values.

Fig.1.2: component of the project

The MATLAB is used to run the authentication process. We should run the program to authenticate and to view the patient's details the heart rate and the ECG wave is used for authentication process.

Once the authentication process is over, the webpage will automatically get opened and the patient's details. In that you can see the patients last details and you can add the current details of the patients
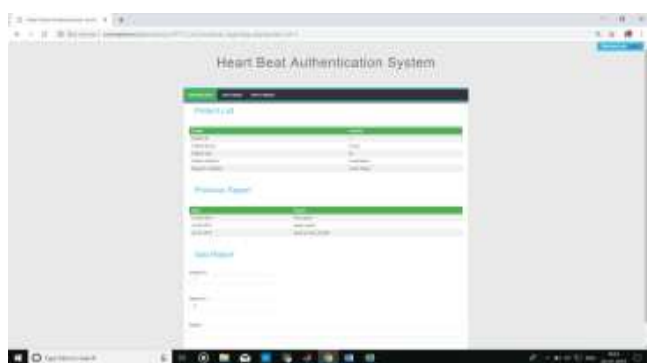

Fig2.2 heart beat authentication webpage

In this you will be able to see the patient's details and existing report, even you can add/edit the report for the new user.

3. CONCLUSIONS

The heartbeat is the new biometric which cannot be replicated and can't create a fake password for the heartbeat authentication. The authentication is created to authenticate the Patients record to be viewed. We have seen how the biometric system has been growing in our digital world. The parameter of the heartbeat authentication system has been

Implemented and it has been worked so, in this we have completed half of the system. The result of the heartbeat is reasonably good success in recognizing the only the Heartbeat of the person, and the PHP webpage has been created to view the patients result. In future the heartbeat authentication will be the new biometrics and that will be implemented in the large scale.

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