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## Abstract

## As a priority when designing our project, we needed an open source image processing library. At this point, we have reviewed many projects that will be examples of image processing and computer vision thanks to OpenCV. Finally, we have prepared an algorithm to get the security alert we want. A measurement will be made between the driver's eyes and the steering wheel while the driver is actively at vehicle. The result of this measurement will give a warning message on the screen with the arrival of the driver at a dangerous distance, that is, if he gets too close to the steering wheel. In this way, it will reflect a safety warning for the driver. Another issue I would like to mention here is the incident when the driver falls asleep, that is, if his eyes are completely closed or yawned, the warning system is activated. Because this is also a very dangerous situation in traffic.

***Keywords***: *Driver, Safety, Security,*

# Introduction

With the developing technology, automobiles have become more of a software tool than a mechanical tool. When we look at recent years, they are more noted for their safe driving equipment than motor technologies. At this point, our main goal is to highlight the dynamism of safe driving. It is carelessness that causes thousands of traffic accidents every year. In this project, important causes such as inattention and insomnia were examined. In order to prevent these things, we believe that it would be right for computer vision to come into play at this point. In addition to its safe driving, we wanted to design a system that could also use it as a stimulus system in emergency situations. It should also be used for unexpected head drops, sudden approach to the steering wheel, for example, in emergency situations such as a heart attack.

Thanks to the introduction of computer vision into our lives, it is possible for us to see autonomous vehicles. However, autonomous driving is being tested before autonomous vehicles. We also wanted to try a more reliable and inexpensive way of autonomous driving in our project. Its cost as an integration is low, and its application efficiency is high. At this point, it is possible to say that our project is distinctive.

# Methodology

First we needed to measure the distance. We proceeded, taking the distance at first from the shoulders. Our pixel size, and the distance we took from the heads of the shoulders, successfully measured the distance when we approached the camera. However, no warning returned a signal. Then we decided to draw the distance at eye level as the right place. At this point, I can say that the resource scanning in the literature has been very useful to us. In this way, it has become more effective for us to analyze the driver's sleep stop or sudden health problem at eye level.



In addition, we are excited about the existence of structures that should be developed and put on this project. With the developing technology, this detection time is significantly reduced, and even thanks to autonomous driving features, it is possible to park the car in a safe area at the time of danger, call for emergency assistance. We believe that we have released a product that is suitable for integration. The fact that the use and domains of computerized vision are so wide shows us that the methods developed can give important results.

# Figures

In this section, first of all, there is a section where the camera should be turned on on our current machine. Then, in a while loop, our face section is located. We keep our FaceMash command “False". Because we don't want the driver to see the "FaceMashes" at this stage. Since we can calculate the points in the background ourselves, we can determine the image closest to the natural image as “

Figure 1: FaceMash and Camera

draw=False” both in terms of the driver's attention and in terms of the natural image. We have points inside the Try block. Thanks to these points, we are able to Decipher the distance between the two eyes. After this distance, it remains to add conditions.

The condition block that I just mentioned is the golden key to our security system. Because the value of 35 centimeters is peeped here. as soon as it drops below 35 centimeters, the warning system that will come out is kept here.



Figure 2: Detection for 35 cm



At this point, we thought about closed eyes and yawning detection. We Decoupled the pixels, measured them as the distance between the two eyelids and lips. We fixed the ideal time by trial and error. We have pressed the same warning on the screen for situations that will occur due to yawning and drowsiness.

Figure 3: Close Eye – Yawning Detection



The basis of our system is mathematically this infrastructure. It shows the driver as an object representation. We used the Focal Length and Distance formulas in our own code operations. Thanks to this, we were able to determine the proximity of the driver.

Figure 4: Equation

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