INTERNET OF THINGS BASED SMART BIKE SYSTEM

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Abstract: Present invention relates to IoT enabled smart bike. The object of the proposed invention is to provide a smart bike which has many smart features like gesture controlled horn and ignition, temperature monitoring of engine, also shows the real time distance and time remaining to arrive the destination. The preferred embodiment comprises of Wi-Fi module, ultrasonic sensor,accelerometer and cloud platforms for managing and processing sensor data. The Smart Bike saves the travelling time and reduces the possibility of road accident by a warning buzzer system. Following invention is described in detail with the help of Figure 1 of sheet 1 showing the schematic diagram for the proposed invention.

Keyword: Internet of Things, IOT, smart bike, Octabrix, Ultrasonic sensor, Temperature sensor , Accelerometer, OLED screen, Four channel Relay .

Introduction

In cities it is seen that many person drivesvehiclecarelessly so that many problems can be arise, such as accidents, KEY got stolen, etc. so to overcome this problem and for controlling it an intelligent and improved system for bikes is required. Although various attempts are made before, for providing various meansfor controlling such events and thus few of the available systems and devices are discussed below. Inclination detection in two-wheelers. A method for operating a vehicle equipped with a surroundings sensor system is provided. In the method, at least one preceding and/or oncoming two-wheeler is detected at least as a function of data of the surroundings sensor system. In addition, an angle of inclination of the two-wheeler is ascertained at least as a function of data of the surroundings sensor system and a movement path of the two-wheeler is predicted based on the ascertained angle of inclination. The operation of the vehicle takes place in this case based on the predicted movement path. Smart crank control for e-bike.

The bike's crank speed and crank position are sensed via a micro controller, torque sensor, gyro and accelerator disposed on the bike's crank. External power and control signals can be passed to and from the crank micro controller and the e-bike controller through a throttle connector of the e-bike controller via slip rings around the crank hub with and with pogo pin connectors connected to the respective slip rings. Throttle data can also be provided to the e-bike controller wirelessly via a wireless dongle coupled to the throttle connector of e-bike controller. Electric bike motor using sensed air speed. An electric bike is described and includes an air speed sensor to sense air speed at the bike, an electric motor to impart motive force to the bike, and a controller operatively connected to the motor, the controller to control the electric motor 10using the air speed sensed by the air speed sensor. The controller includes a set electric-motor parameter for the output power of the motor. The electric-motor parameter can be bike speed. The controller can also use ground inclination to determine the power to be output by the motor to assist in powering the bike.

The controller can use ground inclination to determine the power to be output by the motor to charge a battery in the bike. The controller can set the power of motor assist to be greater in a greater headwind than in a lighter headwind. The controller uses rider weight and rider height as parameters for controlling the motor. Real-time data display device for bicycles. A real-time data display device for bicycles has a mobile electronic device communicates with an image projection device to transmit real-time data by having a MEMS oscillatory mirror simultaneously operating with a laser diode emitting laser beams, so as to project a real-time image with data to the ground 25ahead. Information such as calories, distance, time, and navigation can be acquired by the rider and other road users are easily aware of the rider to ensure safety concerns. Alarm method and system of public bicycle. The method comprises the steps that after the public bicycle is locked, the state and locked position information of the public bicycle are acquired; when the public bicycle is in a locked state, the real-time position information of the public bicycle is acquired, and the distance between the real-time position information and the locked position information is further acquired; a distance threshold is set; based on the distance and the distance threshold, the alarm rule of the public bicycle is acquired. According to the alarm method and system of the public bicycle, the distance threshold is set and the distance information is acquired, so that an alarm is sounded when the public bicycle is transferred.

ISSN (Print): 2204-0595
ISSN (Online): 2203-1731

Automatic crash detection. Systems and methods are disclosed for determining whether or not a crash involving a vehicle has occurred.

The acceleration of the vehicle may be measured using, for example, an accelerometer of a mobile device, which may be located inside the vehicle. The system may determine the magnitude of each accelerometer measurement and whether the magnitude exceeds one or more acceleration magnitude thresholds. The system may also determine the number of accelerometer events within a time window and whether the number exceeds one or more count thresholds. The system may determine whether a crash involving the vehicle has occurred based on the magnitudes of acceleration, number of acceleration events, and various thresholds. In some examples, the system may confirm that a crash has occurred based on, for example, the location of the mobile device.The above mentioned systems suffer various drawbacks, apart from their exorbitant cost in manufacturing and maintenance. Therefore to avoid the drawbacks of the existing system there is need to develop a cost effective and automatic system for bike. Hence the present invention provides an Internet of Things based smart bike.

