Two Wheeler Accident Alert System Using GSM Module

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Abstract: The rapid growth of infrastructure and technology has made our lives easier. The inventions in technology have also increased the road accidents and traffic hazards which causes loss of human life and property because of the poor emergency facilities. This paper provides an optimum solution to this problem. In two wheeler accident alert systems if the speed of two wheelers (Bike) goes beyond the safety limit say to 80Km/hr then immediately alert message goes to parents, and if the accident takes place then immediately call goes to parents informing them of the exact scenario. This is useful in detecting the speed and accident by means of speed sensor and accident sensor. As there is a scope for future improvement, we can add GPS system which will help us to know about the exact location of the accident which will help in understanding the occurrence location of accident and will be very useful to trace the vehicle.

Index Terms **- Micro-controller PIC 16F877A; Speed Sensor; Tilt Sensor; GSM Module; Accident alert, Relay.**

I. INTRODUCTION

In this technologically changing world, there is no time for anyone to know what is happening round them and the people keep on moving without any care. When a car meets with an accident, immediately the GPS co-ordinates of the location are messaged to the owner's family, thereby ensuring timely help to the needy. As nowadays mobile is common electronic gadget that is available with everyone and this problem can be solved by it only. The system is designed to find the vehicle accident status by means of sending a message using a system which is placed inside of vehicle. The system is provided with emergency switch which can be manually operated through SMS; in case of vehicle theft situations the owner can know vehicle's current location and based on that he can stop the vehicle by sending a predefined SMS message to this system. After receiving SMS from owner, this system stops the ignition system hence the vehicle will not function anymore. Again it will come to the normal condition only after entering a secured and verified password.

II. PROPOSED SYSTEM

Now-a-days the ever growing problem of our society is harsh driving and one of the major consequences of harsh driving is accident. The number of accidents in our locality is increasing day-by-day. So an initiative is taken to resolve this problem. Here we have designed a model which continuously monitors the speed of a vehicle, if the speed crosses the desired safety limit, a message is generated. In case if the bike slips that is when an accident takes place then a call is generated to the respective parent. In this, speed sensor and accident sensor are acting as inputs to microcontroller and GSM module and LED indicator acts as Micro- controller's outputs.
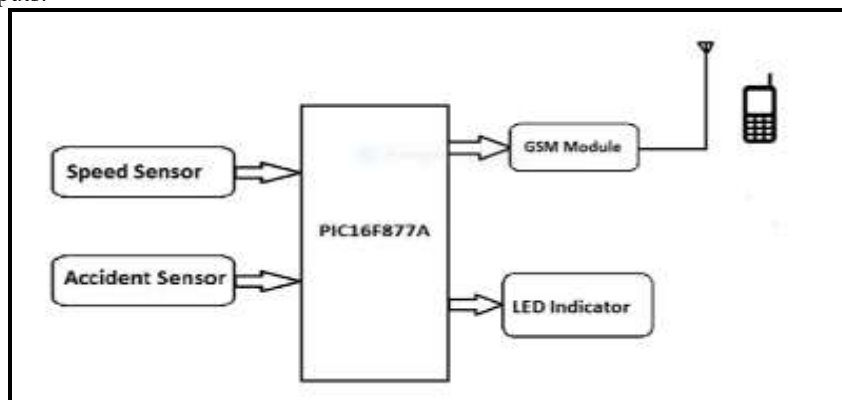

Fig 1: Block Diagram of System.

When vehicle speed goes beyond the desired safety limit while driving, speed sensor will give signal to Microcontroller. Similarly, when accident will happen with sufficient tilt angle of Bike, accident sensor will provide signal to Microcontroller and Microcontroller checks both the signals continuously and perform the logical "OR" operation on both inputs. When signal from any of these two inputs or both are present that means when result of logical "OR" operation is high, microcontroller provides signal to GSM Module/Mobile, Buzzer, LED Indicator. When GSM module gets signal from microcontroller, module initiates the call to mobile whose SIM number is saved in SIM of GSM module. When any of these two inputs or both inputs are present, microcontroller provides signal to LED.

