Smart Ignition System

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Abstract— As geeks of biking have been increasing ever since the Evolution of automobile, road mishaps are increasing day by day, people might be injured or dead and one of the reason is the common negligence of not wearing the helmets. Many people could save their life in accident cases if they wear helmet at the time of accidents. So for this reason we decided to develop a system named "SMART IGNITION". Smart ignition for motorcyclist is a project undertaken to increase the rate of road safety among motorcyclists. The main motto of this project is that the bike will start only when helmet is put on or else the bike will not start. Here image processing technology is used to detect whether Helmet is put on or not. The project is expected to improve safety and reduce accidents that are especially fatal to the motorcyclist.

Key words: Smart Ignition

I. INTRODUCTION

India has among the most unsafe roads in the world. In 2015, over 400 people were killed in road accidents every day. In the same year, two-wheeler accidents claimed 36,800 victims and left around 93,400 injured. Numbers that could have been significantly lower, if riders had proper helmets. If that statistic are not scary enough, the situation seems to be getting worse every year. A recent study published by the United Nations suggests that about 15,000 lives across the world can be saved each year, if motorcyclists start wearing appropriate helmets.

Pointing out how two-wheelers are one of the most unsafe modes of transport, the UN Motorcycle Helmet Study says, "Motorcyclists are 26 times more likely to die in a road crash than drivers of passenger cars. Wearing an appropriate helmet improves their chances of survival by 42% and helps avoid 69% of injuries to riders." The study also makes a dire projection. Between the years 2008 and 2020, almost 34 lakh people might die of motorcycle crashes. A figure that can be halved with appropriate measures. "As many as 14 lakh of those fatalities can be avoided with the proper use of safety helmets," the study says.

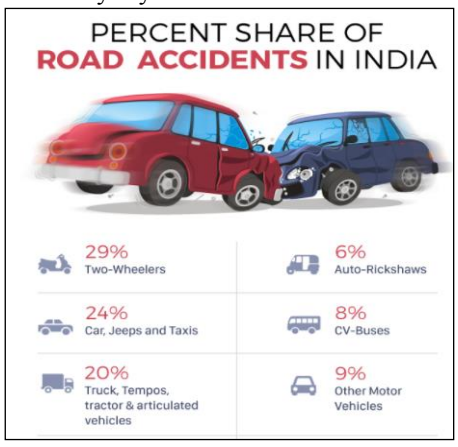

Fig. 1: Percent Share of Road Accidents

In India, over 78% of vehicles on the road are two-wheelers and they account for about 29 % of road accidents, a statistic that has risen steadily over the years. – from 26.3% in 2013 to 27.3% in 2014 and 28.8% in 2015. Wearing a good helmet and tying it properly can prevent loss of lives in 90 percent of accident cases.

II. OBJECTIVE OF PROJECT

The Objectives of this project are:

- Usage of image authentication technology.
- Capturing of objects using camera.
- Ignition control according to images.

III. SMART IGNITION CIRCUIT

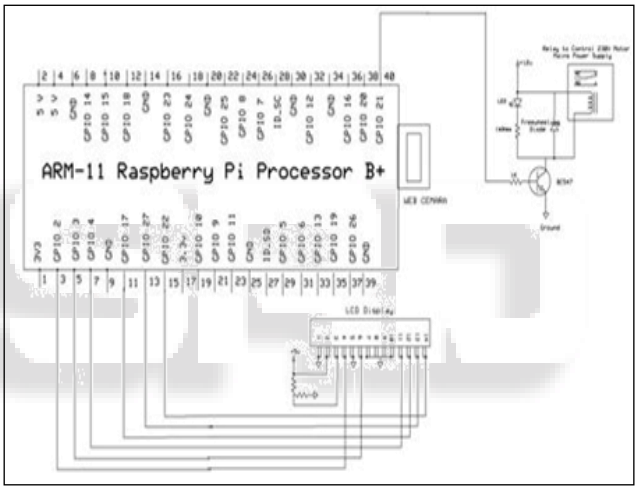

Fig. 3: Schematic diagram of Smart Ignition Circuit

The Fig.3.1 shows connections of various components in the circuit. The webcam which generally takes the image is been connected to Raspberry Pi Processor. The LCD Display which generally Displays information that whether Rider wears Helmet or not is been connected to raspberry Pi processor.

The Relay which basically acts as Electromagnetic Switch is connected in series with raspberry Pi Processor. Relay is generally been used to open and close the circuit. Relay has basically 6 terminals out of which four are data cable and remaining two are power cables. The Relay opens and closes the Switch as per the given instruction of Raspberry Pi Processor. So the Raspberry Pi processor acts as a driver for relay. And Finally Relay is been connected to Ignition Switch.

