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Antitheft System in Vehicle with Automatic Headlights

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Abstract
Now a day's we see that vehicles stolen are on the rise and police has registered so many cases of vehicle stolen every day. Ironically, most of the stolen vehicles are not recovered. Hence it has become a serious issue over years. Besides this world has facing a very serious problem due to accidents of vehicles on roads, it causes loss of life and property. Therefore I have come up with a concept of developing a wireless technology based vehicle theft information system to provide security to vehicles from theft. In this concept if someone tries to steal the vehicle then a SMS is send to the owner mobile through GSM technology that your vehicle has been stolen. An added advantage of this system is that the owner can disable the ignition of the vehicle and prevent theft of the vehicle.
Also it protects the vehicle from accidents due to glare of eyes of driver by high beam headlights on roads. Since this system contain automatic head light system which can automatically judge when the headlight beam needs to be lowered when some vehicle approaching in front of our vehicle and prevent accidents.

1. Introduction

In our day to day life we have seen that vehicles are becoming our essential necessity of life. Despite being various security systems and technologies, vehicles are being stolen in India at a very high rate. According to the data given by the National Crime Records Bureau (NCRB) there are 123,367 two wheeler vehicles were stolen in year 2011 in India, out of which only 32,827 vehicles were recovered. Generally vehicles are stolen right off the streets or open parking spots. Due to the long duration between theft report and action taken by police the vehicle are made underground and later the vehicles are dismantled or sold in neighboring districts. Beside this world is also facing a problem of road accidents caused by Troxler effect (temporary blindness) due to high beam of the approaching vehicles. For the above problems we have come up with an anti-theft system that works in real time environment and also consist of automated headlights. In this system owner get alert immediately when system is activated through SMS and also get instant alert when vehicle is being stolen. This makes the system very fast and reliable. We use mobile as a medium of communication between user and the system based on the technology Global System for Mobile (GSM). The system design is based on Microcontroller which can be easily and efficiently interface between input and output devices of the system. This system also gives a choice to the owner to again activate the ignition of vehicle. Our system is efficient and compatible to all brands available in India. The price of our anti-theft system is reasonably low and manufactures can easily install this system in their motorcycle, and it will not increase the overall cost. The power consumption of our system is also low i.e. 12 volts.

2. Existing System

As per the increment in the rate of vehicle theft, different products are available in market which have only basic functions and use different technologies. And most of them are expensive which user cannot afford for their vehicle. The main problems of these systems are that they make a lot of noise and are not user friendly. They also don't have the technology to stop the ignition of the vehicle when they are being stolen. They are merely limited to alert the owner but not be able to prevent the vehicle from stolen.

Generally systems installed for automatic headlights come with LDR technology. These systems have poor accuracy as not only they sense the light coming from the approaching vehicle but also sense the other lights present such as street lights.

3. Proposed System

The purpose of designing our anti theft system is to decrease the theft rate and develop a system which is cost effective. It consists of infrared sensor which gets interrupted at the time when the wheels of the vehicle rotates and give signal to the microcontroller and then the microcontroller gives trip command to the relay which stop the ignition of the vehicle and also sends an alert to the owner via SMS at the same time.

The automated headlights use microcontroller and ultrasonic sensors to detect the high beam of light and also converting into low beam to prevent the glare in the eyes of the individual driving the vehicle and prevent accidents on roads at night.

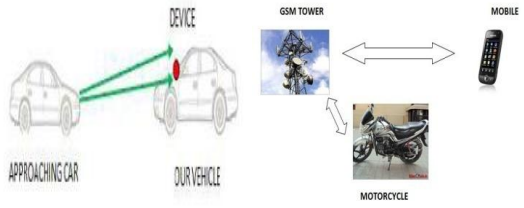

Fig: 1. Over view of our System

3.1 Working

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This system requires DC supply which is provided by the battery of the vehicle. The battery provides 12 volt supply. This 12 volt supply is given to the voltage regulator (7805) which will convert this into 5 volt supply The 5 volt supply is given to microcontroller (ATMEGA328P-PU) for its operation.

Ultrasonic sensor act as an input command to the microcontroller. The ultrasonic module consists of ultrasonic transmitter which can continuously transmitting sound waves at every 10 micro seconds. The module automatically sends signal of 40 KHz and detect whether there is pulse signal back. If the signal back through high level, a analog signal is given to microcontroller which converts high beam Headlights of vehicle into low beam by switching LED's in the Headlights. In this way vehicle Headlights switch from high beam to low beam in the presence of approaching vehicle or vice versa. This prevents glare in the eyes of driver and prevent accidents on roads.

