Anti Bike Theft

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Abstract -- This project presents a smart bike monitoring system for cyclist via Internet of Things (IoT). The system is designed for real time monitoring of cyclist in health condition and cyclist's performance. The sensors are connected to the microcontroller and Wi-Fi module that can be accessed through an IoT platform which is Blynk application. In India transportation is booming field where the count of vehicles increasing day by day. Security and maintenance of those vehicles is a risky one. Monitoring vehicle Digital Locking System is a much needed one in this digital domain. Tracking of our vehicle is also a vital one when your vehicle is not with you. IoT based vehicle parameter monitoring system is a capable one which leads to monitor our vehicle parameter Blynk App. Internet of Things enables us to share data over large or small scalable networks, that consist of inter-related computing devices, sometimes referred to as nodes of the network, without the interference of humans or other machines. Because of the effortless communication between IoT devices, Iot is prevalently used Security Systems. Two-Wheelers are preferred vehicle to steal due to the ease with which they are dismantled and Two-Wheeler thefts are at a rapid rise in India, whereas the rate of recovery remains horribly low, leading to a huge loss that can be considered unrecoverable. A survey of the investigation was to understand the security measures that are needed to be taken, as well as the current availability of the same in the market. Following this, a system was designed and developed using IoT components to create a smart security system that is effective, as well as affordable.

1.Introduction

Most of our daily activities take place outside our home. Because of this, transportation affects every aspect of our lives especially in doing our daily routines such as going to work, school, mall, bank, gym, etc., and even back to our home. Without transportation, there are many activities we could not take part in. Transportation has contributed much to the development of economic, social, political and cultural fields by uplifting their condition. In the Philippines, one of the easy +

transportations today are the Motorcycle is one of the least expensive and a convenient mode of transportation but unfortunately, it is easy to steal, easy to disassemble, and easy to ship as parts (McDono, C ,2011). As motorcycle industry went boom, motorcycle theft in the country has run rampant over the years and countless of their modus operandi has been recorded.

The Philippine National Police has recorded a periodic increase in cases of stolen motorcycles across the country. The PNP Highway Patrol Group said that in 2013, they recorded 3,701 cases of stolen motorcycles. In 2014, the number of stolen motorcycles was at 7,302. During the first quarter of 2015, the HPG recorded the theft of 2,404 motorcycles compared to the 1,562 stolen motorcycles during the same period last year (Dalizon, 2015). In the year 2015, the PNP recorded 8,203 cases of stolen motorcycles last November 2015, the PNP-HPG recorded an average of 6.2 motorcycles being

stolen per day (Dalizon,2016). Motorcycle theft indeed has become a big problem of the community. Although, the authorities are said to be doing the best they can to stop these thieves, it still ranks high up in the list of crimes committed in the streets every day. Security plays a vital role in today's society. Safety of vehicles is extremely essential for every day. Security of vehicles is extremely essential for every private and public vehicle owner. For this reason, various security systems have been carried out, but most of these security systems are expensive, complicated and best suits to cars. Numerous car security systems have been carried out to improve security system by incorporating Biometric techniques such as Face Detection and Finger Print Detection (Pingat et. Al., 2013). Other security systems were equipped with a tracking system using Global Positioning System (GPS) and have the capability to shut down the engine of the vehicle remotely via a text message (Ramadan et. Al., 2012).

As for motorcycles, basic and affordable security system only gives siren indication and will make a lot of noise that disturb people. But if the person is far from the motorcycle location, he will not be able to hear the alarm. Physical type counter measures are also used to prevent theft, such as padlocks, disk break and other more which is a preventive action but it is not safe enough. One of the existing solutions for motorcycle napping available in the market today is the Scorpio Ride "Core" Cellular Motorcycle Alaram and GPS Tracking System. It uses IOS or Android app and a module installed inside the bike. It sends a Short Message Service (SMS) alert to notify the user for tampering of the motorcycle. It has also the ability to track vehicle's location. This system does not have enough preventive measures during theft attempt. Due to these reasons, this study proposed to adapt the car security system solutions to motorcycles. This study also wished to developed and improve its functions to better suit its purpose.