IV. METHODOLOGY

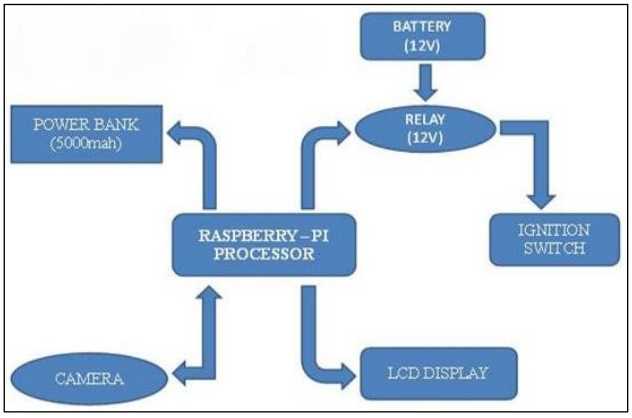

Fig. 4: Smart Ignition System

Generally, the raspberry Pi processor, Camera, LCD display is been powered by the power bank of 5000mah.The camera is used to captures image and sends it to Raspberry Pi processor as shown in Fig.3.2.The LCD display generally displays the information. Raspberry Pi Processor sends the information to LCD display in order to display information.

Relay used here is basically of 12 Volts. The relay is driven by battery of 12 Volts. The Relay acts as electromagnetic switch here and it opens and closes the circuit. When Relay closes the circuit it gives Signal for Ignition and vice versa. In LCD display we have programmed three commands, So When the Rider wears Helmet it displays Thank you and when he won't wear the helmet it displays as Please wear helmet. And as we switch on the ignition switch Smart ignition is been displayed on LCD.

V. IGNITION CIRCUIT

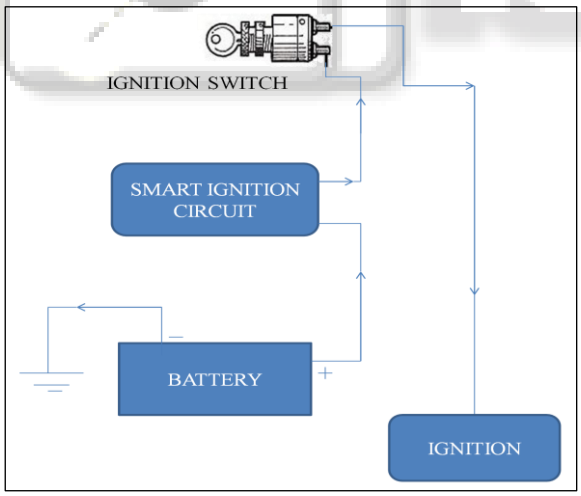

Fig. 5: Ignition Circuit

An ignition switch is a switch in the control system of an internal combustion engine motor vehicle that activates the main electrical system for the vehicle.

Ignition is the process of starting the combustion of fuel in the cylinders of an internal combustion engine.

As shown in Fig.3.3, the positive terminal of the battery is connected to the ignition circuit, negative terminal is grounded. The other terminal of the ignition circuit is connected to the ignition switch which is already connected to the ignition.

When ignition switch is turned "ON" current flows from battery through smart ignition circuit. Now if the Rider wears helmet the Smart ignition circuit allow the current to pass and powers for ignition and in case of Rider doesn't wear helmet then it don't allow the current to pass and hence the rider cannot start his bike.

VI. PROGRAM FLOW CHART

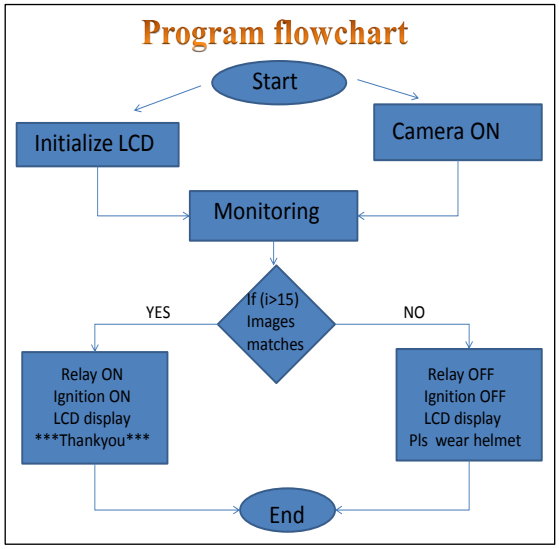

Fig. 6: Program Flow Chart

When our smart ignition system is turned "ON". Camera and LCD gets initialized. Camera starts monitoring that means it starts capturing images of the rider. Now our program code is written in Raspberry Pi. We stored four images of the helmet in different directions. Now coding is done in a way that if we get atleast 16 matching points between the captured image and stored image then relay will "ON" the ignition and in the LCD screen "***Thankyou***" will be displayed. If the matching points are less than or equal to 15 then the relay will "OFF" the ignition and in the LCD screen "Pls wear helmet" will be displayed. This is the basic idea of the program.

VII. CONCLUSIONS

1) Coding was developed in Raspberry Pi processor to detect whether rider wears helmet or not.
2) Image processing technique is used where the input is images taken in all four directions and the output of image processing may be either an image or a set of characteristics related to the image.
3) Image processing technique is very accurate in any road conditions and the chance of error is very less.

VIII. SCOPE FOR FUTURE WORK

1) We can make this project possible to any helmet just by capturing photos of helmet in four directions and feeding that image inside the Raspberry Pi.
2) We can use bike battery for powering the Smart Ignition Circuit.

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