Bikenoid

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Abstract: **Every day round the world, an outsized share of individuals dies from traffic accident injuries. An effective approach for reducing traffic fatalities is automatic traffic accident detection system, second, reducing the time between once Associate in Nursing accident happens and once 1st emergency responders square measure sent to the scene of the accident. Recent approaches square measure victimization integral vehicle automatic accident detection and notification system. The proposed system consists of three phases; the detection phase which is used to detect the accident in low and high speeds. The notification phase, and immediately after an accident is indicated, is used to send detailed information such as accident location, bike detail etc. to the emergency responder for fast recovery. The tracking phase is used to track, locate the lost vehicle.**

Keywords: **IoT, Microcontroller, GSM and GPS module, Accelerometer Sensor, Vibration Sensor.**

1. Introduction

In today's world as the population increases, day by day the numbers of the vehicle also increase on the road and highways. This result in more accident and bike thief that leads to the traffic jams, public not get help instantaneously and also not able to find the lost/robbed bike. This problem is due to the rider's poor behaviors such as speed driving, drunk driving, riding with no helmet protection, riding without sufficient sleep, less security of bike, etc. So, road safety and bike anti-theft safety is one issue that needs special attention. In most of the accident cases, the victims lose their lives because of the unavailability of medical facilities at the right time. The crucial time between the accident and getting victim medical attention can often be the difference between life and death. It is very difficult to know that an accident has occurred and to locate the position where it happens. To solve a problem like these, this accident detection and reporting system along with an anti-theft tracking system are used to save lives by making the medical facilities arriving on time and track lost bikes.

We developed a bikenoid system using an accelerometer sensor along with a vibrator sensor and GSM/GPS for accident detection, reporting, and an anti-theft system. If any accident occurs, this wireless device will send an automated message to Emergency medical services (EMS) and family members giving the exact position of the spot where the crash had occurred. So, they can provide proper medical treatment to patients. This system can also track a lost bike using the GPS and send the location to the bike user via the app. The whole system is based on Arduino/NodeMCU controller. This controller is used to co-ordinate all the activities in the system.

2. Literature Survey

A. Design and implementation of real time tracking system based on arduino intel galileo [2]

This paper projected associate degree economical real time vehicle pursuit and watching system. The projected system has been effectively designed and enforced of auto pursuit supported GPS technology. The device within the vehicle is collected of embedded board Arduino Intel Galileo and SIM908 Module that embrace GPS/GPRS/GSM services. The system received GPS signals and transmitted the info to the Apache internet server a pair of.5.9. Also, these data have been sent to the vehicle owner as SMS. In the case of auto stealing, the suggested system gives the vehicle location information include latitude, longitude, altitude, date, satellites, speed OTG and course. This information helps to track the stolen vehicle and access to it in the shortest possible time. The results of the pursuit system projected compared with the 2 industrial GPS devices to make sure the accuracy of this positioning system. The outcomes of the system ar sensible just like the results of the economic devices. For the longer-term work, a range of services are often further to the present system by connect sensors or actuators.

B. Study and literature survey for safety applications: intelligent transport system (its) [1]

Proposed to design Vehicle communication management protocols using vehicle-to-vehicle communication to address these core issues of safety. I believe that accidents can be diminished and endured altogether utilizing V2V technology. Since installation of wireless atmosphere at each cross purpose would be pricey. A V2V-based methodology seems to be additional cheap for implementing. I have depicted V2V-based conventions to be specific Stop-Sign, Traffic-Light, Throughput-Enhancement and Throughput-Enhancement with Agreement conventions VANET test system to backing these conventions. Results indicate the potential of those new V2V-based protocols to manage intersections with token dependency on infrastructure. Although our protocols are designed for autonomous vehicles that use V2V communication for co-operative driving, they can be adapted to a driver-alert system for manual vehicles at traffic intersections.

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304

C. Wireless sensor networks: A solution for smart transportation [6]

The Intelligent Transportation System is that which utilizes the information technology and Communication can be a perfects system. ITS has a lot of future that can encourage the investors to work through it and make the travelling more secure and safe. ITS could be a promising and rising wireless communication technology to enhance road safety. In this paper we have a tendency to propose a framework and therefore the necessities of VANET applications area unit taken under consideration. We additionally study many facultative technologies for the planning framework. We believe that our study will give a tenet for the planning of a VANET Network. This will facilitate travel to be safe as there'll be warning that may be generated through IHVW system whenever any incident happens.