Background

The present invention relates to a smart bikewhich is based in Internet of Things.The proposed invention has many features as it monitor's the traffic, bike start with voice command, show the status of engine, show the inclination of bike, blow the horn without touching it, it has navigation features, gesture ignition and start with smart band. The preferred embodiment comprises of octabrix, ultrasonic sensor, temperature sensor, accelerometer, OLED screen and four channel relay.

Real time Navigating feature-Once the smart bike is linked with any smart device like smart phone, tablet, smart band, etc. userjust have to set thedestination. Once the destination is set then the smart bike will automatically calculate real time distance and estimated time to arrive the destination. The above data will be shown by the screen. Engine status feature-After starting the bike, the proposed smart system automatically start monitoring the status of the engine i.e. its temperature. It gives information about rate of ignition and efficiency. This will warn you before a severe problem occur. Warning buzzer system-The system works on the basis of bike inclination status. Whenever the bike inclination crosses the limit, a warning buzzer will blow. Software basedsecurity-The smart bike starts and unlocks with a smart device (Google Assistant, smart band) on using special keywords. Smart gesture feature-In the proposed system the smart bike allow to blow horn without touching it and with just making a specific gesture i.e. moving hand or shaking head over the smart system. In the proposed embodiment the robust GPS technology is used to track 25the on spot current location of the bike. The present invention also provides an innovative and easy to use feature of sharing the virtual key, for controlling the bike and all its features. The present invention also provides a very accurate and responsive crash detection system which uses a triple check verification system to confirm the

8crash and immediately sends an emergency prompt message to the SOS number provided by the user. In the preferred embodiment Arduino IDE is used for codingwhich is required to perform various operationswhile driving the bike.Accelerometeris used to monitor the bike inclination. The variation in acceleration at a specific axis shows the inclination of bike. If the inclination limit is crossed,then the buzzer starts.The temperature sensor is placed on the engine to continuously measure its temperature and to monitor the statusof engine. OLED screen is connected to the development board as shown in the circuit diagram. It shows temperature of the engine, inclination of bike from horizontal surface, and navigation from current position to destination. In the embodiment the navigation of the bike can be performed by using a 15third party app -"AutoNotification". This application takes notifications from thesmart devices onto which it is installed. Thus, once the destination is set in the google map its notifications is used by auto notification mobile app and send data to tasker which send the data in IFTTT as a trigger and then by using "Webhooks" onecan print navigation data in the OLED screen. Further for setting up voice command featuresthe proposed invention usesIFTTT (cloud platform). In IFTTT commands are in form of IF "this" THEN "that"where, "this" is termed as trigger and "that" is anaction triggered by "this". As soon as user clickson "this" theyare asked to select a trigger event app such as Gmail, Google Assistant, Blynk, etc. In this systemGoogle Assistantis selected. Once the trigger is selected then clickson "that" and then it willaskto select another app to perform some operation triggered by "this". In the proposed system after writing the code, it has to be uploaded on the development board. This can be easily done by just pressing upload button on 30Arduino IDE.

In the embodiment temperature sensor, OLED, and accelerometer are connected with one octabrix while ultrasonic and relay are assembled with another octabrix. Additional advantages and modification will readily occur to those skilled in art. Therefore, the invention in its broader aspect is not limited to specific details and representative embodiments shown and described herein. Accordingly various modifications may be made without departing from the spirit or scope of the general invention concept as defined by the appended claims and their equivalents.

ISSN (Print): 2204-0595
ISSN (Online): 2203-1731

System Design & implementation

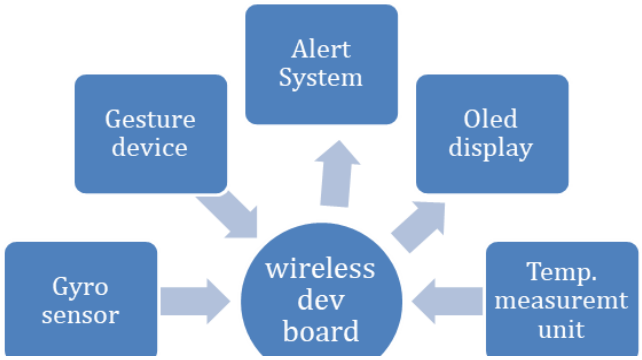

Figure 1 Schematic diagram for the proposed invention.

