

Smart Bikes: An Application of IOT and AI

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Abstract— As it can be seen the number of two-wheelers is increasing day by day, it is no more just a means of transportation but a trend that every youngster wants to adapt. Riding a two-wheeler without a helmet is considered to be cool amongst our generation. Though it is mandatory to wear helmets and not wearing it is considered to be a violation of traffic rules and measures are taken that this particular violation is avoided, teenagers take it very lightly and there are 98 deaths approximately every day as of not wearing helmets. In fact, there are people who think you are “dumb” if you drive your two-wheeler wearing your helmet. This idea focuses on this issue and with the help of Artificial Intelligence and Internet of Thing tries to develop a technology which ensures that no rider rides his/her two-wheeler without helmet. This idea also focuses on the current fine collection methods and tries to bring a change in the traditional methods of fine collection.

Keywords: Internet of Things, Artificial Intelligence, Python, Haar Cascade, GPS Module, XML files

I. INTRODUCTION

AI and IOT have changed the entire way of living. IOT is a technology that applies internet in day-to-day things so that they can communicate with each other and make human life simpler whereas Artificial Intelligence is technology that attempts to make things smart, to make machines capable of taking decisions themselves. With the introduction of Internet of Things, situations have become different these days and the way people are asked to follow things are also changed. People tend to like things that are done automatically and hence products that make use of IOT and AI are quite in demand. The idea of this research paper considers this as an advantage and makes use of Artificial Intelligence and IOT to turn the Normal Bike into a “Smart Bike”.

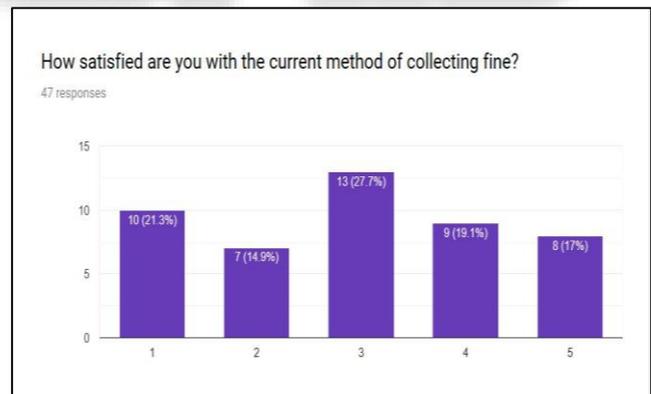
In order, to make sure people drive wearing helmets and the number of accidents decrease, our government has taken an initiative and our government revised the fine of every traffic rule violation. The fine of not wearing helmets has been raised from Rs.100 to Rs.1000, though no significant improvement has been noticed. The possible reasons behind this could be the traditional method of fine collection. The climatic conditions in our country are quite harsh, and it becomes difficult for the traffic police to stand in these harsh conditions making sure everyone drives safely and no traffic rules are violated and if done, fine them appropriately.



Fig. 1: Heroes of India

The traditional fine collection method is not reliable as sometimes the traffic police may charge you more than usual, and you cannot help but pay as your vehicle is at risk.

To get assured of this we took a survey and 63% of people ranked this method 1-3 and needs an improvement in this field with the available technologies. The idea proposed by this system expects to bring a change in the current fine collection method.



II. OBJECTIVE

It should be noted that accidents can take place anywhere, anytime. It is not important that the rider will meet an accident only if he drives above a certain speed limit and if he's on a wide roadway, they can happen at a distance of 5 minutes from your home. It is important that the rider takes the necessary precautions before leaving the home. Considering the conditions of our road, there are great chances that the bike may fall, people may lose control and due to head injuries they may lose their lives. The main objective of this project is to ensure that people do not ride their two-wheelers without wearing helmets and if they do so, they are charged

with appropriate fine which is deducted automatically from their bank account without involving a middle person. This also attempts to reduce the stress on traffic police and no individual can blame them of overcharging or of not paying appropriate attention.

III. OVERALL DESCRIPTION

The idea of this project is to associate the Bike with a mobile application that authenticates the user using Aadhar number, license number and your vehicle's number plate and gets linked to your bank account using appropriate permissions and monitors the activity of your vehicle. The Bike will also have an in-built surveillance camera that captures video and makes use of HAAR CASCADE technique to detect objects. The place where riders insert their keys will have a cover on it disabling the rider from inserting the key and using the vehicle. Once the object- "helmet" (person wearing helmet) gets detected the cover will automatically get removed enabling the rider to insert his key.

It may also be possible that just to insert the key, people will wear the helmet, and once they have started the vehicle they may remove it off. By taking this issue in mind, it has been suggested that, during the ride if the rider takes off his/her helmet, the rider will receive a voice message continuously alerting him/her to put the helmet back. After 10km, if the same situation is encountered, the person will receive a warning in the form of a voice as well as a text message on his mobile phone asking him/her to wear the helmet. The text messages on mobile phone is kept with the intention that if there's someone else riding the bike, the owner of the vehicle can still be aware of the situation and ask the current rider to put his helmet and be safe while driving. The warnings will be given 3 times with an interval of 5-15 minutes (according to the owner's preference) each. If after 3 consecutive warnings the helmet hasn't been deducted appropriate amount of fine will be deducted from the owner's bank account.

The bike will also come with an inbuilt GPS tracking module to get the current location of the vehicle. In case of any theft the owner of the vehicle can know whether his vehicle is on road or is idle, where is the vehicle and can immediately report to the concerned authority and get his/her account blocked.

IV. SPECIFICATION

The object detection objective is achieved using HAAR CASCADE technique, a concept of OpenCV Python library. It requires you to train your object detection module using a Cascade trainer. The training needs certain negative images i.e., all the images not containing the object to be detected and twice the number of this as positive images i.e., all the images containing the object to be detected and save these in two different folders. In our case the positive images would be – images containing HELMETS and negative images would be – images not containing HELMETS. Eg: There are 50 negative images, the number of positive images should be approximately double i.e., 110 images. The cascade trainer would then generate a .XML file that can be used in the python code to detect the object. In windows, the training of the model can be achieved using Cascade-Trainer-GUI.

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V. CONCLUSION

Smart Bike will prove to be very effective solution in assuring people do not ride without their helmets. It will also help to bring down the number of accidents. Using this technology would also give people a feel of "cool" as it uses the most advanced technology. It will also prove to be beneficial to the traffic police officers as they don't have to waste time arguing with the officer to pay the fine nor will the owner take the topic of helmetless driving lightly. It will also improve the methods of collecting fine and will ensure that every single person gets the penalty of violating the traffic rules.

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