On the other hand this system also prevents thefts of vehicle.

The system consists of IR module (IR transmitter & IR receiver). The IR module is secretly installed on one wheel of the vehicle in such a way that the IR transmitter and IR receiver are aligning in the same line in front of each other. If someone tries to steal the vehicle the wheel of the vehicle

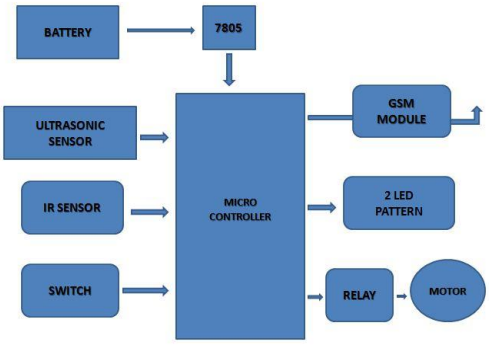

Fig: 2. Block Diagram

rotates. Consequently the rims of the vehicle also rotate which provide interrupts to the IR module. If the IR module interrupts 5 times it gives a signal to the microcontroller. The microcontroller sends trip command to the relay circuit which will stop the ignition of vehicle and also sends an alert (VEHICLE STOLEN!) to the owner Via SMS at the same time. In this way vehicle is being protected from theft in real time.

3.2 Circuit Diagram

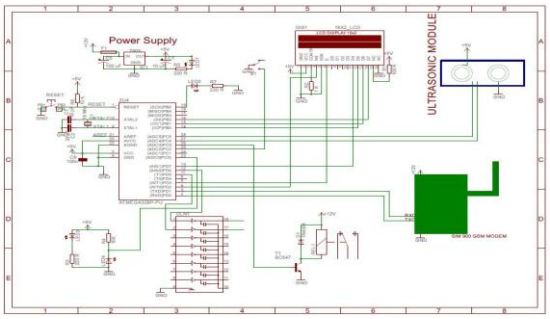

Fig: 3. Circuit Diagram

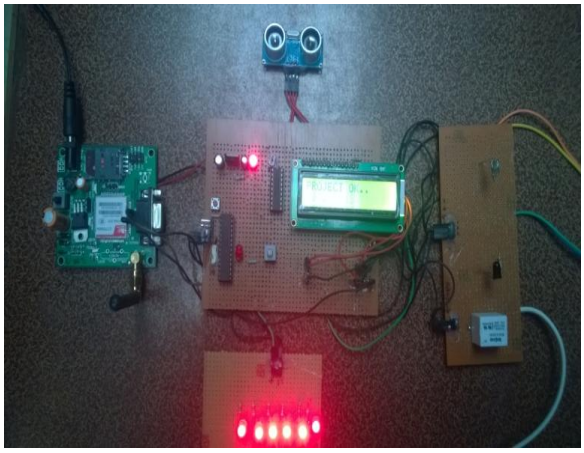

Fig: 4. The Actual Circuit

The circuit diagram consists of a power supply which is 12 volts and a voltage regulator which supplies 5 volts to the circuit. The microcontroller used in this system is ATMEGA328P-PU which consist of 14 digital input pins and and 6 pins with PWM and 6 pins for analog input. It works on 16 MHz frequency and has 32Kb of flash memory. The system also consists of ultrasonic sensor HCSR04. It consists of 4 pins that are Vcc, Echo, Trigger and Ground. Infrared module in this system is used as an input device which has a special purpose LED that transmits infrared rays in the range of 760 nm wavelength.

The relay used in this system is SPDT (Single Pole Double Throw). In this common terminal connects to either of two others, including two for the coil, such a relay has five terminals in total.