HARDWARE :	SOFTWARE :	CLOUD PLATFORMS :
Octabrix (2 Units)	Arduino IDE	Blynk
Ultrasonic sensor (1 Unit)	Tasker	IFTTT
Temperature sensor (1 Unit)	Mi Function button	
Accelerometer (1 Unit)	Auto notification	
OLED screen (1 Unit)	Google assistant	
Four channel Relay (1 Unit)		

Step by Step implementation

- **Step 1: Drawing a rough circuit diagram**

Drawing a circuit diagram help us to understand and plan the working of the device. Such diagram also prove to be very helpful while coding.

- **Step 2: Writing the code**

Now, we have to write operational codes to take the inputs from various units and to perform operations on them.For example, on hand movement over bike's head, horn will blow and many more operations. We have used Arduino IDE for coding. The codes to perform various operations has already uploaded in above section.

- **Step 3 : Setting up accelerometer**

This will help us to monitor the bike inclination. The variation in acceleration at a specific axis shows the inclination of bike. If the inclination limit is crossed then the buzzer starts.

- **Step 4 : Setting up temperature sensor**

The temperature sensor is placed on the engine to continuously measure its temperature to monitor its status.

- **Step 5 : Setting up OLED screen**

OLED screen is connected to the development board as shown in the circuit diagram. It shows temperature of the engine, inclination of bike from horizontal surface, and navigation from current position to destination.

- **Step 6 : Adding navigation feature**

We have performed this task by using a third party app - " Auto Notification ". This application takes notifications from your smart devices onto which it is installed. Thus, once the destination is set in the google map its notifications is used by auto notification mobile app and send data to tasker which send the data in IFTTT as a trigger and then by using " Webhooks " we can print navigation data in the OLED screen.

- **Step 7 : Setting up voice command features**

For this purpose we used IFTTT (cloud platform). In IFTTT commands are in form of IF "this" THEN "that" where, "this" is termed as trigger and "that" is a action triggered by "this". As soon as we click on "this" we are asked to select a trigger event app such as Gmail, Google Assistant, Blynk, etc. In our case we have selected Google Assistant. Once the trigger is selected then click on "that" and then you are asked to select another app to perform some operation triggered by "this". For example in our case we have selected "Webhooks". This will allow you to perform actions on the basis of different input values.

- **Step 8 : Uploading it to the development board**

After writing the code, it has to be uploaded on the development board. This can be easily done by just pressing upload button on Arduino IDE.

- **Step 9 : Assembling components according to the circuit diagram**

After completing the software part, we assembled all the components according to the circuit diagram using jumper wires. Temperature sensor, OLED, and Accelerometer are connected with one octabrix while ultrasonic and relay are assembled with another octabrix. Assembling the smart system with our bike After assembling the system with the bike, it becomes a smart bike.

