"Eye and Face Detection Using ML"

A Dissertation submitted in partial fulfillment of the requirement
for the award of degree of

MASTER OF COMPUTER APPLICATIONS
of
Visvesvaraya Technological University, Belagavi

By

Godhasara Yashkumar Ratilal
1RN19MCA17

Carried out at
New Age Solutions Technologies (NASTECH)

Under the Guidance of

Internal guide:
Dr. Rajani Narayan
Associate Professor
Dept. of MCA

External Guide:
Azib Hasan
Subject Matter Expert
New Age Solutions
Technologies (NASTECH)

ESTD:2001
An Institute with a Difference

Department of Master of Computer Applications
RNS Institute of Technology
Dr. Vishnuvardhan Road, Channasandra, Bengaluru-560 098
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CERTIFICATE

This is to certify that ***Mr. Godhasara Yashkumar Ratilal****, student of 6th semester MCA, bearing the USN:* ***1RN19MCA17*** *has completed his final semester internship work entitled* ***"Eye And Face Detection Using ML"*** *as a partial fulfillment for the award of Master of Computer Applications degree, during the academic year 2022 under our joint supervision.*

Internal Guide

Dr. Rajani Narayan
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Principal

Dr. M K Venkatesha
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DECLARATION

I **Mr.** ***Godhasara Yashkumar Ratilal***, student of 6th MCA, RNS Institute of Technology, bearing USN: **1RN19MCA17** hereby declare that the project entitled **"*Eye and Face Detection Using ML*"** has been carried out by me under the supervision of External Guide **Mr. Azib Hasan**, Subject Matter Expert, and Internal Guide **Dr. Rajani Narayan**, Associate Professor and submitted in partial fulfillment of the requirements for the award of the Degree of Master of Computer Applications by the Visvesvaraya Technological University during the academic year 2022. This report has not been submitted to any other Organization / University for any award of degree or Certificate.

Signature
Godhasara Yashkumar Ratilal

ACKNOWLEDGEMENT

The successful completion of any task would be incomplete without the mention of the people who made it possible, whose constant support and encouragement has crowned my efforts.

I take this opportunity to acknowledge the guidance I have received from different individuals and place on record my appreciation and thanks.

I express my sincere gratitude to **Dr. R N Shetty**, Founder and **Sri**. **Satish R Shetty**, Managing Director, RNSIT for providing us wonderful academic environment.

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I am grateful to **Dr. N P Kavya**, Head of the Department of MCA, RNSIT for nurturing our technical skills and contributing towards the success of this project.

I would also express my heartfelt thanks to my internal guide **Dr. Rajani Narayan**, Associate Professor, Department of MCA, RNSIT for her continuous guidance and valuable suggestions for this internship work.

It's my pleasure to thank **New Age Solutions Technologies (NASTECH)** for providing me the best platform to complete the internship work and glad to thank the external guide **Mr. Azib Hasan**, Subject Matter Expert.

I also express my heartfelt thanks to all the teaching and non-teaching staff members of MCA Department for their encouragement and support throughout this work.

Godhasara Yashkumar Ratilal
1RN19MCA17

ABSTRACT

In this internship, we were asked to experiment with a real world dataset, and to explore how machine learning algorithms can be used to find the patterns in data. We were expected to gain experience using a common data-mining and machine learning library, and were expected to submit a report about the dataset and the algorithms used. After performing the required tasks on a dataset of my choice, herein lies my final report.

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Chapter – 1

INTRODUCTION

1.1 Aim

It is a subdomain of Object Detection, where we try to observe the instance of semantic objects. These objects are of particular class such as animals, cars, humans, etc. Face Detection technology has importance in many fields like marketing and security.

The objective of face recognition is, from the incoming image, to find a series of data of the same face in a set of training images in a database. The great difficulty is ensuring that this process is carried out in real-time, something that is not available to all biometric facial recognition software providers.

1.2 Project Description

Face Recognition is a technology in computer vision. In Face recognition / detection we locate and visualize the human faces in any digital image. It is a subdomain of Object Detection, where we try to observe the instance of semantic objects.

A Haar Cascade is basically a classifier which is used to detect the object for which it has been trained for, from the source. The methodology of face detection can be applied to landmark (e.g., eyes, nose tip, and mouth) localization, which can then be utilized to face geometrical normalization.

Face detection algorithms typically start by searching for human eyes -- one of the easiest features to detect. The algorithm might then attempt to detect eyebrows, the mouth, nose, nostrils and the iris.

