Applicability of wearable biometric sensors

for authentication and health monitoring

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Abstract

Contents

1 Introduction

1.1 Topic covered

1.2 Keywords

Biometrics, pattern recognition, authentication, healthmonitoring, internet of things, smart devices, wearable sensors, eletronics, accelerometer.

1.3 Problem description

In todays world many electronic devices has flooded the market and been taken into use by the public. The latest swarm of devices are wearable electronic devices, eg. healthmonitors, implanted medical device (IMD), smart watches and wearable devices. All of which are capable of logging data for different purposes.

This project focuses on area of wearable sensors which provide healthmonitoring by logging biometric data about its user and to which end this type of data is applicable to other areas like authentication / identification, realtime detection of medical emergencies ie. fall detection, cardiac arrest, and the case of health monitoring over a prolonged time for detection of deterioration or emerging issues, eg. parkinsons desease or cardio vascular issues.

At this point in time, the leading brands of wearable sensors don't provide access to their wearable devices. Meaning the data has to be synced to their online cloud service for storage, before it can be retrieved for analysis. Obviously this poses a real issue for real time events like authentication and identification procedures, or medical emergencies. In addition the idea of storing personal data about health in the cloud and through an untrusted third party poses issues for both healthcare legislation and authentication procedures.

Because of these problems, this project will try to ascertain how applicable the use of wearable sensor are for identification and authentication, and healthcare monitoring on a realtime basis and prolonged time. The sensor data which are interesting includes data from "FitBit" devices which includes heart rate, accelleration, gyroscope and Global Navigation Satellite Systems (GNSS), and smartphone devices, which include video, audio, gyroscope, accelleration and fingerprint data.

1.4 Justification motivation and benefits

1.5 Research questions

- Is "Off-The-Shelf" (OTS) wearable devices applicable for real time health monitoring and authentication / identification?

- Is OTS wearable devices applicable for prolonged health monitoring

- What data is required to perform either of the tasks in question?

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- What type of data is gathered by current OTS wearable devices, and in what form is it available?

  - Must the project develop its own sensor to get the data required?
  - How is the required one measure heart rate using electronic devices?
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1.6   Planned contributions

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