The Internet of Things (IOT) Smart Handshake Contact Information Data Logger Using OTA Technology

Muhammad Aistam, Dr. Hafeez ur Rahman

***Abstract*— The Smart Wrist Band is a wearable bracelet-like device that exchanges information about its clients and their relationships. It is advancement in field of Internet of Things (IOT) and utilizing Over the Air (OTA) technology makes this band more valuable. This trade of information occurs amid the regular signal of the handshake, which is recognized by the wrist band. As such, in this paper, we discuss the Smart Wrist Band technology and feedback. The results suggest that control over personal information is an ongoing issue, but they also highlight the possibility for wearable devices to enable the creation of a set of invented techno-gestures with different affordances and constraints that might be more appropriate for certain social interaction applications.**

***Key Words*—IOT, OTA, Handshake, Smart Band, wearable devices.**

I. INTRODUCTION

We all agree to the fact that we feel more valued and respected when someone remembers our name. We feel more engaged in a conversation when someone know our designation, our expertise or remember where exactly we meet last time. Particularly in business, even remembering someone's name can make a difference in how that person feels about you and your brand.

In past few years, there has been an explosion of online social networking. Web sites like Facebook, Twitter and LinkedIn allow people to build relationships in an active social cyberspace. This development has been paralleled by the increasing attention received by wearable technologies in ubiquitous computing research. My research is convergence of these two domains. I am interested in exploring the social nuances and affordances provided by wearable social networking. I am going to present Smart Band, a technology enhanced wrist band that can store, exchange and send your data to your email account. Smart Band aims to explore the potential of wearable devices to augment real and virtual world social interaction.

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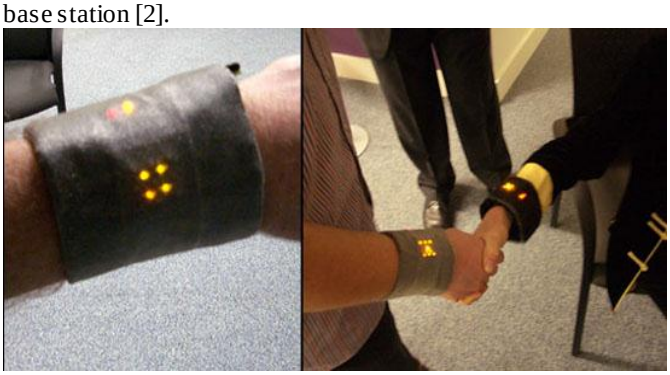
II. EXISTING SOLUTIONS

A. Smart-Its Friends by Holmquist

The Smart-Its Friends technique aims for easy establishments of connections between two artifacts. Their objective is `to develop a range of small, embedded devices as platforms for augmentation and interconnection of artifacts'. During the matching phase, the Smart-It broadcasts its captured movement data and ID to other devices within a limited listening range. Surrounding devices compare the data to their own. Based on whether the devices are moved similarly, they either establish a dedicated connection or not. This connection will physically break when the devices move out of each other's communication range, but will automatically reconnect when placed back in range. Smart-Its Friends are stand-alone devices, meaning there is no base station (PC) involved. This is a property that meets the stand-alone requirement from Shake-On. Furthermore, there are no restrictions on the synchronized movement that is performed. Because of this, the bracelets are continuously broadcasting. Considering the Computation over Transmission design principle, this way of unconditional broadcasting is not energy efficient [1].

B. ***iBand by Kanis***

The iBand is developed by the Human Connectedness group in Dublin for a study towards the influence of techno-gestures upon social networking. Two people shaking hands cause their wristband to connect using infrared (IR) transceivers, after which data is exchanged. Like the Smart-It, the device uses a PIC microcontroller and a 2-D accelerometer. After the event, the user returns to the kiosk to upload all collected contacts at a base station [2].