1.3 Scope

Artificial Intelligence is one of the fastest-growing sectors in the tech sector. And as you can see clearly, the scope of AI has expanded into many sectors, including healthcare, transport, and security. Due to such growth, multiple industries require the expertise of skilled AI professionals.

The future scope of your machine learning career can also be in leadership roles in automation or analytics environments that use data science, big data analysis, AI integration etc.

Chapter – 2

COMPANY PROFILE

2.1 Organization Structure

NASTECH is formed with the purpose of bridging the gap between Academia and Industry.
Nastech is one of the leading Global Certification and Training service providers for technical and management programs for educational institutions. We collaborate with educational institutes to understand their requirements and form a strategy in consultation with all stakeholders to full fill those by skilling, reskilling and upskilling the students and faculties on new age skills and technologies.

An organizational structure is a system that outlines how certain activities are directed in order to achieve the goals of an organization. These activities can include rules, roles, and responsibilities. The organizational structure also determines how information flows between levels within the company.

We know that learning is easier when you have an excellent trainers. That's why most of our educators have achieved an advanced degree in their field. Our instructors are passionate about the subjects they teach and bring this enthusiasm into their training workshop.

2.2 Different departments and functions

- They offer industry and project oriented training programs which not only expose students to hands-on training experience but also make them practical oriented towards the industry-readiness expected in today's time.
- They take pride that all our programs are mapped to a certain Global Certification Exams i.e. after the students are done with their training, they will prove themselves on a global level via a global certification exam.
- They lead from the front in terms of costing of our overall global certification and training programs.
- Industry and project oriented student training programs.
- Certification programs mapped to Global Certification Exams from Microsoft/EC-Council/Google/AWS/ Adobe).
- Placement training for pre-final and final year students.
- LMS and Online assessment solutions for future ready campuses.

2.3 Services

They are providing internships on:

- Data Science using python
- Machine Learning using Python
- Ethical Hacking
- Full Stack Development
- Other Technical & Management Courses
    - IOT with AWS Cloud (Online)
    - Cloud Computing using Azure
    - Cloud Security
    - Python Programming with advance concepts
    - Business Analytics
    - Power BI (Business Intelligence)
    - Advance Excel
    - Digital Marketing

Chapter – 3

TOOLS AND TECHNOLOGY

3.1 Tools/technology used by company

For Data Science:

- SAS
- MATLAB
- Tableau

For Machine Learning using Python:

- TensorFlow
- Keras
- Scikit-learn

3.2 Tools learned in training

- Python
- Colab
- Kaggle
- Github

Chapter – 4

INTERNSHIP WORK

4.1 Task Assigned

Linear Regression:

Linear Regression is the supervised Machine Learning model in which I have to find the best fit linear line between the independent and dependent variable i.e it finds the linear relationship between the dependent and independent variable.

Logistic Regression:

Logistic regression is an example of supervised learning. It is used to calculate or predict the probability of a binary (yes/no) event occurring in which I have to determine if a person is likely to be infected with COVID-19 or not.

Exploratory Data Analysis of Titanic:

To do Exploratory Data Analysis in Python, we need some python libraries such as Numpy, Pandas, and Seaborn. The last two libraries will be used for visualization. In which we have to find the number of male passengers, number of survived passengers.

KNN Algorithm:

The abbreviation KNN stands for "**K-Nearest Neighbour**". It is a supervised machine learning algorithm. The algorithm can be used to solve both classification and regression problem statements. The number of nearest neighbours to a new unknown variable that has to be predicted or classified is denoted by the symbol 'K'.

4.2 Application developed using modern tools

Optical Character Recognition (OCR) is a technology for recognizing text in images, such as scanned documents and photos. We must have taken a photo of a text just because we are too lazy to take notes or type the text because taking photos takes less time than taking notes.

We can do that too just using a few lines of code. One of the OCR tools that are often used is Tesseract. Tesseract is an optical character recognition engine for various operating systems. It was originally developed by Hewlett-Packard as proprietary software. Later Google took over development.

Optical Character Recognition refers to a software technology that electronically identifies text (written or printed) inside an image file or physical document, such as a scanned document, and converts it into a machine-readable text form to be used for data processing. It is also known as text recognition.

In short, optical character recognition software helps convert images or physical documents into a searchable form. Examples of OCR are text extraction tools, PDF to .txt converters, and Google's image search function.

