

Final Year Project Report

Race Classification through Convolutional Neural Network



Project Advisor:

Tayaba Anjum

Submitted By:

Talha Mahboob Alam	12003065-204
Talha Imtiaz Baig	12003065-062
Abdul Wahab	12003065-201
Malik Furqan Zahid	111820022

Session:

BS Software Engineering Batch (003)
2012-2016

University of Management and Technology

C-II Johar Town Lahore Pakistan

DEDICATION

We would like to dedicate this project to our family, friends and especially to our teachers, whose encouragement and support helps us to complete this task. Were unable to do this task but hard work of our respectable teachers helps us to complete this project.

Final Approval

Panel of Examiners:

- 1) **Head of Department**
Department of Computer Science
UMT Lahore _____
(Signature)

- 2) **Program Director (Final Year Projects)**
Department of Computer Science
UMT Lahore _____
(Signature)

- 3) **Supervisor**
Department of Computer Science
UMT Lahore _____
(Signature)

- 4) **Co-Supervisor**

(Signature)

ACKNOWLEDGEMENTS

The completion of this study could not have been possible without the expertise of Miss Tayaba Anjum, who is the adviser of our project. I sincerely thank Miss Tayaba Anjum and Miss Emmen Farooq for their guidance and encouragement in carrying out this project work. Last but not the least, we would like to thank our parents. Without you none of this would indeed be possible.

ABSTRACT

Neural networks are a powerful technology to classify different images. However, there are impressive number of different types of neural networks that are used in the literature and in industry but we used Convolutional neural network (CNN) to classify the images. The biometric framework can utilize race to distinguish individuals in the world with a precise personality. This research proposes a design to order individuals into two races Asian and Non-Asian that effectively in any face acknowledgment framework can be incorporated. The proposed procedure takes in the assigned essential characteristic of the face, skin color pattern and other secondary feature from training of images in order to effectively classify races. We use CNN to create a system that classifies facial images that are based on a variety of different facial attributes and classify it into two separate classes. We use 3 convolutional layers. We used 3052 training images of 64*64 pixels and we achieve 85% accuracy.

CONTENTS

ACKNOWLEDGEMENTS	1
ABSTRACT	5
CONTENTS	6
DEFINITIONS AND ACRONYMS	7
LIST OF FIGURES	8
LIST OF TABLES	9
1 INTRODUCTION	9
1.1 PROBLEM OVERVIEW	ERROR! BOOKMARK NOT DEFINED.
1.2 RESEARCH QUESTIONS	ERROR! BOOKMARK NOT DEFINED.
1.3 RESEARCH OBJECTIVES	ERROR! BOOKMARK NOT DEFINED.
1.4 SCOPE	ERROR! BOOKMARK NOT DEFINED.
1.5 METHODOLOGY	ERROR! BOOKMARK NOT DEFINED.
1.6 SIGNIFICANCE/ POTENTIAL APPLICATIONS	ERROR! BOOKMARK NOT DEFINED.
2 BACKGROUND	ERROR! BOOKMARK NOT DEFINED.
3 LITERATURE REVIEW	ERROR! BOOKMARK NOT DEFINED.
3.1 GAP ANALYSIS.....	ERROR! BOOKMARK NOT DEFINED.
4 PROPOSED METHODOLOGY	ERROR! BOOKMARK NOT DEFINED.
4.1 SUGGESTED APPROACH	ERROR! BOOKMARK NOT DEFINED.
4.2 WORKFLOW OF THE SYSTEM	ERROR! BOOKMARK NOT DEFINED.
4.3 ALGORITHMS/ARCHITECTURE	ERROR! BOOKMARK NOT DEFINED.
5 DESIGN AND IMPLEMENTATION	ERROR! BOOKMARK NOT DEFINED.
5.1 SYSTEM DESIGN.....	ERROR! BOOKMARK NOT DEFINED.
5.2 SYSTEM IMPLEMENTATION	ERROR! BOOKMARK NOT DEFINED.
5.3 ASSUMPTIONS/CONSTRAINTS (OPTIONAL).....	ERROR! BOOKMARK NOT DEFINED.
6 EVALUATION	ERROR! BOOKMARK NOT DEFINED.
6.1 EXPERIMENTATION	ERROR! BOOKMARK NOT DEFINED.
6.1.1 Experimental Setup.....	Error! Bookmark not defined.
6.1.2 Experiments Design/Details	Error! Bookmark not defined.
6.2 RESULTS	ERROR! BOOKMARK NOT DEFINED.
6.3 DISCUSSION/ANALYSIS	ERROR! BOOKMARK NOT DEFINED.
7 CONCLUSION AND FUTURE WORK	ERROR! BOOKMARK NOT DEFINED.
8 REFERENCES/ BIBLIOGRAPHY	ERROR! BOOKMARK NOT DEFINED.
9 APPENDIX	ERROR! BOOKMARK NOT DEFINED.
9.1 GLOSSARY OF TERMS	ERROR! BOOKMARK NOT DEFINED.
9.2 PRE-REQUISITES	ERROR! BOOKMARK NOT DEFINED.
9.3 REFERENCE/ SOURCE DOCUMENTS	ERROR! BOOKMARK NOT DEFINED.

DEFINITIONS AND ACRONYMS

Acronym	Definition
BIF	Biological Inspired Features
CNN	Convolutional Neural Network
DBMs	Deep Boltzmann Machine
ICA	Independent Component Analysis
LBP	Local Binary Patterns
LDA	Linear Discriminant Analysis
LFW	Labeled Face in Wild
MAE	Mean Absolute Error
PCA	Principle component Analysis
RDMs	Restricted Boltzmann Machine
SVM	Support Vector Machine
WLD	Weber Local Descriptor

LIST OF FIGURES

Figure 1: CNN Diagram.....	27
Figure 2: Convolutional Layer.....	28
Figure 3: Single Depth Slice.....	30
Figure 4: Fully Connected Layer.....	31
Figure 5: Graphical User Interface.....	38
Figure 6: Asian Images Dataset.....	42
Figure 7: Non-Asian Images Dataset.....	43
Figure 8: Relation between Number of Iterations and Errors.....	45
Figure 9: Relation between Number of Images and Errors.....	45

LIST OF TABLES

Table 1: Research Questions and Motivations.....	17
Table 2: List of Sources	18
Table 3: Inclusion and Exclusion Criteria.....	18
Table 4: Experimental Vs. Observational Studies.....	20

1 INTRODUCTION

Faces express the abundance of social signs, including race, age and sexual orientation, all of which have included expanding responsiveness from multidimensional research, such as neuroscience and software engineering. Race grouping is trying because of its instability and many-sided quality relying upon point of view and criteria. To address this test, as of late, critical battles have been communicated toward race discovery and arrangement in the group. This Research gives a far reaching and investigative survey of the up and coming advances in face-race observation, standards, calculations, and applications. For the examination purposes, it virtues highlighting a few vital purposes of arrangement that have risen up out of psychological research conventions: Perhaps the most visible, yet wrongly comprehended part of race is the basic trap of mistaking race for skin shading. Our exploration is on Asian and non-Asian grouping framework.