2.Survey

Queensland Police and the RACQ launched their **"Stop Stolen Motorcycles"** awareness campaign last year and have now included this quick **Motorbike Theft Survey**. **RACQ** tech and safety guru Steve Spalding says it is good to see police following up on the launch to "measure any changes (hopefully improvements) of awareness of using anti-theft devices". "RACQ is very supportive of the work QPS is doing to raise awareness of motorcycle theft and promote the use of simple low-cost devices to help secure a bike," says Steve who rides a Triumph Bonneville SE. We think the survey is a great opportunity to assist the police in better understanding the level of awareness riders have about **security and using anti-theft devices.** "Having a bike stolen is not costly for the owner but disruptive and inconvenient to sort out a replacement, and to many riders a bike is more than just function transport. "A rider can reduce the risk of theft by better securing it and a simple device, such as disc look, can mean an opportunistic thief will move on to another bike that's easier for them to take. "A standard steering lock is only

providing a basic level of protection." In Queensland, the motorcycle theft hotspot is Brisbane where 232 bikes were stolen from 2012 to 2017. Half

were stolen from parking bays, 108(47%) were taken from a residence and eight (3%) from business. Only 48% of stolen motorcycles are partially recovered. Most are disassembled and sold for parts. Stop stolen motorcycles are partially recovered. Most are disassembled and sold for parts. Stop Stolen motorcycles campaign leader Senior Constable Tony Tatkovich says 90% of stolen bikes were not fitted with a security device.

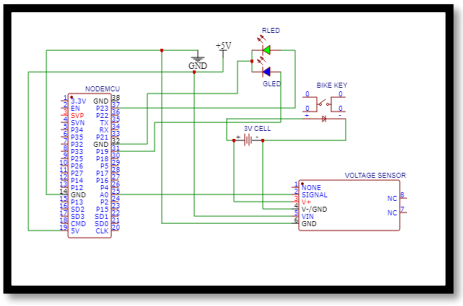
3.1 Methodology

The Methodology for creating an anti-theft system using ultrasonic sensors and the **ESP866** microcontroller can be broken down into several steps:

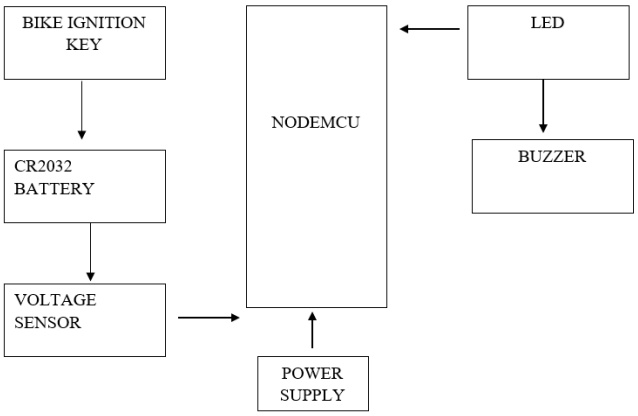
1. Hardware setup: The ultrasonic sensor is connected to the **ESP8266** microntroller. The sensor should be placed in the area that is to be monitored.
2. Sensor calibration: The sensor is calibrated to detect motion within a certain range. The range can be adjusted based on the size of the area being monitored.
3. ESP8266 programming: The ESP8266 is programmed using the Arduino IDE to receive signals from the sensor and send notifications.
4. Blynk app setup: The Blynk app is used to create a user interface for the anti-theft system. The app can be configured to receive notifications when motion is detected and display the status of the sensors.
5. Testing and fine – tuning: The system is tested to ensure that it is functioning correctly. Any necessary adjustments can be made to the sensor calibration or ESP8266 code.
6. Deployment: The system is deployed in the desired location and configured to run continuously. The user can monitor the system through the Blynk App and receive notifications when motion is detected.

It is important to note that the above steps are general guidelines and the specifies of the implementation may vary based on the specific use case, equipment and personal preferences. WBM IoT (Wireless Body Area Network for IoT) is a technology that uses wireless communication to connect various IoT devices such as sensors and actuators to a central hub or gateway. It can be used in combination with ultrasonic sensors and the ESP8266 microcontroller to create an anti-theft system. By using WBM IoT, the anti-theft system can be expanded to include multiple sensors and devices, providing greater coverage and more sophisticated monitoring capabilities.

