

# CHAPTER I INTRODUCTORY

## 1.1 Background

According to Mequanint (2018) A Computer is an electronic device that accepts data, performs computations, and makes logical decisions according to instructions that have been previously given to it; producing meaningful data. Computers have for all intents and purposes come a long way since their first introduction to the general public, and will continue doing so with the advancement of new hardware technologies and methods (T, Furht, T, & Korolija, 2016). With this amount of processing power, the field of Computer Science and Information Technology has seen further advances in various fields that was impossible before due to the hardware limitations. One of these fields is called “computer vision”.

Computer vision is one of the many fields in computing. Computer vision is the act of using computers to recognize and classify visual cues, with the objective to gain information from images, computer vision is also used with videos as well, since videos are just basically a sequence of images. There are multiple ways computer vision can be achieved; from using mathematical models and classifiers, to using more modern techniques like machine learning. In the modern day; computer vision is used for everything from as simple as recognizing and classifying plants and animals, to as advanced as self-driving cars. Face recognition is one of the many fields in computing that uses computer vision.

Face recognition technology is not new, but with the aid of machine learning algorithms, the large amounts of data that is available to work with, and new technologies serving as input; face recognition algorithms has never been better in marking faces (Vinay et al., 2015). Areas where face recognition can be used has expanded throughout the years; from automating attendance in a classroom to aerial crowd surveillance (Motlagh, Baga, & Taleb, 2017), and such there needs to be a guideline on what types of face recognition algorithms to use so that implementation suits the particular use case and can progress smoother for software developers and engineers.

## **1.2 Problems**

1. How to analyze and compare the different face recognition algorithms in Dlib and OpenCV.
2. How to create and compile an In-depth review of the various face recognition algorithms in Dlib and OpenCV that could be used as reference for readers.

## **1.3 Scope**

The mini thesis will be limited to the following scope listed below:

1. The face recognition algorithms used in the mini thesis will not be built from scratch but instead be ones that are readily available for use.
2. The face recognition algorithms that will be analyzed and compared from the OpenCV library are DNN (Deep Neural Network) and HAAR cascade.

3. The face recognition algorithms that will be analyzed and compared from the Dlib library are CNN (Convolutional Neural Network) and HOG (Histogram of Oriented Gradients) from Dlib.
4. The accuracy, speed and ability of the algorithms will be looked into to determine the various advantages and disadvantages of between the face recognition algorithms.

#### **1.4 Objectives**

1. To analyze and compare the different face recognition algorithms in Dlib and OpenCV.
2. To create and compile an In-depth review of the various face recognition algorithms in Dlib and OpenCV that could be used as reference for readers.
3. To serve as an opportunity for us to implement lessons learned from Universitas Internasional Batam into a use case.
4. to fulfill one of the requirements needed to successfully graduate from Universitas Internasional Batam.

#### **1.5 Output**

An in-depth review of the advantages, and disadvantages of DNN, CNN, Haar cascade, and HOG face recognition algorithms, including a chart showing the performance of the previously mentioned face recognition algorithms.

## 1.6 Benefits

Since there has yet to be a comprehensive analysis and comparison between face recognition algorithms ( HOG, DNN, CNN, and HAAR cascade) from the Dlib and OpenCV library, it will contribute to the general knowledge surrounding open source face recognition algorithms. By doing a comparison and analysis between the different open source face recognition algorithms available, future software developers can use this mini thesis as a guideline when making a decision as to which face recognition algorithm to use for their systems. This in turn will further ease the implementation of face recognition to future applications and programs.

For the writers, this mini thesis will provide the opportunity for us to utilize the various skills acquired from Universitas Internasional Batam.

## 1.7 Systematic Discussion

To give a general idea regarding the contents, and structure of this research report, The writers have provided the following systematic discussion below:

### **CHAPTER I: INTRODUCTORY**

The contents of this chapter is about the background of face recognition technology; before stating the objectives and benefits for this mini thesis.

## **CHAPTER II: LITERATURE REVIEW**

The contents of this chapter is mainly about looking at various theories behind the face recognition algorithms that we will be discussing.

## **CHAPTER III: RESEARCH METHODS**

The method that we is used when analyzing and comparing the different face recognition algorithms will be talked about in this chapter.

## **CHAPTER IV: IMPLEMENTATION AND DISCUSSION**

Details regarding the implementation process for the research; which includes getting the necessary data for the comparisons will be explained in this chapter. Discussion about what the data represent and mean will also be in this chapter.

## **CHAPTER V: CONCLUSION**

Finally, in the last and final chapter; the conclusion will be reached by gathering information from the previous chapters. Suggestions about future avenue of research that can be pursued will also be talked about in this chapter.