



MULTIPURPOSE BIKE SAFETY SYSTEM

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ABSTRACT— Nowadays there's an increase in traveling demands among people and a decline in sharing of public transport which led to reliance on own motor vehicles which in turn led to increased travel holdups and increased occurrence of road accidents. In this paper we are proposing a Multipurpose Bike Safety System (MBSS). This model provides overall safety for the motorcycles by enabling an anti-theft system using GPS tracking, keyless ignition using RFID card, automatic headlights, obstacle detection, side stand safety system and much more. The side stand refers to the basic side stand used in motorbikes. It's characterized by means to rigid the stand, in an inclined area. When the motorbike is in the respite on a ramp, the typical stand would reverse, whereas in safety stand the inverse action is locked, and contemporaneously the movement of the bike is sealed by a trifling method that works mechanically. The prototype was generated and deconstructed using the Dassault System Solid works software. The 2D view was formed in AutoCAD. Due to the automatic headlight system and keyless entry it helps the manual switching on and ease out the task. We have an anti-theft design using raspberry pi attached with GPS for location tracking. Along with this we have also acquainted

the system with a collapse cutoff system. This model has been tested for all safety measures and is reviewed to be safe and trusted.

Keywords— Multipurpose Bike Safety System(MBSS), RFID, smart safety stand, automatic, obstacle detection, GPS, headlight system, collapse cutoff.

I. INTRODUCTION

Motorcycle injuries pose a global health problem. More than 300,000 people worldwide are killed using powered two-wheelers each year, and this figure is projected to rise unless new solutions are found. Different countries have different numbers of PTWs in their motor vehicle fleets, but worldwide the number of PTWs on the road has been steadily increasing. PTW fleets have far surpassed passenger car fleets in many countries in the European Union, the United States, and Australia over the last few decades. Many Asian countries continue to rely on PTWs for their primary means of transportation, with about 75 percent of the 300 million PTWs that are currently in use on roads located in Asia. While there are a

variety of potential edges to people and traffic systems in terms of quality, cost-efficient transport, and reduced congestion related to increased use of PTWs, presently these could also be offset by the increased risk of death and high injury related to the employment of PTWs compared to alternative transport modes. Previous analysis has shown that the fatality rates for motorcyclists are 20–40 times over for automobile occupants per distance traveled.

Our objective, therefore, is to develop a two-wheeler safety system that aims to prevent, detect, and report accidents and reduce the probability of two-wheeler accidents.

II. PREVIOUS WORK

● Anti-theft system using sms alert:

Technology is developing very rapidly at the moment. Various types of technological works are created to make it easier for humans to hold out their activities, together with the safety system. However, there are still frequent cases of bike thievery, thanks to the dearth of a security system on motorcycles that solely uses ignition. A dual safety system on the motorcycle has been designed to prevent motorcycle theft using SMS and GPS Tracking system, integrated directly into the internet network on a smartphone, and monitor the location of the motorcycle via Google Map.

● Automatic Headlight System:

While driving a vehicle at night a tangle of several drivers don't dip the headlamps of their vehicles at night whereas approaching. The switch operation is employed to dip the light which can distract the concentration. Automatic higher dippers are the latest convenience in today's cars. This eliminates the requirement for the motive force to manually start or turn out the dipper beam in most driving things. The automated higher dipper system reacts just like the human eye to the light of incoming vehicles and severally turns the higher beam to an unfit beam once required. Such a system offers safety and convenience.

● Keyless ignition system:

In convectional key system they were easy to make duplicate and if lock system is not in the good condition key use to fall from the case to that problem, we have decided to make a keyless ignition system which would work on RFID card with help of Arduino it brings high security to the business and is easy to use.

● Smart safety stand:

A lot of accidents happen in the world because of the open side stand. To overcome this type of accidents, we have made a smart safety stand system. In this system, if the side stand is at an open position, the micro tact limit switch does not allow the ignition to start.

III. PROPOSED METHODOLOGY

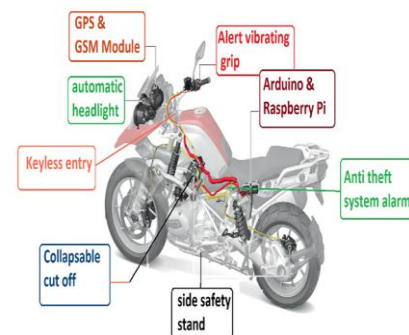


Fig 1: MBSS system architecture

In the MBSS we have used a micro tact switch which is fitted in the ignition circuit in the series system. When the stand is at a closed position circuit is complete and thus the ignition happens, if the stand is at open position the circuit is not complete hence the ignition does not happen. In this way plenty of road accidents will be prevented at the 1st stage itself.

