A SEMINAR REPORT ON

FINGER SLEEVE

Submitted in partial fulfillment of the requirements for the award of the degree of

BACHELOR OF COMPUTER APPLICATION

Mahatma Gandhi University, Kottayam

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CERTIFICATE

This is to certify that the report entitled **"FINGER SLEEVE"** has been submitted by **Maxon Mathew,180021096948** in the partial fulfillment of award of degree in Bachelor of Computer Application of Mahatma Gandhi University during the academic year 2018-2021.

Head of the department **Principal**

Smt. Namitha Shajan **CAPT.Dr.M.K.Ramachandran**

Seminar Guide

Smt.Namitha Shajan

Submitted for the examination held on

Examiners

1. **……..**
2. **…….....**

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MAXON MATHEW

DECLARATION

I hereby declare that this seminar report entitled "**FINGER SLEEVE**" is a bonafide record of seminar work done by the in partial fulfillment of the requirements for Degree of Bachelor of Computer Applications, under the guidance of **Ms.Namitha Shajan**, Assistant Professor of the Department of Computer Application ,St. Anns College,Angamaly.

Date: Maxon Mathew

Place: Angamaly

ABSTRACT

In this Article we present a novel wearable navigation system along with implicit HCI (iHCI) model, where interaction with technology is dissolved into a day-today activity. In this type of HCI model a computer takes the input and tries to output an action that is a proactive anticipation of next action of a user. Usually, in urban areas people use voice assisted navigation systems or navigation guidelines displayed on a mobile phone. Some navigation systems are already installed on car dashboard, which needs explicit attention in order to make driving decisions.

A navigation system using haptic perception to guide a user throughout a journey is the key contribution of this paper. It does not ask for explicit user attention and demonstrates the indolent form of technological interaction. This wearable device is an index finger sleeve, which consists of vibrator modules, Bluetooth communication module and Microcontroller Unit (MCU). A working prototype has been built and tested.

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INTRODUCTION

1.INTRODUCTION

Finger sleeve is a wearble device. wearable computing enables human to wear a computational device on body. Wearable devices can be of many types, and each addresses specific use case, such as smart glasses, smart wrist watch, heart monitoring hedsets and many more. With the advent and growing popularity of wearable devices like the Google Glass, Fitbit Flex, Nike fuel Band, LG life Band and the Oculus rift, wearable computing is proving to be one of the major technological advancements in the 21st century. These body mounted devices are able to monitor various activities in real-time.

For a wearable navigation device the success factor lies in the accuracy of navigational signalling and unobtrusive interaction. With Implicit Human Computer Interaction model, user need not necessarily be interacting with the computing system. Moreover, interaction with limited visual attention is often emphasized as a design goal for wearable input. Finger Sleeve, a wearable navigation device, works along with the Android Smartphone. Android Operating Systems (OS) based Smartphone covers largest consumer market share, which helps us choose Android Smartphone as a GPS navigator. Here android OS based Smartphone is running a Google Map like application and providing the navigational signals to the Finger Sleeve. The user has to wear Finger Sleeve and pair it with the Smartphone running a navigational application. Finger Sleeve provides easy navigation throughout a journey.

EXISTING TECHNOLOGY

2. EXISTING TECHNOLOGY

The NAVIGATE Jacket helps the wearer find her destination using integrated LED lighting and haptic feedback. The companion app stores relevant destinations and uploads the directions to the jacket which gives turn by turn directions. Then the wearer can walk unimpeded with instructions being visualized on the sleeves of their jacket. designed with NAVIGATE features tailored into the sleeve, the lights indicate how far to the next turn and the current stage of the journey. Vibrations alert the user when to turn and in which direction.

2.2 ADVANTAGE

- Vibrations alert the user when to turn and in which direction.
- Find route to their destination.
- User friendly.
- Device operates on minimal number of steps.
- Reduced time of travel

2.3 DISADVANTAGES

- Data Connectivity
- Complex Topography of Roads
- Cars with GPS enabled dashboards.
- This device can be used for visually impaired but unable to detect the obstacles

3. PROPOSED TECHNOLOGY

The wearable device finger sleeve which will navigate the user to reach their destination. This system consists of android based smart phone application and finger sleeve device. The device connects to a smart phone with the help of Bluetooth so HC-05 is used. ATmega168 micro controller performs computational tasks. Two micro vibrators (left and right) are used to provide vibrational indicator direction.