4.3 Professional learning (Discipline, attitude, planning, group work, self-assessment)

- The Disciplined Collaboration in Professional Learning (DCPL) project supported teachers to identify and trial new ways of solving issues related to student learning, engagement and wellbeing.
- We'll be looking at our Future of Learning report, and analysing attitudes towards personal and professional development through learning.
- A professional learning plan is a "set of purposeful, planned actions and the support system necessary to achieve the identified goals.
- an ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve.
- As part of engagement in Professional Update, individuals should self-evaluate using the Professional Standards relevant to their context.

Chapter – 5

IMPLEMENTATIONS

5.1 Screen Shots

```
[3]  import cv2
     import numpy as np
     from google.colab.patches import cv2_imshow

     !wget https://penntoday.upenn.edu/sites/default/files/article_images/Youth.jpg -o people.jpg

[5]  peopleImg = cv2.imread("/content/Youth.jpg")
     peopleImg = cv2.resize(peopleImg, (400,300))
     cv2_imshow(peopleImg)
```

Figure 5.1: Normal Image

```
peopleImg = cv2.imread("/content/Youth.jpg")
peopleImg = cv2.resize(peopleImg, (400,300))
model_face = cv2.CascadeClassifier("/content/haarcascade_frontalface_default.xml")
face = model_face.detectMultiScale(peopleImg, 1.1, 2)
for (x,y,w,h) in face:
  cv2.rectangle(peopleImg, (x,y), (x+w, y+h), (0, 0, 255), 2)

cv2_imshow(peopleImg)
```

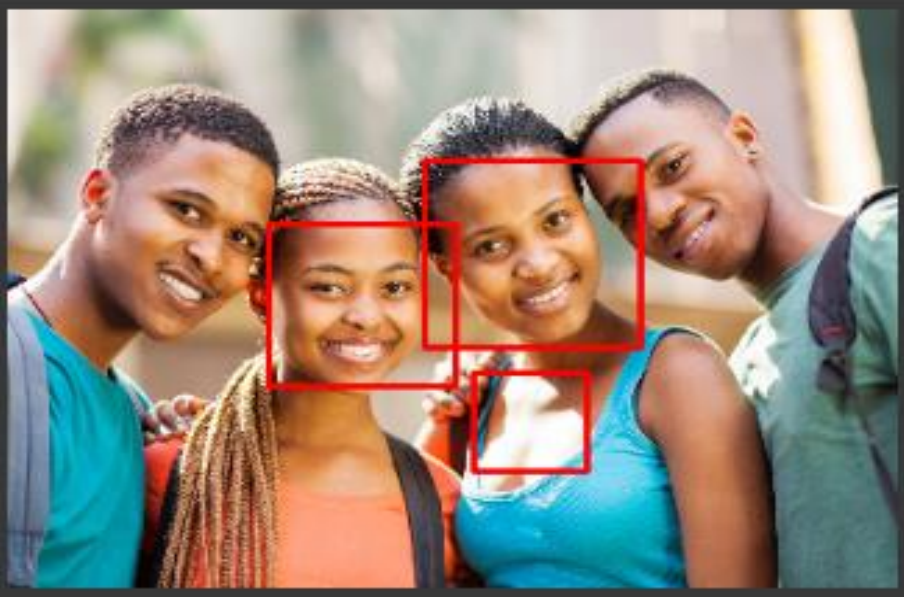

Figure 5.2: Face Detection

```
peopleImg = cv2.imread("/content/Youth.jpg")
peopleImg = cv2.resize(peopleImg, (400,300))
model_eye = cv2.CascadeClassifier("/content/haarcascade_eye.xml")
face = model_eye.detectMultiScale(peopleImg, 1.1, 2)
for (x,y,w,h) in face:
  cv2.rectangle(peopleImg,(x,y),(x+w,y+h),(0,255,0),2)

cv2_imshow(peopleImg)
```

Figure 5.3: Eye Detection

Chapter – 6

CONCLUSION AND FUTURE WORK

Machine learning is quickly growing field in computer science. It has applications in nearly every other field of study and is already being implemented commercially because machine learning can solve problems too difficult or time consuming for humans to solve.

With a humongous amount of data becoming more available today, Machine Learning is starting to move to the cloud. Data Scientists will no longer explicitly custom code or manage infrastructure. A.I. and ML will help the systems to scale for them, generate new models on the go and deliver faster and accurate results.

AI is likely to replace routine jobs and repetitive tasks like picking and packaging goods, separating and segregating materials, responding to repetitive customer queries, etc. Even today some of these functions are still done by humans and AI will take over these tasks in the future.

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