SMART BIKE

[1]Sachin Tondale, [2]Tejaswini Wakchaure, [3]Radhika Yennawar, [4]A. A. Dhavlikar

Department of Electronics and Telecommunication, Modern education Society College of engineering, Pune - India
Sachintondale01@gmail.com, Wakchaure.tejaswini@gmail.com, radhikayennawar@gmail.com

Abstract : We are proposing a project of smart bike. The aim of this project is to minimize the risk of accident. This system follow some steps like side stand indication, alcohol detection with helmet and automatic upper dipper with automatic headlight before the rider start his journey. Initially the system inside the bike check whether the rider placed helmet on his head or not, if he had placed helmet then the system checks for the presence of alcohol in the drivers exhaling air. If both conditions are met then only the bike will start.

According to this project when accident is occur that means the vibration sensor and MEMS sensor crosses its limit then bike will automatically turn OFF. Then GPS module traps the rider's location and sends it to rider's family and defence team by using GSM module. Also fuel indication is digitalizing so rider can easily know how much fuel is remain. Overall this device provides much advanced facilities for bike rider.

Keywords—GSM; GPS; PIC controller; Vibration sensor; Smart phone; Helmet detection; Alcohol detection , side stand indicator

I. INTRODUCTION

In India because of road accidents annually 130,500 deaths happened. This has been announced by the World Health Organization in its first ever global status report on Road safety. To prevent or to reduce these road accidents we introduce the SMART BIKE. Our project SMART BIKE reason to increase the rate of road safety among bike riders and to reduce the increasing number of fatal road accidents over the years. It also reduces the road accidents caused due to alcohol use. The rider cannot start the vehicle unless he wears the helmet. And alcohol sensor senses if the driver has drunk the ignition turns on only when alcohol test is below predefined value and helmet sensor result is positive. In this system we also include accidents detection. It detects in significantly less time and sends the basic information to first aid center within a few seconds by GSM/GPS and also the location of bike. So we can save the life by rider. Also it detects automatic upper dipper and according controls the light. Many accidents occur because of light. Also provide safety for side stand, at the time of driving the bike if, side stand is outside then alarm will be ON. Another part which interfaces to bike is side stand indicator. Many accidents occur just because of side stand is not taken up. If bike is ON but side stand is not taken up then buzzer and LED will ON. [1]

Block diagram

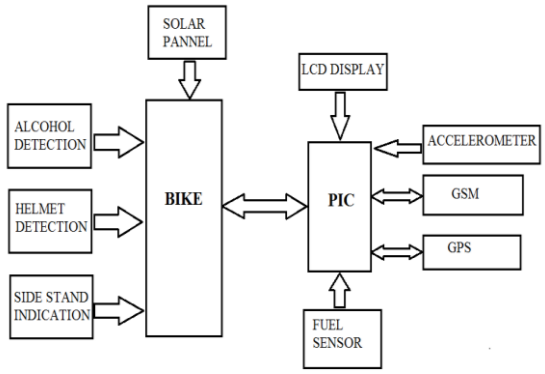


FIG. 2.1BLOCK DIAGRAM OF SMART BIKE

This paper mainly focuses on safety of rider. For that we used different applications. In order to avoid the accidents and other malpractices. Vehicle accidents due to the use of alcohol are increased and wearing of helmet reduces the severity of the accidents. Also accidents occur because of side stand so we are combining these applications in a single microcontroller system. All applications require battery. We are providing power through solar panel which will place on front side of bike. This solar panel can charge battery continuously.

II. HARDWARE DESCRIPTION

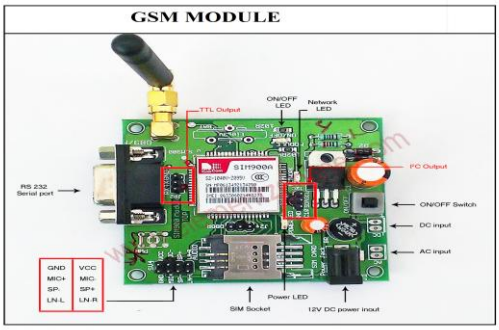
1. PIC Controller

The PIC 18F452 is used for to interface GSM and GPS module to bike. Also used to display the fuel level of bike.

