Navigation Belt

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Abstract: **With every passing day, mobile navigation is getting better and better. It all is useless though when we are riding a bike as the shaking bike will make it difficult for the phone to stay still. In order to overcome this problem, we introduce 'The Navigation Belt'. The system consists of a belt with 4 directional vibrators fit in it. All these vibrators will be connected to an Arduino Nano chip which acts as the commander in the system. With the help of Bluetooth, it will receive directions on where to go and the vibrators will vibrate accordingly. Hence whenever the user wears a Navigation Belt each and every turn he has to take will be said to him via his vibrating belt, hence he won't have to look at the phone and neither remember the directions for a complete journey.**

Keywords **– Arduino Nano, Bluetooth, vibrators, Google maps, Navigation**

I. INTRODUCTION

With the growth of Google maps, navigation is becoming way simpler each and every day. The problem comes in when we got to use Google maps as for that we need a mobile or a tablet and a stable place. Even in cars without a sticky thing, it is barely possible to navigate using a phone. Luckily a car is a closed environment and a phone which fell inside a car stays inside and safe. Things get messier though when it comes to the bike.

There is no fixed place where we can stick our phone to on a bike. Even if we somehow find one, considering how weak the shock absorbers of a bike are, the chances of the phone falling are high. If the phone falls off the sticky material it will fall right on the road and grabbing it back will become a tedious job. In the worst case, it can also lead to an accident.

There are people willing to use the growing navigation system but fail to know how. Hence the utility model comes into picture which consists of a belt. This belt can be worn as a normal belt and there is a 100 percent chance that it will stay on you throughout the journey. The belt is fitted with 4 vibrators which resemble four directions of navigation (North, East, West, and South).

These vibrators will be controlled by an Arduino chip. Detailed explanation on how the vibrators will provide the directions will be mentioned in the later part of the paper. The Arduino chip will be connected to the mobile phone via a Bluetooth chip both the Arduino chip and the Bluetooth module being inside the buckle. Compared with the existing system it will be more reliable, stable and danger free. Hence the system is worth the efforts.

II. THE PROPOSED SYSTEM

A. SYSTEM OVERVIEW

The system proposed in this paper is a two-part system. The belt and mobile, the belt consists of 4 vibrators, 1 Arduino chip, 1 switch, 1 LED and 1 Bluetooth module. The second part will consist of a mobile app which can manually control the best or outsource the inputs from google maps.

1. THE VIBRATORS

The system consists of 4 vibrators each representing a direction. On the basis of the vibrations, the user will define what direction to move.

VIBRATOR LEFT	VIBRATOR RIGHT	VIBRATOR FRONT	VIBRATOR BACK	DIRECTION TO FOLLOW
YES	NO	NO	NO	TAKE LEFT

NO	YES	NO	NO	TAKE RIGHT
YES	NO	YES	NO	MOVE NORTH-WEST
NO	YES	YES	NO	MOVE NORTH-EAST
NO	NO	NO	YES	TAKE U-TURN
NO	NO	YES	NO	MOVE FRONT FOR MORE THAN 1 KM
YES	YES	YES	YES	DESTINATION ARRIVED

2. THE ARDUINO CHIP AND THE BLUETOOTH MODULE

The proposed Arduino chip for the system is the Arduino nano which is the smallest of all Arduino chips and can easily be hidden inside the buckle of the belt. For the Bluetooth module, we have selected HC 05 which will also be housed inside the buckle with the Arduino chip. Figure 1 (a) and (b) shows HC 05 Bluetooth module and Arduino nano.

Figure 1 (a) HC 05

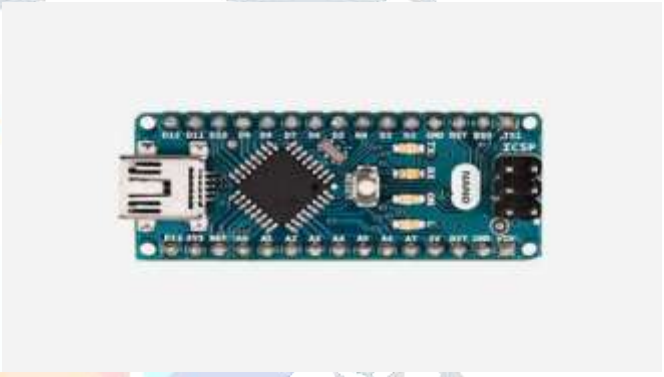


Figure 1 (b) Arduino Nano

3. EXTRA PERIPHERALS

Following is the list of extra peripherals required for implementation of the navigation belt.

- A normal two layered belt: A normal two layered belt is required to hide the wiring inside the first layer of the belt. Also, the belt must be a buckle belt instead of a hook one because the Arduino chip will be hidden inside the buckle.
- Wires: Wires will be required to connect the Arduino chip with the vibrators. The wires selected must be such that their color blends with the color of the belt.
- LED: At least two LEDs will be required to be fit inside the belt, one of which will indicate the condition of the belt and other will indicate the connectivity of the belt with the mobile app.
- Switch: A switch is required to turn on and off the Arduino chip whenever required so that the belt can be used as a normal belt whenever required.
- Custom belt buckle: We obviously can't use the buckle already present with the belt. Instead, we will have to our custom made buckle which has enough space to fit the two LEDs, the Arduino chip, the Bluetooth module, and the switch.

B. THE MOBILE APP

The mobile app is a 2 part process.