Fig.1 finger sleeve

3.1 ABOUT TECHNOLOGY

The wearable device performs the task of navigation and helps user's to reach their destination. This device does not require any additional information to be downloaded from the internet, therefore, the overhead of data usage is less but maps should be downloaded before starting navigation. This system consists of android based smart phone application and finger sleeve device. The device connects to a smart phone with the help of Bluetooth so HC- 05 is

used alternatively we can use BLE (Bluetooth Low Energy) module .The computational tasks are performed by the ATmega168 microcontroller. Two micro vibrators (left and right) are used to provide vibrational indicator direction. This device can be used for visually impaired but unable to detect the obstacles.

Finger Sleeve has two major parts :

- Android OS based Smartphone Application.
- A Finger sleeve device.

3.1.1 ABOUT DEVICES

3.1.1.1 HC-05

Fig.2 HC-O5

HC-05 - It is used to send and receive data wirelessly to/from android OS based Smartphone. Another alternative is to use Bluetooth Low Energy (BLE) module. Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices, and building personal area networks (PANs). Invented by telecom vendor Ericsson in 1994, it was

originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization.

3.1.1.2 ARDUINO NANO

Arduino Nano - It has ATmega168 microcontroller with 16KB memory to store the code. It is responsible to run computational tasks. A microcontroller (or MCU, short for microcontroller unit) is a small computer (SoC) on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals. Program memory in the form of Ferroelectric RAM, NOR flash or OTP ROM is also often included on chip, as well as a typically small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications consisting of various discrete chips.

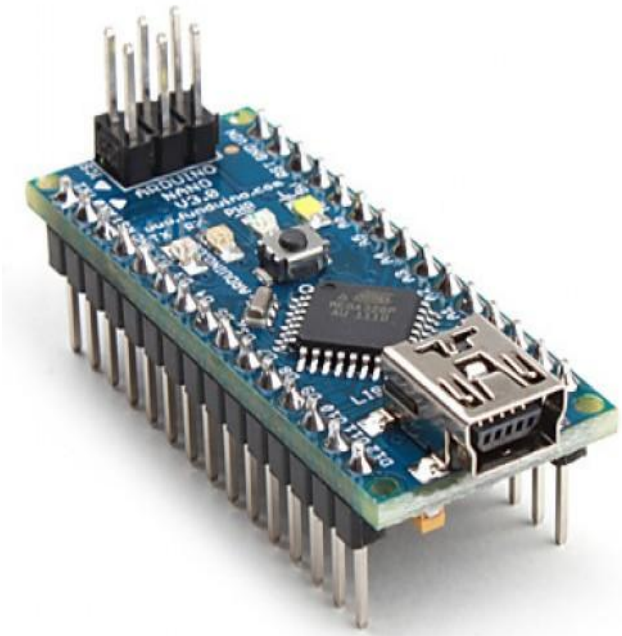

Fig.3 Arduino nano ATmega 168 microcontroller

3.1.1.3 MICRO VIBRATOR

Micro vibrator- Two micro vibrators are used to provide a vibrational indicator of respective direction. Each vibrator corresponds to particular haptic navigational signal viz. Right or Left. The micro vibrators will be so embedded into sleeve, one each to left, and to right side of a finger, that they are almost invisible. This "vibrator" is essentially a relay using normally closed contacts to supply power to the relay coil, thus immediately breaking the connection, only to be reconnected very quickly through the normally closed contacts. It happens so rapidly it vibrates, and sounds like a buzzer

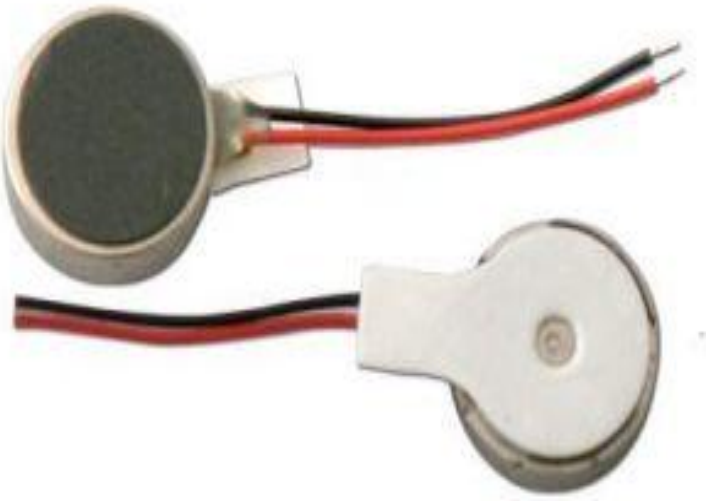

Fig.4 micro vibrator

3.1.1.4 LI-ION BATTERY PACK

Li-ion Rechargeable Battery Pack: Battery pack is responsible to power the Arduino nano. It is a rechargeable battery capable to maintain 80% capacity after 800 cycles. The smallest

