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Livzy – Making Living Easy and Smart

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Abstract:- Livzy, an IOT based Healthcare band which monitors user's activity and provide results accordingly. The band will be connected to phone with wireless technology called Bluetooth and with the help of this technology band will be able to send and receive data to and from phone and which in turn will connected to server. Livzy also has an Android Application which will show all the stats of activity performed by the user like Steps, Distance, Calories, Heart rate, User Tracking, etc. With the help of Gyroscope sensor, Band will be able to understand the gestures and actual motion of an individual by Behaviour Analysis and those gestures will be useful to perform any action. This concept can be used in Home Automation to handle our home appliances in easier way. Thus this will help users to overcome their health issues and also automate his daily life.

Keywords:- IOT, Android, Healthcare, Bluetooth, User activity, Behaviour Tagging.

I. INTRODUCTION

An activity tracker/smart band, also known as a fitness tracker, is a device or application for monitoring and tracking fitness-related metrics such as distance walked or run, calorie consumption, and in some cases heartbeat and quality of sleep. The term is now primarily used for smart watches that are synced, in many cases wirelessly, to a computer or smart phone for long-term data tracking. Electronic activity trackers[2][3] are fundamentally upgraded versions of pedometers; in addition to counting steps, they use accelerometers and altimeters to calculate mileage, graph overall physical activity, calculate calorie expenditure, and in some cases also monitor and graph heart rate and quality of sleep.

Some also include a silent alarm. Wearable[1][4] sensors have been widely used in medical sciences, sports and security. Wearable sensors can detect abnormal and unforeseen situations, and monitor physiological parameters and symptoms through these trackers.

This technology has transformed healthcare by allowing continuous monitoring of patients without hospitalization. Medical monitoring of patient's heart rate, brain activity, muscle motion and other critical data can be delivered through these trackers. Moreover, in sports training there is an increasing demand for wearable[1][4]. Sensors Activity trackers are available both with and without display. Certain movements of the user, such as working in the household, cycling, swimming, dancing or rowing can distort the results obtained from activity trackers.

II. LITERATURE SURVEY

A. Study on Smart Security Technology for Women based on IOT

In the current situation, the important goal is to provide security to women from issues of women harassment. The only thought haunting every girl is when they will be able to move freely on the streets even at any time without worrying about their security. This paper suggests a new idea to use technology for women safety. "Over 34,600 cases of rape have been reported across the country last year with Madhya Pradesh and Delhi topping the infamous list of states and union territories, this statistic released by the Country's National Crime Records Bureau(NCRB) had revealed" That's a HUGE number! We propose an idea which changes the way everyone thinks about women safety. We propose to have a device which is the integration of multiple devices, hardware comprises of a wearable[4] "Smart band" which continuously communicates with Smart phone that has access to the internet.

The application is activated and loaded with all the required data which includes Human behaviour and reaction. The application has access to GPS and Messaging services which is pre-programmed in such a way that whenever it receives emergency signal, it can send help request along with the location co-ordinates to the nearest Police station, relatives. This action enables help instantaneously from the Police.

B. Study of wearable Smart Band for User Motion Recognition System.

Improvements in technology and the advent of smart devices have led to the development of smart phones, tablets, and smart TVs. Further, in recent years, wearable devices have gained considerable research attention. Wearable devices that are incorporated into clothes and accessories allow individuals the free use of their hands. The basic concept of these devices- a device that can be worn instead of being carried-supplements the intellectual capacity of a human; therefore, in this paper, we aim to implement a computing environment to integrate large-scale equipment with these devices.

In order to respond to user needs in real time, it is necessary to develop wearable devices that ensure the user's

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safety. Further, to reduce the discomfort of using multiple devices, wearable[1][4] devices should be compatible with other devices such that only a single device is necessary. Therefore, in this paper, we combined a smart TV, wearable smart band, and smart phone to enable the user to effectively store physical information; moreover, we developed a system to manage this information.

C. Motion-Based. Authentication for Wrist Worn Smart Devices

Wrist worn smart devices such as smart watches become increasingly popular. As those devices collect sensitive personal information, appropriate user authentication is necessary to prevent illegitimate accesses to those devices. However, the small form and function-based usage of those wearable[1] devices pose a big challenge authentication. In this paper, we study the efficacy of motion based authentication for smart wearable devices. We propose Motion Auth, a behavioural biometric authentication method, which uses a wrist worn device to collect a user's behavioural biometrics and verify the identity of the person wearing the device. Motion Auth builds a user's profile based on motion data collected from motion sensors during the training phase and applies the profile in validating the alleged user during the verification phase.

We implement Motion Auth using Android[5] platform and test its effectiveness with real world data collected in a user study involving 30 users. We tested four different gestures[10] including simple, natural gestures. Our experimental results show that Motion Auth can achieve high accuracy (as low as 2.6% EER value) and that even simple, natural gestures such as raising/lowering an arm can be used to verify a person with pretty good accuracy.

III. COMPARISON BETWEEN EXISTING SYSTEM & PROPOSED SYSTEM

A. Existing System

In Existing system there are various features like activity tracker[2][3], Steps counting, Heart rate, Sleep monitoring and so on. They use various hardware to accomplish the same and some of them are costly and also they are not that accurate. These band have their own android application for displaying appropriate information captured by hardware to the user. These band comprises of minimal features and are limited at the end as they only used as activity tracker[3]. There are various band with different brands which are available at different price segment.