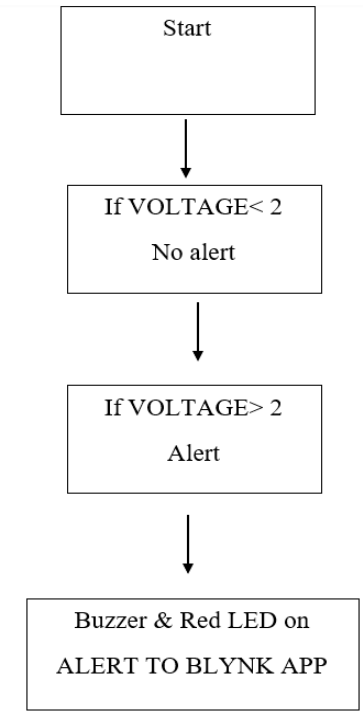
3.2. Circuit Diagram



3.3. Block Diagram



3.4. Flow chart:



Chapter 4

OBJECTIVES:

Public awareness and safety are one of the most important confrontations in the place of effective welfare for the bikers. And now a days bike is the important thing in daily life it is too much critical to make the bike secured day by day majority of people that are riding a simple bike which has no feature than riding, and majority of accidents are a major cause of death and disability. A bike accident in highways and roadways is one of the increasing fatality rates for the previous years.

1. The first objective of this project is in order to create a secure system such that theft can be prevented and a alert system can be achieved.
2. By using Nodemcu the condition of theft detection including and also as well as any alert to Blynk can be achieved.

3. In order to detect the, Voltage sensor is been utilised for the detection of the battery is been started.
4. the main microcontroller, where all the sensors is been connected to this unit and later on it is been updated to Nodemcu.

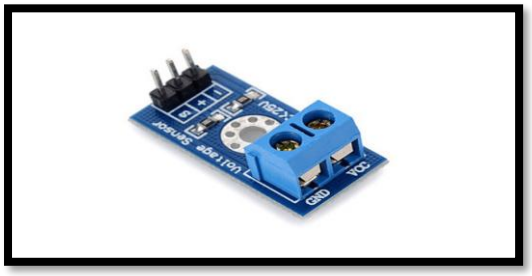
Chapter 5

Components

5.1. Ultrasonic Sensor:

Specifications: Position Switch: ON/OFF, wires with male plugs, Number of Keys: 2, Keys color: Gold Wiring: 2 Wires, 1 Position Key Switch with Black Plastic Body, One Position ON – OFF Key Switch, Key Removable In Off Position Only. This Key Switch has a tab with a hole in it for screw mounting to inside on instruments cluster or scooter body. (100%Brand new!) wire length: 125MM, Number of Keys: 2, switch positions: 1(ON/OFF), required fixing hole diameter:19.4MM, Max Barel Diameter: 26MM (Approx), Connector type: 2 Way motorcycle connector features: Ignition key switch for your motorcycles. Dirt bike, bikes, Go-Karts, ATV, Electric Cycles, Universal fit, Easy to install.

5.2. Voltage Sensor



Voltage Sensor is a precise low-cost sensor for measuring voltage. It is based on principle of resistive voltage divider design. It can make the red terminal connector input voltage to 5 times smaller. Arduino analog input voltages up to 5V, the voltage detection module input voltage not greater than 5Vx5=25V (if using 3.3V systems, input voltage not greater than 3.3Vx5=16.5V). Arduino AVR chips have 10-bit AD, so this module simulates a resolution of 0.00489V (5V/1023), so the minimum voltage of input voltage detection module is 0.00489Vx5=0.02445V.

The voltage sensor module is a 0-25 DC voltage sensing device that is based on a resistive voltage divider circuit. It reduces the input voltage signal by the factor of 5 and generates a corresponding analog output voltage. This is the reason why you can measure the voltage up to 25V using the 5V analog pin of any microcontroller.

