Signal Lights for Cyclist Through Voice Turn and Manual Switch

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Abstract

Due to covid-19 pandemic most people switch to a much safer and healthier way of transportation which is riding a bike or much known as cycling. But along with it, we can say that more cyclists is proportional to more accidents and incidents on the road occurring to bike commuters. With it we came up with a product to resolve the common cause of bicycle related accidents. Usual cause of bicycle related accidents is misunderstanding about bicycle turns and out of balance due to manual hand signals for cyclists. In order to solve the top cause of the problem we came up with voice recognition and manual switch activated bicycle turn signals it will definitely solve the problem because we put it in a vest which is much easier for other motorist to see and we make it voice activated so that cyclists do not need to raise their hands anymore in making turns.

Keywords

Arduino - Arduino is an open-source hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices.

Artificial Intelligence - is the ability of an artificial mechanism to exhibit intelligent behavior. AI programs have developed from the primitive stage to the point where they include computer programs that perform medical diagnoses, mineral prospecting, speech understanding, and vision interpretation.

Cyclist - the one who rides a cycles and bikes.

Motorist - A driver of an automobile or motor powered vehicle.

Turn signals - a flashing light on a vehicle to show that it is about to change lanes or turn.

Voice or speaker recognition - is the ability of a machine or program to receive and interpret dictation or to understand and carry out spoken commands.

I. Introduction

Since the beginning of the pandemic, our society has undergone a significant transformation. The COVID-19 outbreak has heightened the demand for a cycle-friendly Metro Manila, according to [1], the covid-19 pandemic has heightened the demand for a cycle-friendly Metro Manila, but public utility vehicle operations remain constricted. As a result, many individuals have switched to cycling as a mode of transportation throughout the city. While a rise in cyclists is excellent for the environment, it has also resulted in an increase in bicycle accidents. Last year, the number of bicycle accidents in Metro Manila reached an all-time high, as did the number of cyclists, owing to the need for alternative modes of transportation when the covid-19 lockdown halted public transportation.

According to monitoring data from the Metropolitan Manila Development Authority (MMDA), the total number of bicycle accidents last year jumped to 2,606 from 1,759 the year before. The number of bicycle accidents also reached 2,000 for the first time since the MMDA began recording statistics in 2009 when it was at 1,111 [2]. As a result, the researchers created an idea that will help riders avoid collisions. This study is based on the idea of adding a signal light to bicycles. The signal light would consist of an automatic voice turn and a manual switch that could be mounted on your bicycle. This study will protect cyclists and increase their safety. It is easy to use and environmentally friendly, and it will put you at ease and keep you safe on the road.

II. RELATED WORKS

There are two methods for demonstrating turn on a bicycle: 1) with your hands, or 2) with signal lights. We'll cover the last option underneath, yet in the event that you're glad to utilize your hands and arms to sign, the basics are:

Left turn - stretch out your left arm and all fingers, or point left with your forefinger.
Right turn - expand left arm sideways bowed at a 90-degree point, pointing hand upwards and palm confronting advances.

Right turn (elective) - reach out your right arm and all fingers, or point right with your forefinger.
Halting/easing back - expand our left or right arm sideways, twisting it at a 90-degree point, pointing hand downwards and palm confronting in reverse.

iSmart Cyclist Jacket
According to [3], people have been using bicycles as a mode of transportation for many years, and despite the widespread availability of newer, faster modes of transportation, the use of bicycles is not decreasing. Numerous cities' urban development is pointing to a friendly environment for cyclists, and given the environmental benefits, there have been specific policies encouraging the use of bicycles as a mode of transportation. Since cycling in a city is a difficult task. Traffic signals, cars, other bicycles, weather conditions, inappropriate roads, and obstacles are just a few of the things cyclists must keep in mind in order to complete a ride safely.

The task can be difficult when the cyclist knows the way, but if she or he ignores it, navigating can become even more difficult, especially in cities where street designation does not follow an easily recognizable pattern. Even at night, cyclists will find it difficult to point them. This study aims to address this issue by introducing a Smart Jacket for cyclists, which will make cyclists more visible, especially at night, by indicating directions before they take a turn.