D. Design and development of GPS-HSM based tracking system with google map-based monitoring [10]

The project is all regarding dominant thieving of a vehicle. The system is regarding creating vehicle safer by the employment of GPS, GSM technology and an online application. The simulation is done by PROTEUS software. This project will be any increased by the employment of camera and by developing a mobile primarily based application to urge the $64000 time read of the vehicle instead to check it on computer, which might be additional convenient for the user to trace the target.

E. Vehicle tracking and locking system based on GSM and GPS [13]

In this paper, we have proposed a novel method of vehicle trac king and locking systems used to track the theft vehicle by using GPS and GSM technology. This system puts into the sleeping mode vehicle handled by the owner or approved persons; otherwise goes to active mode. The mode of operations changed by persons or re motely. When the stealing known, the responsible people send SMS to the micro controller, then issue the control signals to stop the engine motor. After that all the doors locked. To open the doors or to restart the engine licensed person has to enter the passwords. In this methodology, simply t rack the vehicle place and doors barred.

F. Real time vehicle trac king system using GSM and GPS technology-an anti-theft tracking system [11]

In this paper we've planned AN anti-theft system which may be accustomed track a vehicle fitted with the planned device in it. It may also be employed in life chase, asset tracking and in stolen vehicle recovery. In the future we tend to could integrate different connected devices during a vehicle like sensors. We will produce a server to ascertain the vehicle route and different info on our pc and that we can save the flight of it. The sensors put in in our vehicle will report the vehicle info to our server Associate in Nursing it will type an intelligent following system. There square measure varied reasons why automotive house owners and public vehicle operators like better to have a GPS. You can confirm your location, whether or not you're travel domestically or during a foreign land, having a GPS is truly an advantage. If you're thinking that you're lost, you'll use your GPS receiver to understand your actual location. Vehicle following systems square measure unremarkably utilized by fleet operators for fleet management functions like routing, dispatch, on-board information and security. Other applications embrace observance driving behavior, like Associate in Nursing leader of Associate in Nursing worker, or a parent with a young adult driver.

3. Proposed System
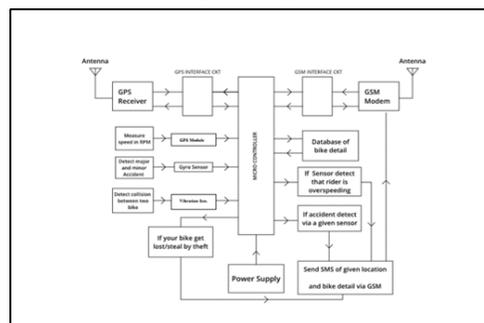
Fig. 1. Bikenoid overall system block diagram

For microcontrollers, it used Arduino Uno along with GSM/GPS module. GSM module is used for GPRS to maintain devices online and communicate with each sensor, and it also includes SMS system for notification and reporting. All this work under 5V power supply while for GSM module it requires 12V power supply.

Fig. 2. Bike Design and Implementation

The figure will describe the working principal of this device. Bikenoid system have two type of power supply system, where primary power source is for anti-theft security and secondary power source is for accident detection and reporting along with over speeding tracking system. Where secondary power source will depend on bike ignition, when rider start the bike engine that time secondary power source will get on and accident detection and reporting system will get start. And the whole process is depending on legit key. However, if bike does not get start due to fake key then vibration sensor detect the vibration and it will alert the rider via app and make alert sound

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305

with the help of buzzer. Whereas the primary power source will remain always on for security of rider bike.
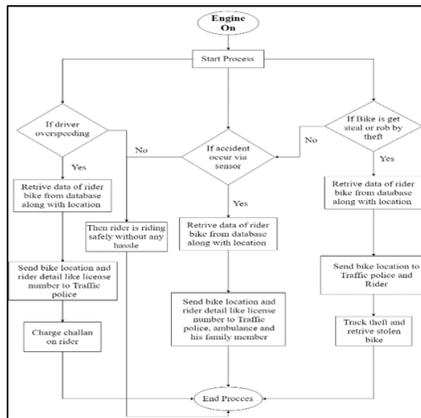

Fig. 3. Flow Chart on working Process.

