

# VIETNAM AVIATION ACADEMY

Department of Telecommunication - Electronics Engineering Technology

LOCATED IN HO CHI MINH CITY



Graduation Thesis

## "DROWSINESS DETECTION AND ALERT SYSTEM IN THE CAR"

Written by

*Nguyen Van Anh Tuan*

*Roll.No.1753020018*

Under the guidance of

**Msc.Vo Phi Son**

May 4, 2021

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# PREAMBLE

In nowadays, along with the continuous development and progress of science and technology, image processing is one of the topics that need attention and development. From the first researches about black-white image, gray-scale and digital image, image processing has been studied deeply and applied a lot in our life. Besides that, along with the development of Raspberry Pi with small scale, its promoting more development and application with practice.

The application of Raspberry Pi in image processing aims to provide a few of image processing solutions to apply in real life. In this project, I have used Raspberry Pi to detect drowsiness in the car with algorithms that can respond in real time, the optimal solutions are simple but bring efficiency and high accuracy. I started to identify directly through a camera connected to Raspberry Pi, and programmed using Python with the ability to track and mark the subject's eyes, thereby determining whether the subject was closed or opened and alert a driver immediately, eyes are recognized by the Facial Landmarks algorithm, then calculate the distance between the eyelids using Euclid to detect eye states and detect drowsiness.

**Auth. Nguyen Van Anh Tuan**

# WORDS OF THANKS

Reality show that success is always associated with support of friends, teacher,... And i have special thanks to Mr.Vo Phi Son and my close friends for helping me completing this project.

I have tried my best to do this project. However, due to my lack of experience and knowledge, there are still some unexpected mistakes in the project. Please let me know your opinions and criticizes. Once again, thank you so much.

**Auth.Nguyen Van Anh Tuan**

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# Chapter 1

## OVERVIEW ABOUT PROJECT

### 1.1 Introduction

Nowaday along with the strong development of Science Technology, Robot, Self-Driving Car, AI,... In addition, image processing is a relatively new science compared to many other sciences, but now it is one of the rapidly growing fields and attracts special attention from researchers, research centers, application on this fascinating field. Image processing plays an important role in many practical applications of science and technology as well as in everyday life such as: production and quality assurance, movement of robot, self-driving car, guild tool for the blind, security and monitoring,...

Recently, the popularity and efficiency of using Raspberry Pi kit in applications in science and technology, with characteristics like a miniature computer about the size of a mobile phone, runs an open operating system, is equiped with a powerful processor, low power consumption, and low cost, allowing you to configure the Raspberry Pi kit as a problem-solving computer.

Besides, from the actual needs, drowsiness while driving is quite common and it is also one of the casues of serious accidents, requiring a device that can monitor the state of the person while driving to be able to promptly warn the driver when the driver accidentally falls asleep while driving.

From these reasons has prompted me to research application of Raspberry Pi kit to image processing in order to offer some image processing solutions that can be applied in life.

### 1.2 Target and The Limits of Project

This project is the first step to learn about the application of processed images in reality, at the same time is also a step to deploy the learned knowledge. Through research and serious work to practice manners, as well as perfecting methods, researching thinking and solving a problem. With the objectives of the project is:

- Learning about Raspberry Pi 3 model B+ kit
- Install OS for Raspberry Pi 3 B+
- Learn about image processing
- Learn about OpenCV, Python

- Install library for OpenCV, Dlib
- Recognize techniques
- Drowsiness Detection by using camera connect to Raspberry Pi and alert to driver through speaker
- Write program
- Experimental model
- Write report

The limit of project is the distance from camera to object from 0,3-1m, detected object not to use glasses and the angle is smaller than 40 degrees, if the object is out of this range, the detection maybe inaccurate or undetectable.