A. Microcontroller

The PIC microcontroller PIC16F877A is one of the most renowned microcontrollers in the industry. This controller is very convenient to use, the coding or programming of this controller is also easier. One of the main advantages is that it can be write-erase as many times as possible because it uses FLASH memory technology. It has a total number of 40 pins and there are 33 pins for input and output. PIC16F877A is used in many PIC microcontroller projects. PIC16F877A also has many applications in digital electronics circuits.
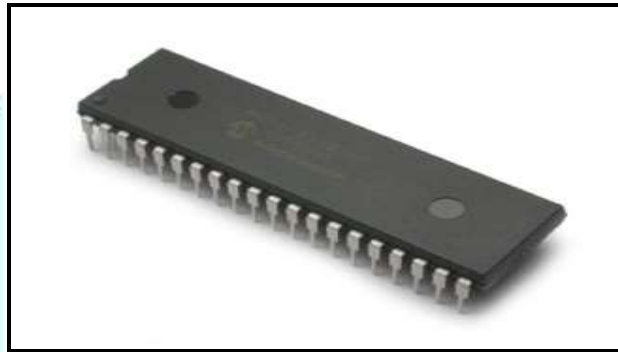

Fig 2: PIC 16F877A

It features all the components which modern microcontrollers normally have. For its low price, wide range of applications, high quality and easy availability, it is an ideal solution in applications such as: the control of different processes in industry, machine control devices, measurement of different values etc.

B. Speed Sensor

Speed sensor is made up of a simple small fan which is calibrated and made in such size that when air which falls on it has flow of greater than 80km/hr, it produces the high signal. Speed sensor is mounted on vehicle in proper position to fall wind/air properly. Wheel speed sensor designed model is a type of sensor used for measuring the speed of the wheels, per unit time. These systems are completely relied on the information transmitted from the wheel speed sensor. It uses the signals supplied by the sensor and calculates the distance covered by the car. The wheel speed sensors normally function at 12 to 24 DC power supply where the reverse polarity protection is standard and the sensor has built in protection against pulsed transients to 60V, 40V. When the wheel speed sensor fails or there's a problem in the sensor's wiring circuit, it normally or usually disables the ABS (Automatic lock brake System). Disabling of wheel speed signal is very risky and serious problem. It may create some issues with locking up. Wheel speed sensors produce an alternating current (AC) output voltage that varies if wheel speed sensor fails or there's a problem in the sensor's wiring circuit, it usually disables the ABS (Automatic lock brake System). Disabling of wheel speed signal is very risky and serious problem. It may create some issues with locking up. Wheel speed sensors produce an alternating current (AC) output voltage that varies in frequency and amplitude with wheel speed. The faster the wheel turns, the greater is the frequency and amplitude of the sensor's output signal varies. If the ABS warning light is on and you find a code for a wheel speed sensor (and the sensor is adjustable), the problem may be nothing much more than too much wide air gap.