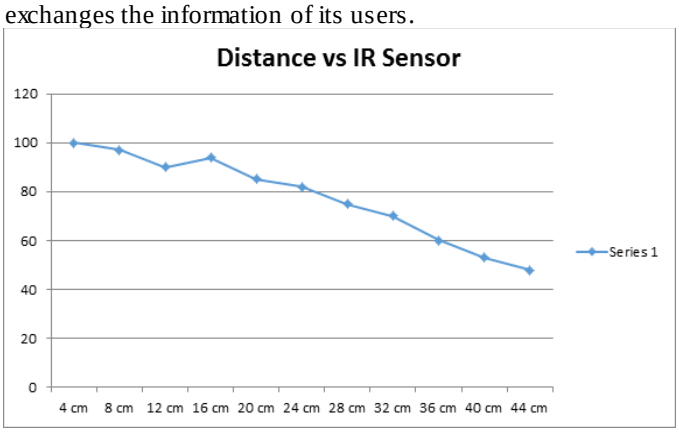
C. ***B-HandDS by Augimeri***

The B-HandDS can be considered the solution that comes closest to the system desired by Shake-On. The wristbands are in sleep mode until another device enters their proximity, using a beaconing mechanism. Then, Augimeri introduces a cooperative handshake detection protocol (CHDP) that requires both parties to confirm the handshake before they exchange data. Sensor data is first classified locally, after which only potential handshakes are advertised. Then, potential handshakes received from other smart bands are compared to its own and might lead to a connection. For both local classification and matching, a feature vector is composed and fed to an algorithm based on a J48 Decision Tree. The motivation for the use of the J48 decision tree is the fact that the algorithm is lightweight and computationally inexpensive, good for coarse-grained classification [3].

It is concluded from this comparative study that there is no system or algorithm yet that satisfies all of the design requirements. The requirement is to develop device which simple exchange information of persons who shake hand with each other.

III. SMART WRIST BAND

Smart wrist band is a bracelet that exchanges information when one user shakes hands with another. IR transceivers [4] on both bands send and receive data whenever they come in front of each other (during hand shake). Data of both users exchanges during this process. Comfortable to wear, reliable and water proof smart wrist band sends received code to webserver. It was hard and tiring job to connect band to computer every time when there is change in code. Over the Air (OTA) technology [5] is used to program controller without using serial communication cable. The Smart Band fulfills all requirements and easily exchanges the information of its users.



IV. CHALLENGES

There are heaps of challenges which I need to confront before succeeded to make Smart Band efficient, compact, reliable and easy to use. The voyage starts with selecting right components. Smart Band must be connected to web server through internet.

A. Approach 1

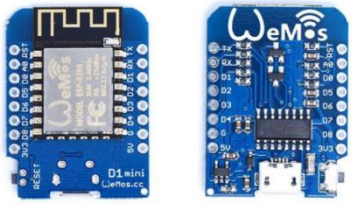
Using Arduino UNO [6] and ESP8266-01 [7]. Although Arduino UNO connected with ESP8266-01 have capability to fulfill our requirements but size of Arduino UNO is big, and it created lot of difficulties in designing a wrist band.

B. Approach 2

Size issue solved by using Arduino Nano [8] instead of Arduino UNO, yet the new issue emerges. Arduino Nano cannot provide enough current to operate ESP8266-01. So, we have to use voltage divider rule or voltage regulator to regulate voltage from 5v to 3.3v. But it affects the efficiency of ESP8266-01, out of 20 experiments only 3 times ESP8266-01 worked properly (15% efficiency). So it was great risk to use this much inefficient components in Smart Band.

C. Approach 3

Finally found an amazing product from WEMOS.



WEMOS D1 mini [9] is much similar to Arduino board but it has built in ESP8266-12, so it is much reliable to connect WEMOS D1 Mini to Wi-Fi and through this we can enter into whole new world of Internet of Things(IOT) [10].