When rider ride bike on highway then system start the process and keep monitoring on rider behaviour. Bikenoid will have three types of monitoring process:

A. Speed Monitoring
1. In this process, system will keep tracking rider speed in real-time. If rider trying to over speed against the given speed limit then system will alert sound in order to reduce the speed and try to convince rider have safe ride without any hassle.
2. However, rider ignore the system request and against break the rule then system have to forcefully send the bike detail to the nearby toll plaza police station. In order make fine on rider for going against law.

B. Accident detection and Reporting system:
1. If any accident detects by system then it will immediately send position of bike and its rider detail to the emergency medical service (EMS) via SMS service provider to take injured rider quickly to nearby hospital and also system will inform their family relatives.

4. Anti-theft system

1. In this process, system will keep on monitoring on bike security against theft. If anything happens on bike, then it will quickly alert rider that someone is trying to put fake key on bike to start engine.
2. If you get lost or robbed, then rider can check bike position via app with the help of GPS module implement inside bike.
3. Rider can also inform police officer about their lost/robbed bike and track the position of theft along with bike.

In bikenoid system GSM module is used for SMS service provider as well as internet provider for the system to remain online if something happens to bike or rider. Bikenoid system is device that will reduce accident, mange traffic control in better way and also provide better security on bike against bike theft. Bikenoid system can able to convert bike into intelligent

based system. In future this system will goes up too many features like AI, deep learning about road and traffic control etc. They will able to communicate to each other.

5. Hardware and Software Requirements

Hardware Requirements:
- Nodemcu ESP8266/Arduino UNO
- GSM module
- GPS module
- Accelerometer sensor
- Vibration sensor

Software Requirements:
- Arduino IDE

6. Methodology

- Step 1: When the ride starts the engine, process starts. These are 3 observations under process.
    1. Over speeding issue
    2. Accident detection
    3. Theft prevention
- Step 2: If the rider is over speeding in contrary to given speed limit the system will detect with the help of GPS module (which calculates Speed=Distance / Time. By using GPS location, distance can be calculated. The clock inside the GPS receiver that synchronizes regularly with the atomic clocks aboard the GPS satellite to measure time between the distances). The system alerts sound to the rider to reduce the speed.
- Step 3: If the rider ignores the warning the information of rider and bike are retrieved from the database and send to nearest traffic police to charge a fine against rider.
- Step 4: If an accident occurs due to over speeding or collision the vibration sensor uses piezoelectric effects to detect force of accident.
- Step 5: Sensor is used to measure the changes in gravitational position of the bike during an accident and defines the type of accident.
- Step 6: After the system detects an accident it will send the position of bike and rider information to the rescue squad (police, an ambulance and family member) via SMS services provided by GSM module.
- Step 7: When the rider starts the engine theft security which uses vibration sensor is active and is continuously monitored. When someone is trying to use false key to operate the bike the system will alert the rider.
- Step 8: If the bike gets stolen or lost with the help of GPS module rider can track the position of bike.

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306

7. Result
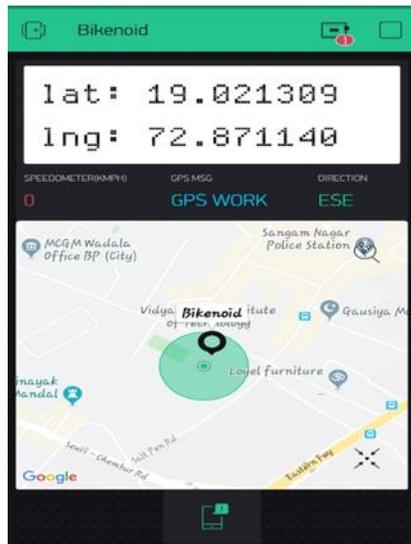
Fig. 4. Blynk App Demonstration
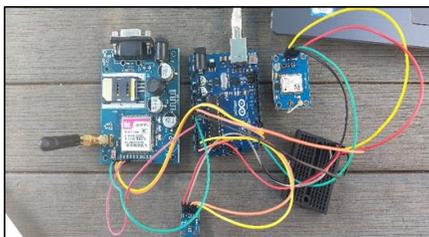
Fig. 5. Hardware Implementation

8. Conclusion

This paper presented the design and implementation of bikenoid.

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