2. GSM (Global system for mobile communication)

The GSM module is required to establish a communication link between the owner of the vehicle

and the PIC controller. We used SIM 300 GSM module in our system.

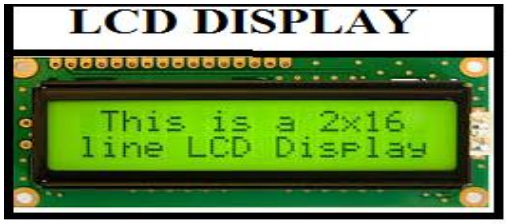


3. GPS (Global positioning system)

The GPS module is used to trap the location of bike rider whenever accident is occur.

4. LCD

16X2 LCD is used to display the output of controller.

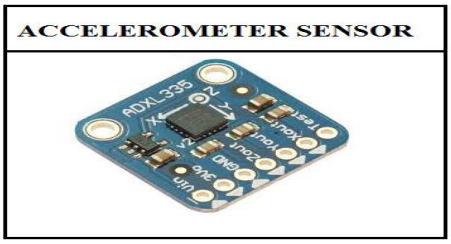


5. Solar panel

In this project we need 5V power supply. So instead of power supply we use rechargeable batteries. Using solar panel we can charge these batteries.

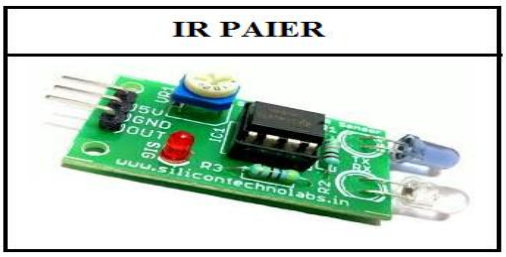
6. Accelerometer sensor

The accelerometer sensor is used to detect the fall and fall indicates accident is occurred. Then GSM module will send the message to riders family or defence team.



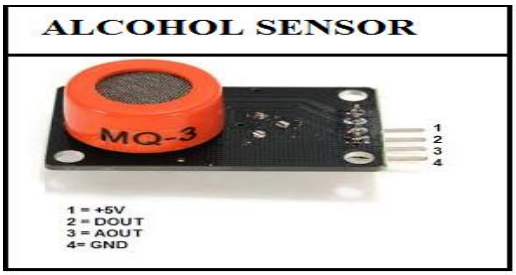
7. IR sensor

The IR sensor is just used for line of sight communication



8. Alcohol sensor

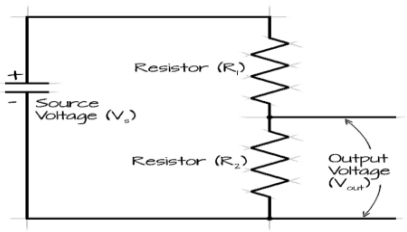
The alcohol sensor is used to detect the alcohol assiduity on rider's breath and compare it with predefined value.



III. CIRCUIT DESIGN

a. Voltage divider circuit

Vin =2.2v, Required output voltage Vo=0.7v



$$V_{out} = \frac{V_s \times R_2}{(R_1 + R_2)}$$

Assume R1=100 ohms

0.7=2.2*100/(100+R2)

R2=200 ohms

b. Resisters

All the resisters before Transistor and LED are current limiting resister and its value is 100 ohms.

c. Transistors Logic

In Automatic upper dipper circuit the transistor logic is used As the AND gate logic.