C. Tilt Sensor

Tilt sensor is a device that produces an electrical signal that varies proportionally with an angular movement. These sensors are used to measure slope or tilt within a limited range of motion. Sometimes, the tilt sensors are also referred to as "inclinometers" because the sensors just generate a signal but inclinometers generate both readout and a signal. A tilt sensor is one of the crucial part of this accident alert system, is a type of transducer. This sensor helps in giving information about the horizontal and vertical inclination of the vehicle.
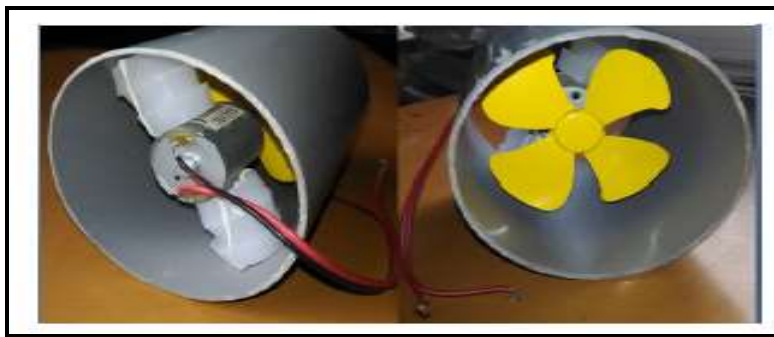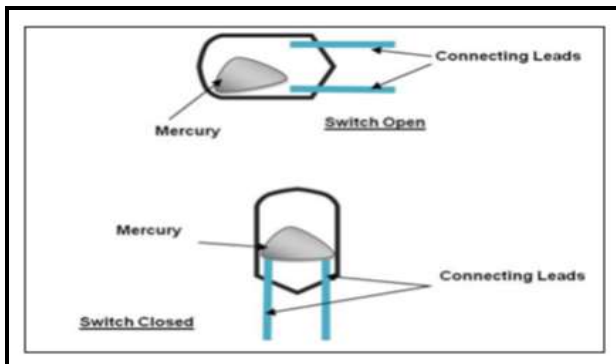
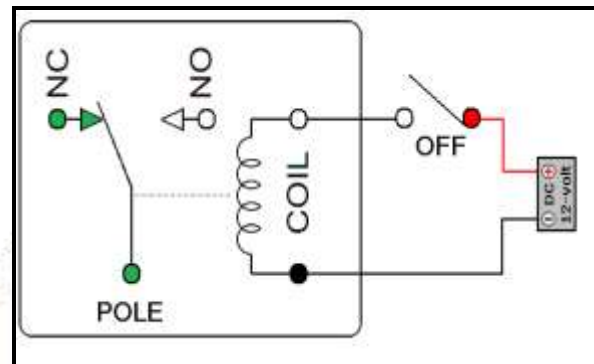Fig 3: Diagram of Speed Sensor Designed

Fig 4: Tilt Sensor

Fig 5: Internal Circuit Diagram of Tilt Sensor

D. GSM Transceiver 300

Highly integrated radio frequency (RF) Agile Transceiver designed for use in 3G and 4G base station applications. Its programmability and wideband capability make it ideal for a broad range of transceiver applications. The device combines a RF front end with a flexible mixed-signal baseband section and integrated frequency synthesizers, simplifying design-in by providing a configurable digital interface to a processor.
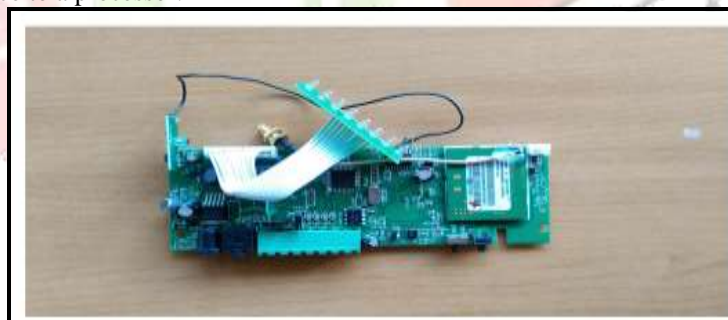

Fig 6: Diagram of GSM Transceiver 300

It uses the highly popular SIM 300 module for all its operations. The modem consists of all the required external circuitry required to start experimenting with the SIM 300 module like the power regulation, external antenna, SIM Holder, etc.

E. Relay

A relay is device that acts as an electrically operated switch. It is a device which controls the switching of circuit by receiving energy to operate itself, it can be considered as remote control switch. Most relays are electro magnetically operated. Current through a coil generates a magnitude coil that attracts the armature which in turn closes and opens the electrical contact. Operation is in millisecond range, thus relays can be considered as remote control switches. Contactor is a type of relay that can handle the high power required to directly control an electric motor or other loads. Solid-state relays control power circuits, instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics are used to protect electrical circuits from overloading or faults.