size of a battery pack, micro vibrator, Microcontroller Unit (MCU) and Bluetooth module helps Finger Sleeve to be worn easily.

3.1.2 CHARACTERISTICS

- Finger Sleeve is designed to be an eyes-free navigational device and practically takes minimal number of steps to operate.
- The biggest advantage is that Finger sleeve saves significant amount of time as well as allow user to focus on road without being distracted.
- The finger sleeve pair with smart phone only once when initiate map application.
- it takes over the task of navigation relieving user to peek into Smartphone while he/she is on the move

3.2 WORKING

ANDROID OS BASED SMARTPHONE MOBILE APPLICATION

We developed a Bluetooth communication module, the mobile application, which is compatible to run on android OS version equal to 4.0 and above, that connects Finger Sleeve with a Smartphone. The Android application utilizes the map service provided by Google APIs and triggers the micro vibrators.

There are few pre-requisites to be done on the Smartphone prior to start the application**:**

1. Start the Bluetooth and pair the Finger sleeve with Smartphone. However, this is done only once and hence for the Bluetooth connection will be automatically established.

2. Enable the GPS of Smartphone.

3. Wear Finger sleeve into the index finger.

Fig.5 Scenario of using a finger sleeve along with Smartphone application

Android OS based Smartphone mobile Application

1. Start.

2. Set the destination point on map.

3. Draw a navigational path over a map. (Application will perform this automatically)

4. Signal the finger sleeve.

5. Start sending navigational signals to Finger Sleeve.

6. Detect the change in positions of User's current location.

7. Repeat the steps 5 and 6 until the user arrives at the destination or application is explicitly closed.

8. Stop.

The design of the first prototype is bearable by the user. After productizing the Finger sleeve, it will be almost invisible and difficult to trace the underline hardware modules used. This leaves a trail for a professional PCB designer to make a final Finger Sleeve Device using flexible. A navigational android application is running as expected. Thus an android application and Finger sleeve completes the navigation system.

Fig.6 Sequence diagram

3.3 ADVANTAGES

- Find route to their destination.
- Reduce road accidents.
- Less data usage.
- User friendly.
- Device operates on minimal number of steps.
- Offline navigation once map has been downloaded.
- Less wastage of Fossil fuels and reducing carbon footprint.
- Reduced time of travel

3.4 DISADVANTAGES

- Data Connectivity:-

In case of limited data connectivity smart phone GPS will not work as expected, leading to an ineffective use of Finger Sleeve.

- Complex Topography of Roads:-

In case of complex converging nodes Finger sleeve operations needs to be ameliorated more stringent tests should be conducted

- This device can be used for visually impaired but unable to detect the obstacles

3.5 APPLICATIONS

- Media controller for a smart phone.
- A wearable pointing gadget.

4. FUTURE SCOPE

- Media controller for a Smartphone.
- A wearable pointing device.
- Customizable keys to be used along with the mouse.
- Finger sleeve can help visually impaired, but it has to be integrated with obstacle detection systems.

CONCLUSION

5. CONCLUSION

In this paper, we have presented the experimental results and in depth analysis of the Finger Sleeve prototype for navigation during walking and driving a car tasks. Finger Sleeve, a wearable navigational assistant, shows the potential of being effective navigational beacon. Preliminary studies of user reactions and feasibility of using such wearable navigational device suggest that it is an easy to use and a propos for the navigational needs of the user in present era.Smart wearable based navigation has various added advantages like a user friendly system, dependable navigation system and reduced travel time.

Allows vehicle drivers to effectively find the route to their destination.This propose darchitecturecaneffectively satisfy the requirements of smart navigation service. Reduce road accidents or tragedies, facilitate towards road safety and environment friendliness we can conclude that SMART NAVIGATION SYSTEMS mainly comprising of wearable devices have an upperhand over the traditional or the current navigation systems.

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