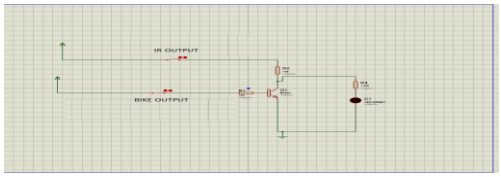
d. Comparator

IC 741 op-amp is used as a comparator in helmet safety security circuits.

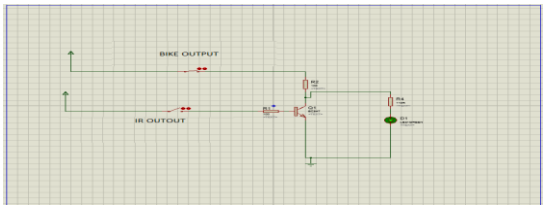
IV. IMPLEMETATION AND RESULT

a. SIDE STAND INDICATOR

If the BIKE is ON and the sides stand also taken up by rider then output should be as shown below

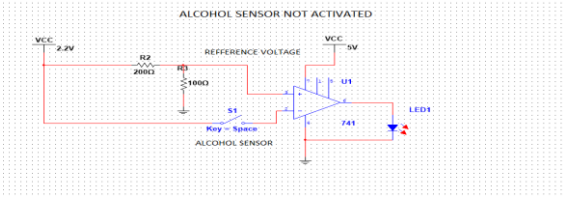


If the BIKE is ON but the sides stand not taken up by rider then output should be as shown

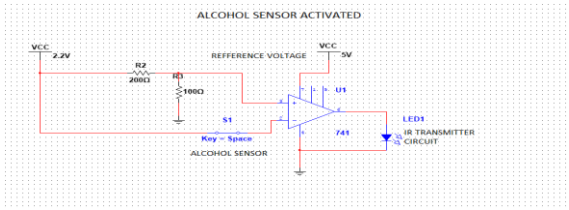


b. HELMET SAFETY SECURITY WITH ALCOHOL DETECTION

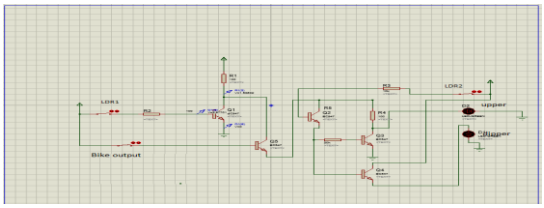
When the Rider wears Helmet and not drunk then the output should be



When the Rider wears Helmet but he is drunk or vice s versa then the output should be

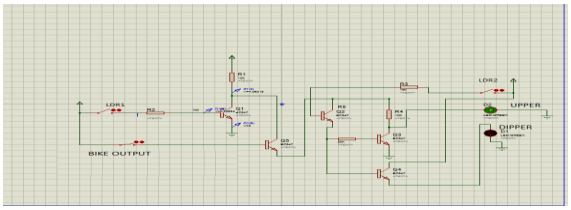


c. AUTOMATIC UPPER AND DIPPER CONTROL

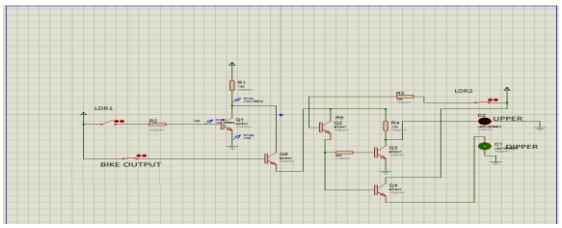


At day time

At night time normal condition (UPPER LIGHT)



At night time front side bikes light incident on our bike (DIPPER LIGHT)



V. CONCLUSION

Our system SMART BIKE has implemented half of part successfully. Our system efficiently checks the wearing of helmet and drunk driving. By implementation this project a safe two wheeler ride is possible which would decrease the head injuries during accidents and also reduce the accident rate due to drunk driving. In this project we also added automatic light and upper dipper light control so it becomes easy to handle and user friendly so there is not need of manually change due to automation, and side stand indication is also there so the ration of accident due to side stand not taken is avoided.

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