When an electric current passes through the coil it generates a magnetic field that activates the armature and the successive movement of the movable contact either makes or breaks (depending upon construction) a connection with a fixed contact. If the set of contacts was closed, when the relay was de-energized, then the movement opens the contacts and breaks the connection, and vice versa if the contacts were open.
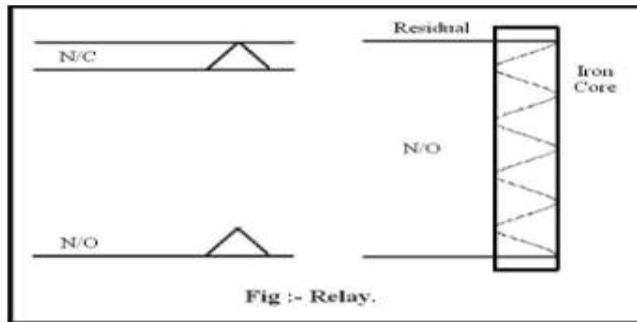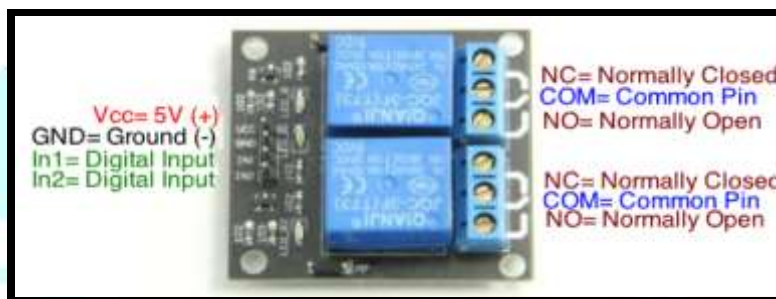

Fig 7: Internal Connections of Relay

Fig 8. Circuit of Relay

III. RESULTS & DISCUSSIONS

Whenever accident of the vehicle occurs, then the device sends a message with the information of accident location and the time to the predefined numbers so that help can be made available.
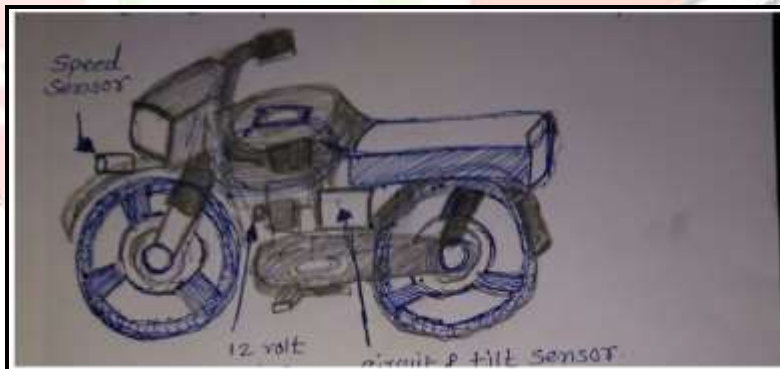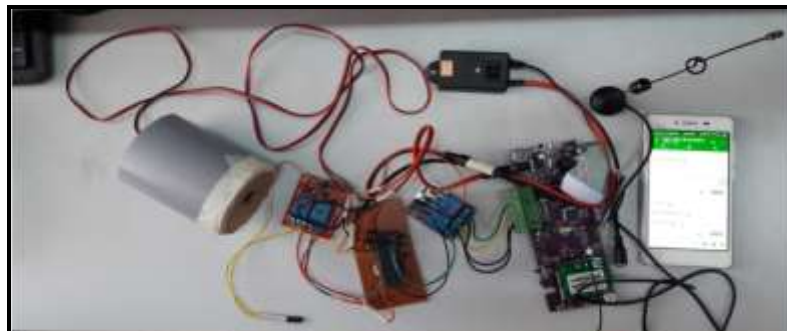

Fig 9: Actual Implementation of System

Fig 10: Practical Working of Accident Alert System

IV. CONCLUSION

This system is most useful for accidents. It is a low cost. The information regarding accident can be sent to particular contact numbers using GSM. The purpose of this system is to detect accident and generate call to their respective guardian. As a result, system is sending SMS to the parent from the accident location. A working model of Two Wheeler Accident Alert System using GSM module has been implemented successfully. The biggest advantage of our developed system is, whenever the sensor is activated we will immediately get an acknowledgement from GSM modem to our mobile numbers which are stored in EEPROM, without any delay.

V. FUTURE SCOPE

- Use of GPS system for knowing the exact location of the accident prone area.

- Installation of camera in the front portion of the vehicle to have the clicks of the scenario which took place.

- Using the proposed system for four wheeler vehicles.

- Using different sensors to know the status of the vehicle i.e., temperature sensor, fuel sensor.

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