# SMART PROTECTIVE HELMET FOR SAFETY

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***Abstract*— The paper mainly focuses on increasing the safety of the motor cyclists. The main idea behind this is the increase in death rate because of the increase in road accidents of the motorcyclists. The main reasons behind these accidents are that the helmets used do not have any safety features, which includes not wearing the helmet string that consists of the lock or not wearing the exact helmet size. To overcome these, a secure system is designed for the helmet. The system is designed such that the motorcycle starts and is able to move only if the motorcyclist is found wearing the helmet, thus improving the safety and reducing fatal road accidents.**

***Index Terms*— Protective helmet, safety.**

## I. INTRODUCTION

Motorcyclists are always at a greater risk of accidents when compared to that of car. Travelling on a motorcycle has a higher risk of death or major injuries. This high risk to human life can be avoided by use of several preventive measures such as a full face helmet(to protect injuries to head), gloves(used to maintain the grip on the motor handle), jackets(provides protection to elbows and shoulders), pants(protection for the knees) and many other personal protective equipment. But these will be useful only when they are worn. The main problem lies in the motorcyclists not wearing these for personal protection.

In this paper we have addressed one such solution that enables the motorcyclists to compulsorily use one such protection i.e; wearing a full protection helmet. Helmets play a very big role in saving a person's life. Wearing a helmet reduces the death risk of motorcyclists by 37% compared to riding without it. A full face protection helmet provides the most protection. We know that even after repetitive suggestion and rules, the biker however tends to avoid wearing these protective helmets. Hence we find a solution that will enable the biker to properly wear this helmet if he has to start the motorcycle

## II. BLOCK DIAGRAM

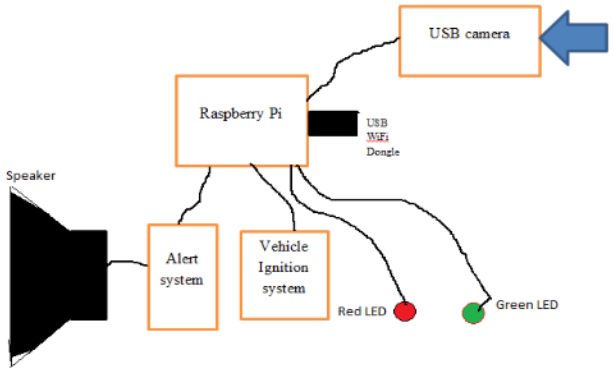


Figure 1: Block diagram of the proposed system

Figure shows the proposed system. To control the vehicles ignition system we use Raspberry Pi. We mark three circles on the helmet. If three circles are detected, it means the helmet is properly placed on a person's head. We place the camera on the bike. When the three circles on the helmet are detected, the ignition key of the bike is turned ON. To detect the circles in a image we use HOUGH Transform method.

## III. RESULTS

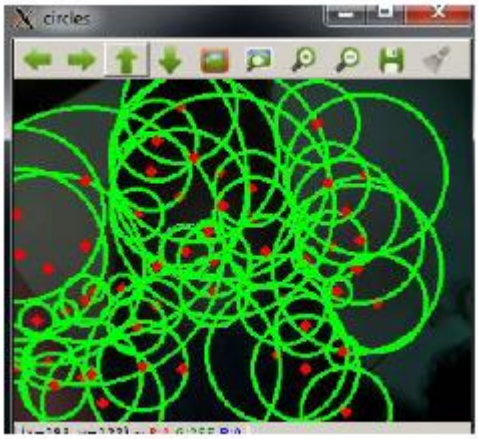


Figure 2. Detecting all the minute dots including the three main dots

Three main parameters are responsible in detecting the minute dots shown in the above figure 2. They are cv2.Houghcircle, cv2.cv.CV_HOUGH_GRADIENT and HoughCircle( ) which is dp indicating image resolution. The last two parameters in HoughCircle( ) namely min and maxradius designates the minimum radius and maximum radius of the circle that has to be detected respectively. In this case we have assumed both last parameters to be equal to zero which has resulted in the detection of all the points, which is a major drawback.

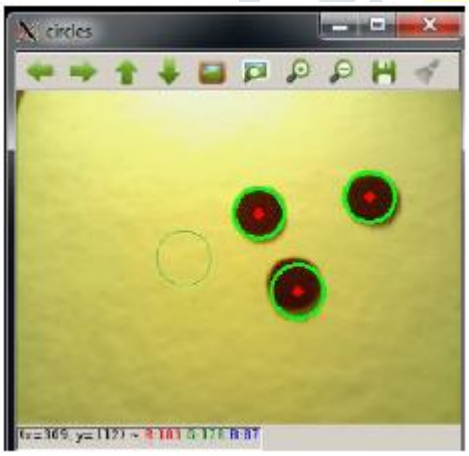


Figure 3. Detecting three circles on the helmet

In order to avoid the drawback mentioned above, that is the detection of all the points, we can assume different values for the last two parameters, in this case we have assumed minradius and maxradius to be 15 and 25 respectively which will result in detecting the circles only in that range excluding remaining circles as shown in the above figure 3.

## IV. CONCLUSION

In this paper, this system is designed such that the motorcycle starts and is able to move only if the motorcyclist is found wearing the helmet, thus improving the safety and reducing fatal road accidents.

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