B. Proposed System

In Proposed system we have added a new feature called behaviour tagging. Behaviour tagging is basically a concept in which an action is performed based on gestures[10] made by a user. So this concept we are going to implement in Home Automation which will make easier for user to control his/her home. For this we have developed a system which has an Arduino [6] UNO for controlling Home appliances and Bluetooth Module for receiving commands from Band.

So the working for the this is like when any gesture is performed by the user those gestures[10] will be sent to an Android[5] app and further those gestures data are sent to Home system, thus an appropriate action will be performed. For example, we have set a gesture for turning on fan like two circular motion of hand, thus whenever this gesture is performed Fan will turn on.

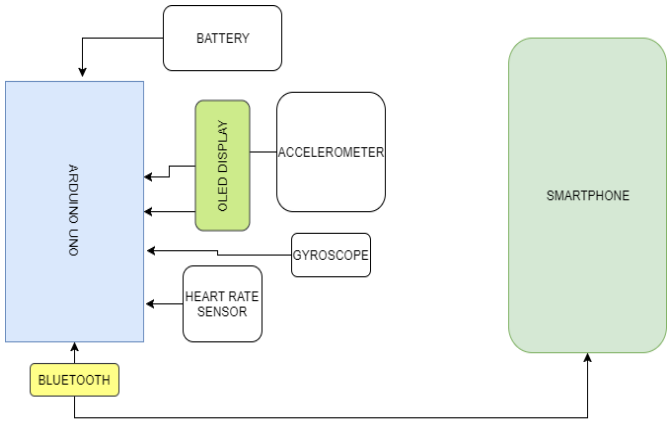

Fig 1:- Proposed System

Existing System	Proposed System
This does not provide IOT based system.	This provides IOT based system.
No Behaviour Tagging concept used.	Here, behaviour tagging concept is used.
This system does not comprises of Women safety feature.	This system comprises of the same.
Not much reliable as it is only used as activity tracker.	More reliable than existing system as it provides both existing and proposed features.

Table 1: Existing System V/S Proposed System

Also we have implemented emergency alert system for women's safety. In this there is a switch in band of which it will be activated. So the working for the same is that when a switch is pressed an emergency alert message will be sent to registered contacts with its current location and the victim's phone will be ringed at highest possible sound which will basically tell other that something is wrong over here.

IV. METHODOLOGY

Proposed system aims to help users to achieve both existing features of band and also the proposed features of the band. Thus this will make an efficient use of smart band as it provides activity tracking as well as IOT based system. The use of proposed system band is similar to existing system band. Being such kind of band it also covers Safety for women by adding emergency alert system. More over proposed system may cost more as it provides some additional features for Home automation and all the user data will be stored in a server database so that the user can get to view their

information from anywhere. Thus this makes proposed system not only easy to use but also in a smarter way too than other existing features.

V. ALGORITHM

In this project there is no such specific algorithms used but some libraries and formulas are used. Libraries are used to get digital output from different hardware sensors and formulas to get desired output and also to remove noise. Libraries used in project are as follows:

- SoftwareSerial
- SPI
- Wire
- Adafruit GFX
- AdaruitSSD1306
- PluseSensor Playground

All the above libraries are compatible with Arduino[6][7] UNO. Every hardware uses its own library so classification for the same is as follows:

- SoftwareSerial – Bluetooth Module (HC-05)
- SPI, Adafruit GFX, AdafruitSSD1306 – OLED Display
- Wire – MPU6050[7] (Accelerometer and Gyroscope)
- PluseSensor Playground – Heart Rate sensor

Formula to calculate steps is as follows:

```
//getting the raw values from MPU6050
//average threashhold value is 0.8
g Force X = float(gForceX);
g Force Y = float(gForceY);
g Force Z = float(gForceZ);

total = sqrt((gForceX * gForceX) + (gForceY * gForceY) + (gForceZ * gForceZ));
total = (total + (total - 1)) / 2;
Serial.println(total);
delay(200);

 //cal steps
 if (total > threshhold && flag == 0)
 {
  steps = steps + 1;
  flag = 1;

 }
 else if (total > threshhold && flag == 1)
 {
  //do nothing
 }
 if (total < threshhold  && flag == 1)
 {
  flag = 0;
 }

 Serial.println('\n');
 Serial.print("steps=");
 Serial.println(steps);
```

Formula to calculate distance over steps:

```
//average step length is around 76
distanceInCM = (averageStepLength * steps);
distanceInKM = (distanceInCM / 100000);
distanceInM = (distanceInCM / 100);

if (distanceInM > 1000) {
Serial.print("Distance in KM:");
 Serial.println(distanceInKM);
} else {
Serial.print("Distance in M:");
Serial.println(distanceInM);
}
```

Thus, these are some formulas and libraries used in project to get desired output from hardware.

VI. CONCLUSION

Thus this ensure that you are able to focus on enjoying better health and getting in shape through tracking the steps you take, calories burned, your heart rate and certain movements of the user, can distort the results obtained from activity trackers[2][3]. Also will be able to automate various tasks such as Home atomisation using Behaviour Analysis/Tagging and control those tasks on your fingertips. This technology has transformed healthcare by allowing continuous monitoring of user activity and give the same to the user.

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