FANCYWING Saddle Bag with LED Light Indicators
A seat pack with marker LEDs, the under-seat sack will work well for you, answering transmissions from its not difficult-to-utilize remote to abandon those you are very much educated.

It accompanies a movable glue mounting lash, making establishment and expulsion easy, and its waterproof external shell with delicate cushioning protects your assets from effects or knocks. It is USB battery-powered and waterproof, making it the best sack to store your possessions, and can likewise function as a signal light to guard you while cycling in the street.

Bike Signal Pod
Signal Pod is the straightforward and natural remote demonstrating framework that permits cyclists to zero in and out while flagging and turning. Ride with expanded certainty, demonstrating to drivers and people on foot behind you without compromising control of your bike. The Signal Pod is not difficult to utilize, and a breeze to set up! Essentially associate the remote control unit to the handlebars, and append the Signal Pod light unit to the seat post. Then, during cycling, tap the control unit to move and show signs to the back of your bike. Particularly valuable in rush hour gridlock, where extreme control of your bicycle is required, your hands need never leave the handlebars! The extra-brilliant LED light showcase permits you to demonstrate left and right obviously, with an additional risk light choice available to you. Discernible blares go with the visual markers, permitting you to caution those close by at the bit of a button. While Signal Pod doesn't substitute the requirement for front and back lights in obscurity, the unit is great for easy, upgraded back flagging, constantly. Climate resistant and tough, the Signal Pod is the ideal gift for any cycle fan.

Bicygnals
It's somewhat difficult to measure how powerful they are as markers, yet cycling in and out of town utilizing solely the pointers - without hand signals - vehicles have by and large been mindful, not overwhelming while I'm demonstrating to turn right, for instance, and involving an avoided pointer as a prompt to pull with regard to a side street I'm transforming into. So indeed, the message is by all accounts got and figured out and about (Atkinson, 2010).

The Bicygnals come clipped together - the two units structure a flawless oval shape and you can store them taken care of when they're not on the bicycle. The two lights cut onto mounts that likewise highlight reflectors, which is a smart idea. I was a little stressed that the weighty front unit (250g) would either skip off the mount or move it out of position, however I had no issues on the test. They look perfect, if a digit enormous, on the bicycle and keeping in mind that you wouldn't put them on a Carbon racer they're positively not awkward on a mixture or metropolitan machine.

So to utilize it. Introduce the (provided) batteries then, at that point, hold down the on/off buttons on both to match the units. This requires a couple of moments and can be rehashed in the event that they lose each other when switched off, which they do every once in a while. The Bicygnals have three modes: marker just, pointer and static light or pointer and blazing light. they streak occasionally in any event, when dim, to make sure you know they're on.

The markers are controlled by two major, cordial buttons on the shoulders of the front light which are not difficult to find and utilize; press once to turn them on and again to drop, they switch themselves off after a portion of a moment or somewhere in the vicinity. The back unit gets the sign inside about a portion of a second. It's possible to unintentionally stir things up around town yet you for the most part notice, basically around evening time. However, we missed the perceptible sign that the Winkkuu reflect has.

Lumos Helmet
According to Lumos (2010), At the point when you're out and about, we think it appears to be legit to communicate in a similar language as the drivers around you. Most mishaps happen when drivers don't see you or misread your expectations and intentions. Dissimilar to hand signals, you can leave the blinkers on all through your entire turn without getting off-adjusted and falling while at the same time attempting to do as such. Since these blinkers are situated at

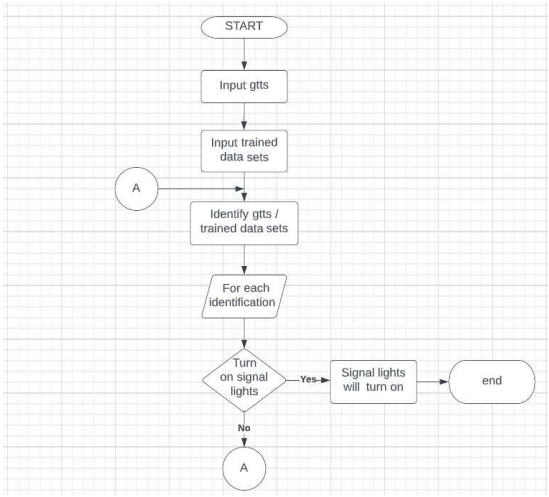
eye-level, they are likewise more straightforward to detect by the drivers around you.