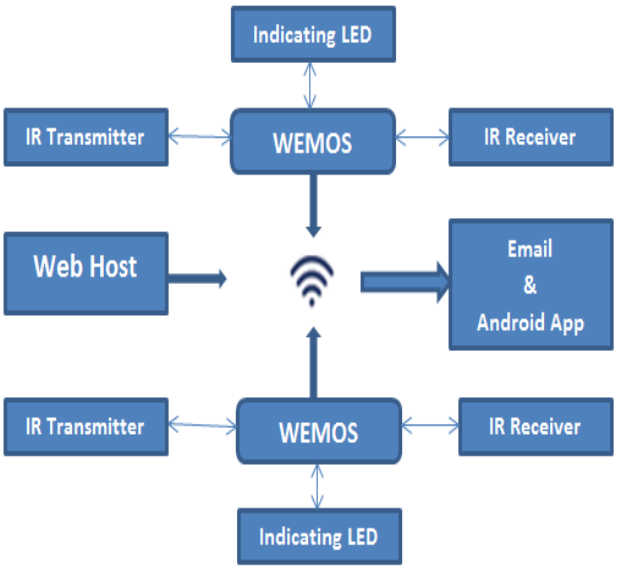
D. Approach 4

To send desired code from IR transmitter it is ideal to use JVC Panasonic Protocols [11]. In JVC Protocols there is 8-bit address and 8 bit command length. It works much better then SIRC Protocols.

The picture above demonstrates a typical pulse train of the JVC protocol. The JVC Protocols uses pulse distance encoding of the bits. Bit time is of 1.05ms or 2.10ms.

Web server is another major part which takes input from sensor through WEMOS D1 Mini and sends data behind it to Android App or email, as per requirement. There are numerous online webs hosting [12] provider and this part can be finished effectively.

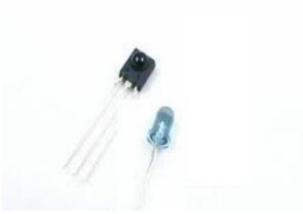
V. BLOCK DIAGRAM



VI. COMPONENTS USED IN SMART BAND

1) WEMOS D1 mini
2) IR Transceiver
3) Resistors
4) LEDs






VII. WORKING

1) Each band has its own unique ID that matches the ID in the server corresponding to which all users have saved data on it.

2) WEMOS D1 mini is like computer of our device which controlling IR transceivers.

3) When user shake hands with one another the ID's exchanges via IR transceivers.

4) Then data behind that ID is sent to Android App or Gmail via web server.

5) There is PHP script uploaded on webserver which is responsible to conduct all these operations.

6) Finally the Android app or Gmail will have data of people you met and you can easily view that data anytime.

7) The PHP command for sending is as follows:

mail($admin_email,"$subject",$text,"From:" .$email);

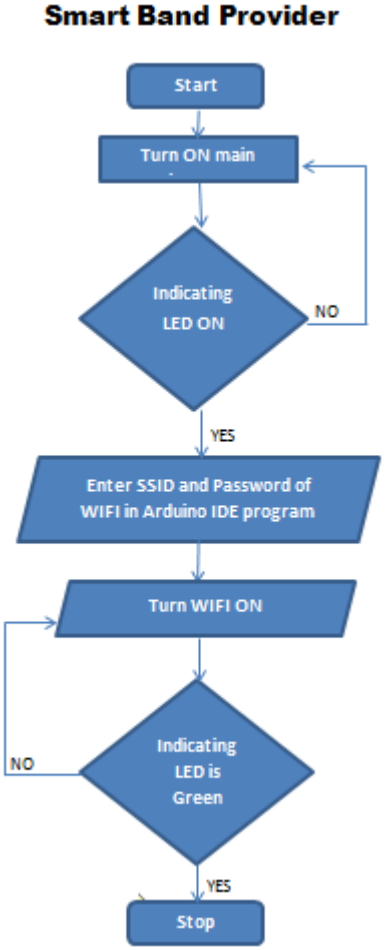
8) Information of both users will upload on webhost. Here, the 000webhost is used

```
<?php

                        $text ="    Name: Usman (EE-04)
                                    Place: iUSE School of Engineering
                                    Date: 11 Apr, 2017
{$rcv_wemos_1} ";


$admin_email    = "aitsameeiuse@gmail.com";
$email  = "aitsam@iuse.edu.pk";
$subject ="smart handshake";

mail($admin_email,"$subject",$text,"From:" .$email);

                        $text ="    Name: Aitsam (EE-05)
                                    Place: iUSE School of Engineering
                                    Date: 11 Apr, 2017
{$rcv_wemos_2} ";
```