The operating principle of the motorcycle security system as illustrated in figure 1 is that when the engine starts, the security system activates the engine ignition and at the same time, it activates the alarm and transmits signals to be processed by Arduino microcontroller. The vehicle owner will receive a sms pointing the latest coordinates with the vehicle movement.

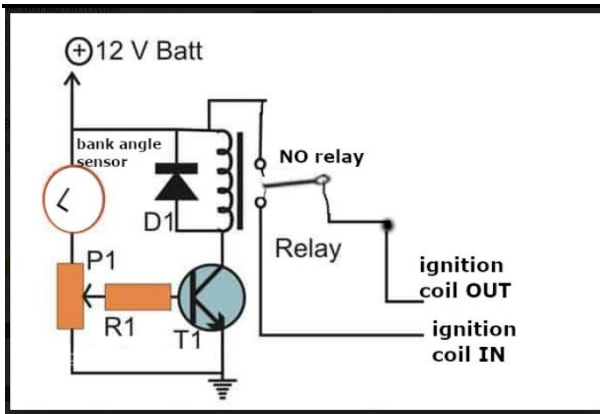


Fig 2: MBSS collapse cutoff mechanism

Using a back angle sensor to cut off the ignition in the situation of an accident, we are going to fix the back angle sensor at the vertically center of the vehicle. When the vehicle goes below the mentioned degree (i.e.: - above 70 degree) the sensor circuit opens, and it cuts-off the ignition as we have joined the sensor in series connection with the switch.

The MBSS automatic headlamp system uses LDR that senses the headlamp of approaching vehicles, because the resistance of LDR changes as per strength. The LDR sense the sunshine and alter its internal resistance in step with the sunshine fall thereon, that is more mounted in PVC pipe of four cm length positioned on the grill of automotive or before specified the sunshine falls on the LDR only vehicles are approaching and is distance of 3M to 9M. When light falls on it, the resistance decreases and makes output of IC555 low. The distance between two vehicles must be between 3m to 9m for the circuit to operate. However, this distance can be varied by proper positioning of the PVC pipe and by adjusting the variable resistor VR1. Due to change in intensity the voltage given to 555 timer control IC becomes high or low. The headlamp light intensity is based on certain conditions and threshold. Once the approaching vehicle passed away, LDR went dark and output of 555 IC changed. It changes the headlight beam from dipper to upper.

In the MBSS Keyless ignition system we will be using RFID tag, When we punch it on RFID receiver detects the RFID tag then signal is passed to Arduino, then it verify the RFID tag's signal if it is not then nothing happens but if it is the correct one signal goes to L 293 Module. This module activates the relay and thus the relay turns on the

ignition system. In this system we have integrated a speed sensor and ultrasonic sensor to the Arduino. If the motorcycle speed crosses the given speed (i.e., above 30kmph) then the ultrasonic sensor starts working and starts detecting the road and obstacles which can come in the way, if the obstacle is closer than 15 feet the sensor detects the obstacle and beeps the sound which is mounted at the motorcycle handle to grab the attention of the driver.

IV. RESULTS

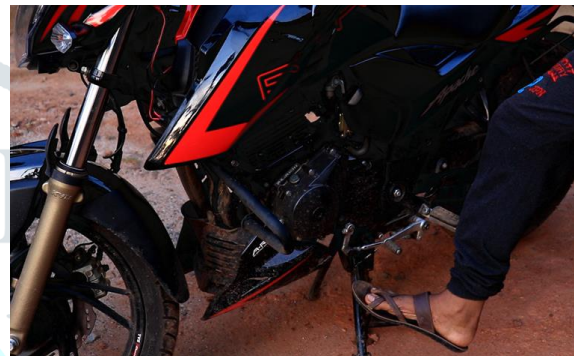


Fig 3: Side stand testimonial



Fig 4: Collapse cutoff testimonial

V. CONCLUSION

In the world there are plenty of accidents on the road and due to lack of safety for the motorcycles. There are some bikes which have few safety systems in them, but they are on the higher side of prices which are not affordable for middle class people so, we have developed this multi-purpose safety system for all kinds of bikes at an affordable price which will provide a little more security and safety for bikes and drivers. We will assemble these all 6 types of safety system making it 1 unit which is compatible and compact with only little modifications in the bike and it won't damage battery or battery life and it is not dangerous for human beings. It's a very reliable and efficient

system as it runs on Arduino and circuits. We can track and keep a record of our bike as it has a GPS system.

VI. REFERENCES

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