Lumos head protectors or helmets are fit for showing blinkers, turn signals and brake lights. In the event that you ride around traffic, particularly in metropolitan regions with a thick vehicle populace, being unsurprising is critical.

While you're making a turn, or dialing back, these are significant occasions that drivers around you ought to be aware of so they can respond in a like manner.

III. METHODOLOGY

The voice is first identified using the trained data sets in this methodology. It will determine whether or not the signal lights will turn on once it has been identified. On the occasion a cyclist is riding a bike with safety precautions by having the vest and attached with the signal lights through voice turn and manual switch. Gtts has been integrated into our system, and it will submit data sets to trained data in order to assess whether or not the signal lights will turn on after it has been recognized.



A. Data Collection Techniques

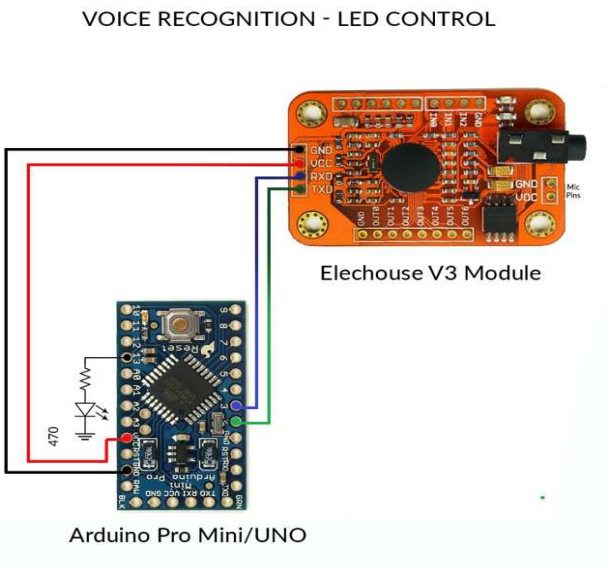


Figure 1. Arduino Connections

Elechouse V3 Module and Arduino Pro Mini/UNO. We used the Elechouse V3 module to train our voice recognition AI. In addition, on our text to speech module we created an AI with a google text to speech library.

Hardware Parts

- Arduino Nano 33 BLE Sense x1
- 20cm Waterproof RGB LED Strip x1
- Hook Up Wire Kit (22 AWG) x1
- 30cm/12in Plastic Ruler x1
- 3.55mm 4 Pole Plug, Stereo Phone Jack x2
- Bicycle Watch Mount x1
- Low Current Lithium Ion Battery Pack - 2.5Ah (USB) x1
- 6 foot USB micro-B Cable x1
- Cable Tie, Double-Sided x1
- Bicycle Reflective Vest x1
- Elechouse V3 Voice Recognition module

Software Requirement:

- Arduino IDE
- Python IDE
- gtts library
- VoicerecognitionV3 module

B. Data Preprocessing

A Voice Recognition V3 Module and a gTTS module were used. We used the V3 module to train data sets and followed the principle of connecting the gTTS to the V3 module. We'll put the principle into practice by connecting a gTTS chip to an Arduino and hardcoding the text.

IV. EXPERIMENTAL RESULTS

Elechouse V3 is one of the most reduced and simple-to-control voice recognition modules on the lookout and market.

The gadget works at an info voltage scope of 4.5 - 5 volts and will draw a current under 40 mA. This module can work with close to 99% recognition precision assuming it is utilized under ideal circumstances. The decision of mouthpiece and the clamor in the climate assumes an essential part in influencing the presentation of the module. It's smarter to pick a receiver with great responsiveness and attempt to decrease the clamor in your experience while providing orders to get the most extreme exhibition out of the module.

a. *e*)

V. CONCLUSIONS AND FUTURE WORKS

The researchers recommended the following for future study.

1. Future researchers must invest more time in creating their own voice recognition AI module, it will make the product more innovative and unique than using a built in AI module.
2. Less exposed wirings. We, the researchers, encourage the future researchers to make the product less exposed and protect the fragile components or wirings.
3. Stronger and much more solid vest with adjustable strap to make it fit and intact to the user's body.

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