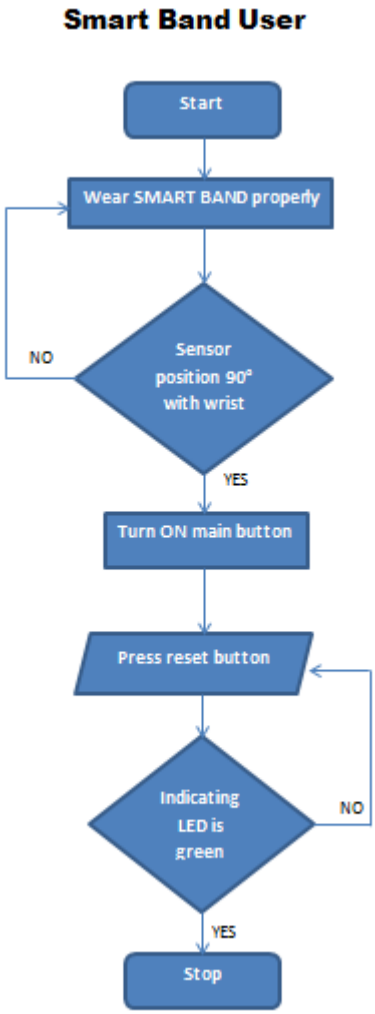
9) Android App

VIII. Flow Charts for User and Provider

First flow chart describes how the provider can operate Smart Band. The green LED represents that WEMOS is connected to WIFI and all other components are working properly. Providing correct SSID and password is very important, and it is also case sensitive.



Second flow chart describes how user can operate the Smart Band. User has to press reset button every time he/she turns the main button ON. Pressing reset button will allow the system to connect with WIFI. Indicating LED turns green when system is connected to WIFI.



IX. Over the Air (OTA) Technology

Over The Air (OTA) is a standard for the transmission and reception of application-related information in a wireless communications system. OTA is commonly used in conjunction with the Short Messaging Service (SMS), which allows the transfer of small text files even while using a mobile phone for more conventional purposes. In addition to short messages and small graphics, such files can contain instructions for subscription activation, banking transactions, ringtones, and Wireless Access Protocol (WAP) [13] settings. OTA messages can be encrypted to ensure user privacy and data security. The involvement of OTA technology in this project makes it easier to use and user friendly. The user just has to tell the provider about the information he/she want to share during handshake and provider without connecting band with computer using wire can update the information in the specific band.

X. Applications

According to Marketing Donuts [14], the information of people we meet in meetings, conferences, seminars become the part of our short-term memory.

After 1 day 54% was remembered
After 7 days 35% was remembered

The Smart Band will help its user to safe the data of people he/she shake hand with. These links could be very helpful in growing your businesses making new partners or sharing new ideas.

Your data is also secure because you will share only that data which you can share easily with anyone. Moreover, you can also update your data anytime. The exchange data can be access anytime by using email or Android App.

XI. Scope of Improvement

1) Make smart wrist band more attractive by adding some extra features like whether updates etc.

2) New and more reliable methods to transmit code via IR.

3) Can also exchange large data like pictures and videos.

4) Improve user interface of Android app.

5) Ability of Smart wrist band to connect to any available network.

6) Use of Raspberry Pi for server and data base.

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