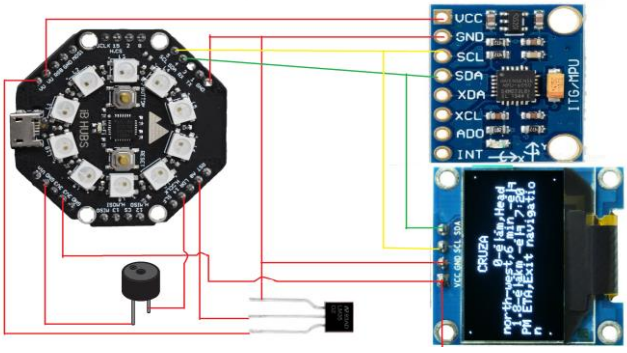

Figure 2 Hardware circuit diagram for octabrix 1

ISSN (Print): 2204-0595
ISSN (Online): 2203-1731

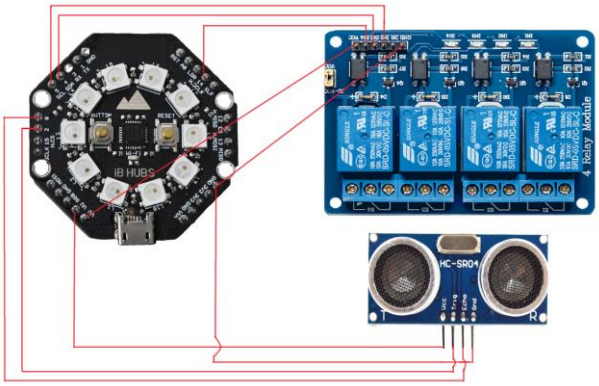

Figure 2 Hardware circuit diagram for octabrix 2

In order that the manner in which the above-cited and other advantages and objects of the invention are obtained, a more particular description of the invention briefly described above will be referred, which are illustrated in the appended drawing. Understanding that these drawing depict onlytypical embodiment of the invention and therefore not to be considered limiting on its scope, the invention will be described with additional specificity and details through the use of the accompanying drawing.

Features of the project

- **Real time Navigating features**

Once the smart bike is linked with any smart device like smart phone, tablet, smart band, etc. We just have to set our destination. Once the destination is set then the smart bike will automatically calculate real time distance and estimated time to arrive the destination. The above data will be shown by the screen.

- **Engine status feature**

After starting the bike, the smart system will automatically start monitoring the status of the engine i.e. its temperature. It gives information about rate of ignition and efficiency. This will warn you before a severe problem occurs.

- **Warning buzzer system**

This is the most interesting feature of the smart bike. The system works on the basis of bike inclination status. Whenever the bike inclination crosses the limit, a warning buzzer will blow.

- **Software based security**

The smart bike starts and unlocks with a smart device (Google Assistant, smart band) on using special keywords.

- **Smart gesture feature**

The smart bike allow us to blow horn without touching it and with just making a specific gesture i.e. moving hand or shaking head over the smart system.

Conclusions

Internet of Things based system for smart bikehaving features, monitor's the traffic, bike start with voice command, show the status of engine, show the inclination of bike, blow the horn without touching it, it has navigation features, gesture ignition and start with smart band, said systemcomprises of octabrix, ultrasonic sensor, temperature sensor, accelerometer, OLED screen and four channel relay, characterized in that;temperature sensor, OLED, and accelerometer are connected with one octabrix while ultrasonic and relay are assembled with another octabrix; Arduino IDE is used for coding which is required to perform various operations while driving the bike, accelerometer is used to monitor the bike inclination,variation in acceleration at a specific axis shows the inclination of bike, if the inclination limit is crossed, then the buzzer starts, andtemperature sensor is placed on the engine to continuously measure its temperature and to monitor the status of engine;OLED screen is connected to the development board,shows temperature of the engine, inclination of bike from horizontal surface, and navigation from current position to destination. Accordingly as claimed in claim wherein said systemnavigation of the bike performed by adapted configured system 'Auto Notification', this takes notifications from the smart devices onto which it is installed, thus, once the destination is set in the google map its notifications is used by auto notification app and send datato tasker which send the data in IFTTT as a trigger and then by using "Webhooks" one canprint navigation data in the OLED screen. Accordingly as claimed in claim wherein for setting up voice command features system implemented IFTTT (cloud platform),IFTTT commands are in form of IF "this" THEN "that" where, "this" is termed as triggerand "that" is an action triggered by "this", as soon as user clicks on "this" they are asked to select a trigger event app such as Gmail, Google Assistant, Blynk, etc, here in this system Google Assistant is selected;Once the trigger is selected then clicks on "that" and then it willask to select another app to perform some operation triggered by "this". Accordingly as claimed in claim wherein said system after writing the code, it has to be uploaded on the development board, performed by just pressing upload button on Arduino IDE.

Acknowledgement

It is a pleasure to thank Chhattisgarh Swami Vivekanand Technical University(CSVTU), Bhilai, Chhattisgarh, for his constant support and encouragement of this research. Also, the financial support from the Technical Education Quality Improvement Programme (TEQIP Phase-III) of Government of India with the assistance of World Bank through the CSVTU University being acknowledged.

ISSN (Print): 2204-0595
ISSN (Online): 2203-1731

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ISSN (Print): 2204-0595
ISSN (Online): 2203-1731