3.3 Flowchart

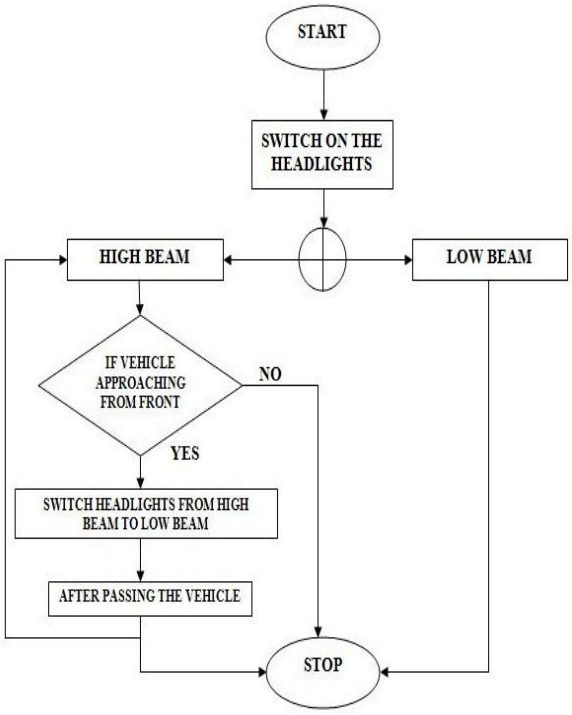

Fig: 5. System flow for Automatic Headlights

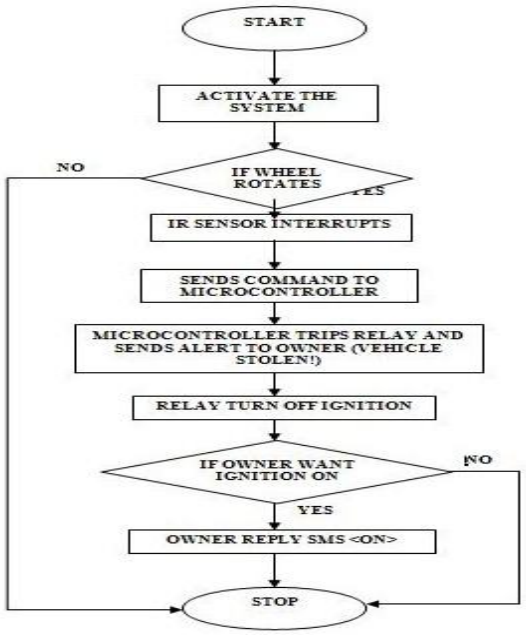

Fig: 6. Flowchart for Antitheft System

4. Result

A. Antitheft System

When the owner activates the system he/she gets the SMS as shown below:

If any unauthorized person trying to move the vehicle for stealing, the system gives an alert to the owner by a SMS when it gets 5 interruptions due to the movement of rims of the wheel.

After getting alert system automatically trips the relay and ignition of bike is off.

In this way we prevent the THEFT of the vehicle.

B. Automatic Headlights

In our prototype model, initially the headlight is in High Beam i.e. all six LEDs glowing as shown in figure.

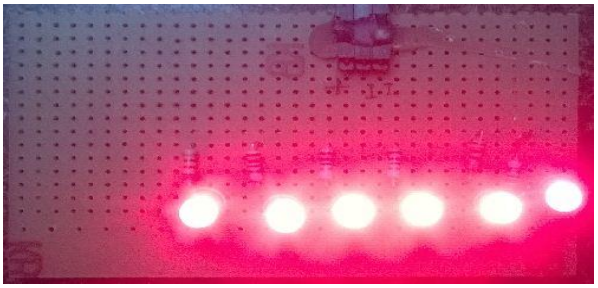

Fig: 7. Headlight at High Beam

If any vehicle approaches from front the Ultra Sonic sensor sense the vehicle and sends command to the system then the system automatic switches high beam to low beam i.e. three LEDs glows.

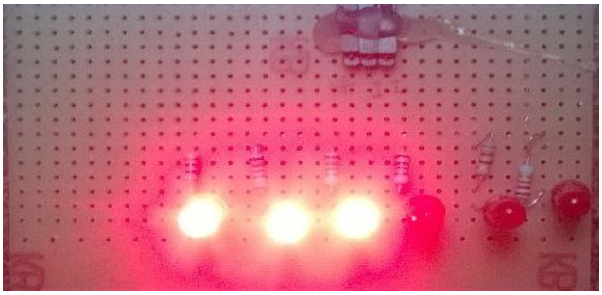

Fig: 8. Headlight at Low Beam

When the vehicle passes, then the low beam changes into high beam automatically.

5. Conclusion

The proposed system is successfully tested several times in real time environment. This system has dual functions one is to prevent theft of vehicles and another one to prevent accidents on roads at night due to glare in the eyes of the rider. This system has several advantages over conventional systems present in the market such as low cost, compact design and overall low power consumption.

The antitheft system not only alerts the owner but also prevent the vehicle from theft by stopping the ignition.

This proposed system will act as a deterrent to the thieves.

6. Future Aspects

Our prototype model could be better in near future if we add some features like GPS technology and Biometric Recognition System.

We could also make our model more reliable and secure by using satellite technology instead of GSM technology.

Also we will add some features which includes that more than one person are getting alert at the same time such as friends and Police Control Room.

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