1. Google Maps: The navigation belt will be dependent on Google maps for directions to move in. All the directions will be provided via Google maps to our self-made android app. This will be done with the help of Google API which will be fed to our android app by our developer.
2. Android App: The app is initially implemented in android only but we plan to implement it at other platforms too. The android app will basically act as an interface between the arduino chip and Google maps. The arduino chip is programmed

to understand certain commands and the app will exactly send those commands after processing the commands received from Google maps.

Though the mobile app is a two way process but the user will be unaware of the two stages running. The user will be directed to the Google maps app and once he enters the destination the app will redirect to its own interface. Once the app shows good condition, there is no longer a need to look at the app; the belt will take over from that moment on.

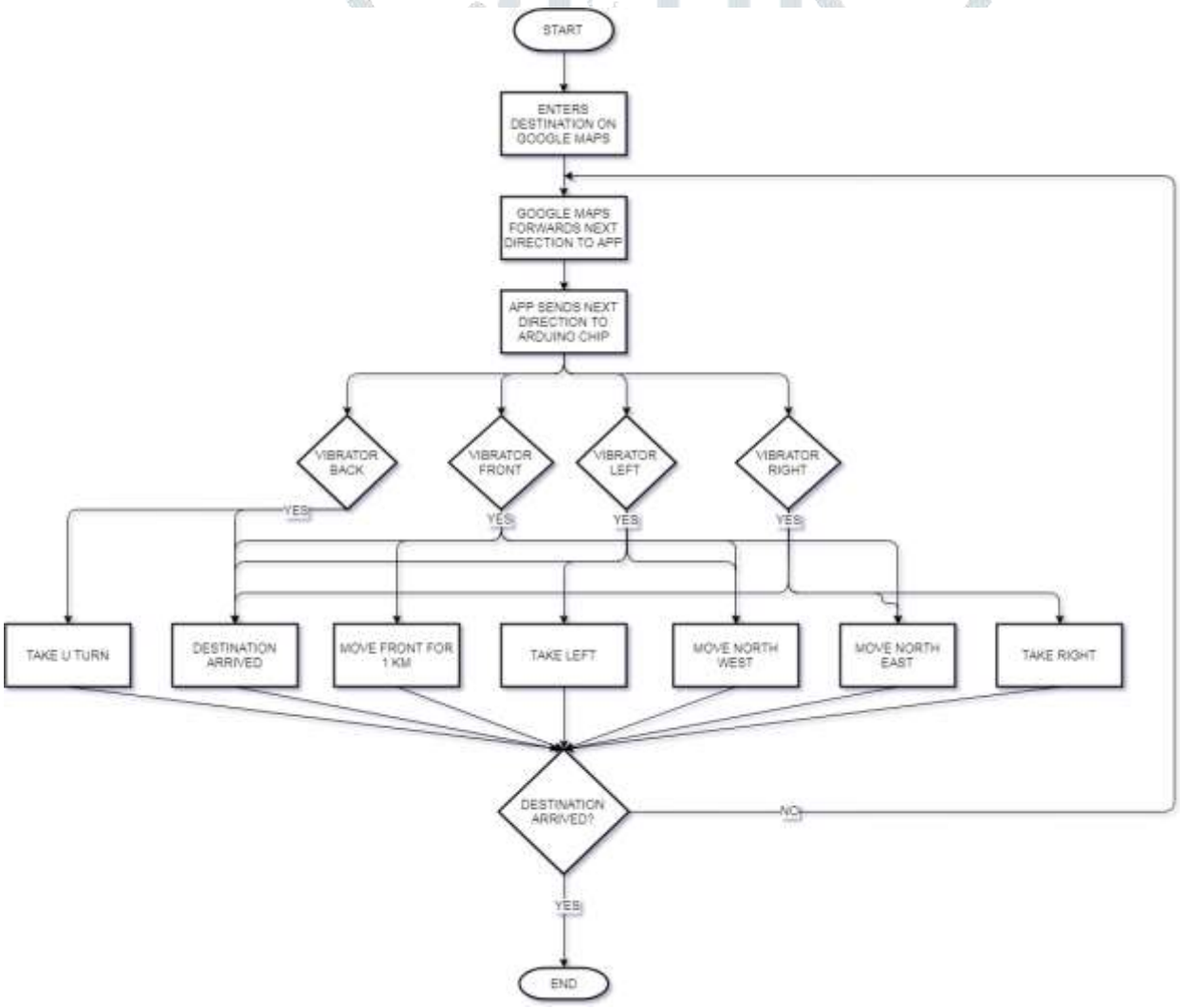
C. THE PROGRAMMING LANGUAGES

There are three programming languages used in the system

- JAVA
- C
- C++
- XML

Java and Xml are of prime importance in making the mobile app whereas C, C++ are important for Arduino programming. The key places where programming will be required are Arduino chip, creating an interface for Google maps and sending commands to the Arduino chip.

D. FLOWCHART OF HOW SYSTEM WORKS



III. CONCLUSION

The Article proposed an intelligent system which can help make navigation possible while riding a bike. The belt receives directions from the mobile app via the Arduino chip. The chip then commands the vibrators to vibrate indicating the direction in which the bike rider must move.

There will be a 2 part mobile app, first will receive the directions from Google maps and second will transmit it to the chip. The mobile app will also monitor the user safety by keeping a track of where he or she goes. The system will provide a boon to navigation system as it will have more users to analyze traffic and closed roads. People sensitive to vibrations or people out of our belt size are the only ones who will have a problem wearing the belt.

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