Features:

1. Voltage input range: DC 0-25V
2. Voltage detection range: DC 0.02445V-25V
3. Voltage Analog Resolution: 0.00489V
4. DC input connector: Terminal cathode connected to VCC, GND negative pole
5. Output interface: "+" connect 5/3.3V, "-" connect GND, "s" connects the Arduino AD pins.

5.3.CR2032 Battery:

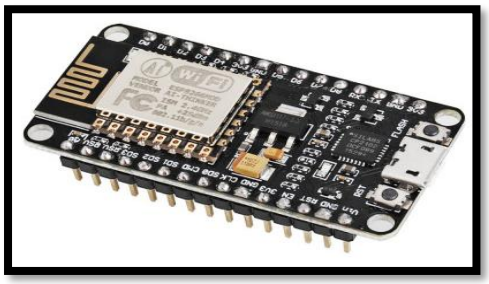
The CR2032 3V Lithium Coin Battery is the most commonly used coin battery that provides long-lasting and reliable power for various devices. They are used to power small electronic devices such as a calculator, Wist Watches, remote controls, Various medical Devices, fitness Gadgets, & Machines, toys, etc. The CR2032 is a 3V coin-type Lithium Battery that comes with a 225 mAh capacity. It has flat top terminals. It is ideally suited for use in all kinds of products where the trend is to achieve increasing miniaturization. Since the manganese dioxide that is chemically very stable is used for the plus terminal as an active material, if preservation conditions are proper, 90% of capacity remains even after ten years of storage. It employs organic electrolytes with minimum creeping so they are vastly superior in terms of leakage resistance under environmental changes.

Features:

1. High and Stable voltage (3V)
2. A full lineup for use in a wide variety of applications
3. No mercury added
4. Useful in a wide range of temperatures (-30°C to +60°C)
5. The very high weight-to-power ratio
6. Manganese dioxide material
7. High capacity Long Lasting life.

8. Low self-degradation rate and superior storability
9. 0.2mA continuous standard drain
10. High leak protection and hence no oxidation damage in devices, so it can be used in any expensive Gadget with superior safety.
11. Resistance to continuous discharge and hence Very low self-discharge;
12. Long shelf life for up to 10 years.

5.4. ESP8266:



The NodeMCU with cp2102 Wi-Fi Board is an all-in-one microcontroller + Wi-Fi platform that is very easy to use to create projects with Wi-Fi and Nodemcu (Internet of Things) applications. The board is based on the highly popular ESP8266 Wi-Fi Module chip with the ESP-12 SMD footprint. This Wi-Fi development board already embeds in its board all the necessary components for the ESP8266 (ESP-12E) to program and upload code. It has a built-in USB to serial chip upload codes, 3.3V regulator and logic level converter circuit so you can immediately upload codes and connect your circuits. This board contains the ESP-12E chip with a 4MB! flash memory so no worries for your long project codes. The ESP8266 NodeMCU with cp2102 development board - a true plug-and-play solution for inexpensive projects using Wi-Fi. The module arrives pre-flashed with NodeMCU firmware so just install your USB driver. The NodeMCU is an open-source project and you can find all the design files and so on from their github page. This microcontroller board can easily be programmed using the Arduino IDE programming software.

Specifications and Features of Node MCU: -

1. 11 b/g/n Wi-Fi Direct (P2P), soft-AP
2. Integrated TCP/IP protocol stack
3. CP2102 Serial / USB Chip
4. +19.5dBm output power in 802.11b mode
5. 4MB Flash Memory
6. Integrated low power 32-bit CPU
7. SDIO 1.1 / 2.0, SPI, UART
8. Dimensions – 49 x 24.5 x 13mm
9. Integrated TR switch, balun, LNA, power amplifier and matching network
10. Integrated PLLs, regulators, DCXO and power management units
11. On board USB to serial chip to easily program and upload codes from the Arduino IDE
12. Embeds logic level converter circuits
13. Has on board 3.3V regulator to ensure enough power to function as your go-to WiFi chip!
14. Easy access to the GPIO pins for easy prototyping
15. ESP-12E Processor
16. Easy to use breadboard friendly form factor
17. Voltage Regulator / Converter, excellent DC to DC conversion, super-efficient.

5.5. Power supply module

Specifications:

Usage/Applications	Industrial
Supply Voltage	5V
Output Voltages	+1.8V, +3.3V, +5V
Maximum Load	0.75 Amps
Input efficiency	72%
Input Frequency Range	47 to 63Hz
Minimum Order Quantity	1 piece

Description:

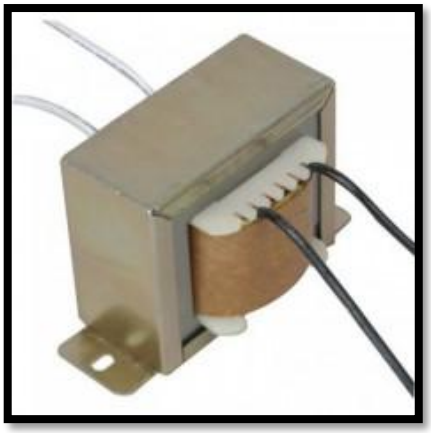
Input Voltage AC 0-12

Output Voltages: +1.8V, + 3.3V, +5V, +12V DC

Inputs and output connected to Terminal Blocks

Maximum Load 0.75amps

5.6. 12V Stepdown Transformer:



0-12 500mA Step Down Transformer is a general-purpose chassis mounting mains transformer. Transformer has 230V primary winding and non-centre tapped secondary winding. The transformer has flying coloured insulated connecting leads (Approx. 100 mm long). The Transformer act as step down transformer reducing AC - 230V to AC - 12V.The Transformer gives outputs of 12V and 0V. The Transformer's construction is written below with details of Solid Core and Winding. The transformer is a static electrical device that transfers energy by inductive coupling between its winding circuits. A varying current in the primary winding creates a varying magnetic flux in the transformer's core and thus a varying magnetic flux through the secondary winding. This varying magnetic flux induces a varying electromotive force (E.M.F) or voltage in the secondary winding. The transformer has cores made of high permeability silicon steel. The steel has a permeability many times that of free space and the core thus serves to greatly reduce the magnetizing current and confine the flux to a path which closely couples the winding.

Specifications of 0-12 500mA Step Down Transformer: -

- Input Voltage: 230V AC
- Output Voltage: 12V or 0V
- Output Current: 500mA
- Mounting: Vertical mount type
- Winding: Copper

Features of 0-12 500mA Step Down Transformer: -

- Soft Iron Core.
- 500mA Current Drain.
- 100% Copper Winding

Applications of 0-12 500mA Step Down Transformer: -

- DIY projects Requiring In-Application High current drain.
- On chassis AC/AC converter.
- Designing a battery, Charger.

5.7. Buzzer:

- Rated Voltage: 6V DC
- Operating Voltage: 4-8V DC
- Rated current: <30mA
- Sound Type: Continuous Beep
- Resonant Frequency: ~2300 Hz.
- Small and neat sealed package.
- Breadboard and Perf board friendly.

5.7. Software Requirements:

5.8.1. Arduino Integrated Development Environment (IDE)v1

Learn how the Arduino IDE v1, works, such as compiling & uploading sketches, file management, installing dependencies and much more. The Arduino Integrated Development Environment – or Arduino Software (IDE) – contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of means. It connects to the Arduino hardware to upload programs and communicate with them.

5.8.2. Writing Sketches

Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension .ino. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom righthand corner of the window displays the configured board toolbar buttons allow you to verify and upload and serial port. The toolbar buttons allow you to verify and upload programs, create, open and save sketches and open the serial number.

5.8.3. Tools

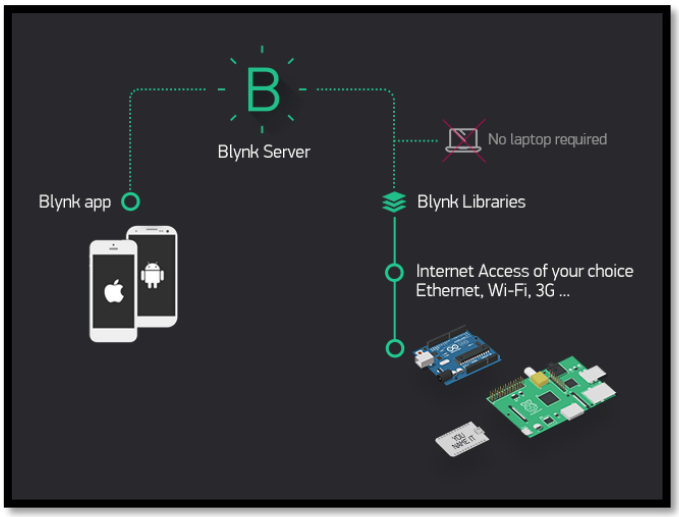
Auto Format This formats your code nicely: i.e. indents it so that opening and closing curly braces line up, and that the statements inside curly braces are indented more. Archive Sketch Archives a copy of the current sketch in .zip format. The archive is placed in the same directory as the sketch. Fix Encoding & Reload Fixes possible discrepancies between the editor char map encoding and other operating systems char maps. Serial Monitor Opens the serial monitor window and initiates the exchange of data with any connected board on the currently selected Port. This usually resets the board, if the board supports Reset over serial port opening. Board Select the board that you're using. See below for descriptions of the various boards. Port This menu contains all the serial devices (real or virtual) on your machine. It should automatically refresh every time you open the top-level tools menu. Programmer For selecting a hardware programmer when programming a board or chip and not using the onboard USB-serial connection. Normally you won't need this, but if you're burning a bootloader to a new microcontroller, you will use this.Burn Bootloader The items in this menu allow you to burn a bootloader onto the microcontroller on an Arduino board. This is not required for normal use of an Arduino board but is useful if you purchase a new AT mega microcontroller (which normally come without a bootloader). Ensure that you've selected the correct board from the Boards menu before burning the bootloader on the target board. This command also set the right fuses.

5.9 IOT Blynk

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

There are three major components in the platform:

- Blynk App - allows to you create amazing interfaces for your projects using various widgets we provide.
- Blynk Server - responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.
- Blynk Libraries - for all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands.
- Now imagine: every time you press a Button in the Blynk app, the message travels to ~~space~~ the Blynk Cloud, where it magically finds its way to your hardware. It works the same in the opposite direction and everything happens in a Blynk of an eye.



- Features:
- Similar API & UI for all supported hardware & devices
- Connection to the cloud using:
    - Wi-Fi
    - Bluetooth and BLE
    - Ethernet
    - USB (Serial)
    - GSM
- Set of easy-to-use Widgets
- Direct pin manipulation with no code writing
- Easy to integrate and add new functionality using virtual pins
- History data monitoring via Super Chart widget
- Device-to-Device communication using Bridge Widget
- Sending emails, tweets, push notifications, etc.
- new features are constantly added!

You can find example sketches covering basic Blynk Features. They are included in the library. All the sketches are designed to be easily combined with each other.

Conclusion

The proposed IOT based Helmet and Fuel Anti-Theft system hits a perfect stability between usability, usefulness and cost. The system was not designed to serve as a fancy accessory. Perhaps was designed to fit into the user's daily routine by being unnoticeable and yet makes a great difference in rider's life. The system was designed to ideally provide significantly more data to the user with minimal additional cost. And this system makes the rental company to safeguard their assets. This project can be advanced to give exact value levels of petrol by coding the float level sensor to notice the amount of petrol stolen off and its scope can be extended to large vehicles such as cars and heavy motor vehicles like truck and buses. The same accelerometer sensor that is used in this project to measure the deviation of vehicle respective to the horizontal and vertical plane can be used to give information to the traffic guarding authorities to prevent accidents. The helmet protection part of the project can be extended to any essential commodity in vehicle which can be safeguarded.

Chapter 6

Future Scope

In our project we use Accelerometer sensor so there will be a huge number of existing models that can be more helpful and useful that can avoid the theft happenings and immediate arrival of the ambulance by locating the accident spot, that the message is send to the registered number and easily get first aid. In the use of vibration sensor when travelling due to the external air pressure and speed braker or some cracks in the road may cause maximum impact on the two-wheeler so accelerometer is better to use.

Chapter 7

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