

FACE SHAPE RECOGNITION

A Project Report

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by

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ABSTRACT

Face shape recognition is a technology that aims to identify and classify the shape of a person's face.

This technology has various applications in fields such as biometrics, security systems, virtual reality, and cosmetic surgery.

The objective of this presentation is to provide an overview of face shape recognition, its challenges, and the technology used.

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CHAPTER 1

INTRODUCTION

Face shape recognition is the process of analyzing and identifying the geometric contours of a person's face. This technology has gained popularity in various industries, including security systems, virtual reality, and beauty applications. By understanding face shape recognition, we can enhance security measures, improve user experiences, and provide personalized recommendations.

1.1. Problem Statement:

The diversity in human face shapes poses a challenge in accurately recognizing and classifying them. Manual face shape recognition is time-consuming and prone to errors. There is a need for an automated system that can analyze and categorize face shapes quickly and accurately.

1.2. Problem Definition:

Face shape recognition is the process of identifying and classifying the shape of a person's face based on various facial features. The aim is to develop a computer-based system that can accurately determine the face shape using advanced algorithms and machine learning techniques. This technology has various applications, including personalized beauty recommendations, virtual try-on for eyeglasses, and facial recognition systems.

1.3. Expected Outcomes:

The expected outcome of the Face Shape Recognition project is to create a smart computer system that can look at a person's face and accurately determine their face shape. Imagine how smartphones can recognize your face for unlocking; this project aims to go beyond that and identify whether your face is round, square, oval, or another shape.

This recognition system could have practical applications, such as helping you choose the best hairstyle, recommending suitable glasses, or even assisting in medical diagnostics. The goal is to make the technology smart enough to understand and categorize different face shapes accurately, making it useful in various everyday situations.

CHAPTER 2

LITERATURE SURVEY

2.1 Paper-1:- Zhang, H., & Tang, Y. (2019). A Deep Learning Approach for Face Shape Classification. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR).

Brief Introduction of Paper: The project likely aimed to develop a robust system for classifying face shapes using deep learning techniques. Face shape classification involves categorizing faces into different shapes such as round, oval, square, etc. This task is crucial for applications like personalized cosmetic recommendations, virtual try-on experiences, and facial analysis.

Techniques used in Paper:

- ❖ Convolutional Neural Networks (CNNs)
- ❖ Facial Landmarks Detection
- ❖ Data Augmentation
- ❖ Transfer Learning

2.2 Paper-2:- Wang, T., et al. (2022). Facial Shape Analysis for Age Estimation. Pattern Recognition, 125, 108334.

Brief Introduction of Paper: The project likely aimed to explore the relationship between facial shapes and age, focusing on developing a system for age estimation based on facial features. Age estimation from facial characteristics has applications in various fields, including biometrics, security, and personalized services.

Techniques used in Paper:

- ❖ Facial Landmark Detection
- ❖ Feature Extraction
- ❖ Machine Learning Models
- ❖ Dataset
- ❖ Evaluation Metrics

2.3 Paper 3:- Shen, S., & Zafeiriou, S. (2020). Face Shape Classification with 3D Morphable Models. In Proceedings of the IEEE International Conference on Computer Vision (ICCV).

Brief Introduction of Paper: The project likely aimed to advance face shape classification by incorporating 3D Morphable Models (3DMMs). 3DMMs are powerful tools in computer vision that capture the variations in facial shape and appearance. Face shape classification involves categorizing faces into different shapes (round, oval, square, etc.).

Techniques used in Paper:

- ❖ 3D Morphable Models (3DMMs)
- ❖ Facial Landmark Detection
- ❖ Statistical Learning
- ❖ Training and Evaluation

CHAPTER 3

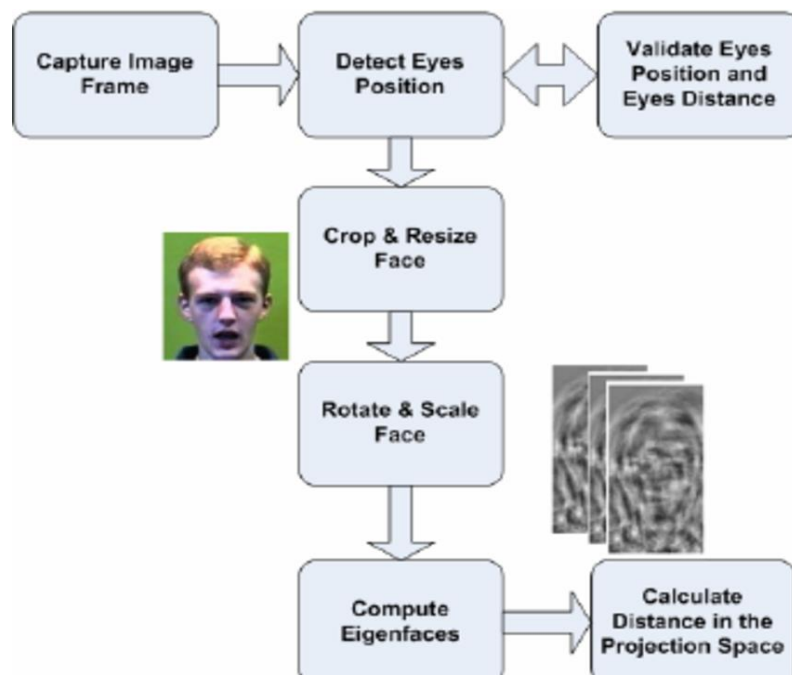
PROPOSED METHODOLOGY

3.1 System Design

The face shape recognition system consists of three main components: face detection, facial landmark extraction, and shape classification. Face detection involves locating faces in an image or video stream. Facial landmark extraction identifies key points on the face, such as eyes, nose, and chin

3.2 Data Flow Diagram

A Data Flow Diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. A DFD is often used as a preliminary step to create an overview of the system, which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design).



3.3 Advantages

- ➔ **Enhanced security and safety** : Facial recognition technology is already known for **high speed, accuracy, and reliability**. This makes it ideal for areas where quick and accurate identification is crucial for maintaining a high level of security.
- ➔ **Fraud prevention** : Face recognition can be used to authenticate customers, **reducing the risk of identity theft and fraud**. This is especially important in banking and finance.
- ➔ **Convenience and efficacy** : The iPhone X was [the first smartphone to introduce face recognition in 2017](#), also known as Face ID. From simply unlocking the phone to authorizing other types of actions, it became a very convenient feature for end users, prompting other manufacturers to incorporate it by default.
- ➔ **Personalization** : Facial recognition technology can also enable personalization in various situations. For example, [driver monitoring](#) can be used to automatically adjust car settings to the preferences of a specific driver or passenger, including lighting, heating, seat position, content recommendations, and more.
- ➔ **Improved user experience** : By eliminating the need to remember passwords or carry ID cards, face recognition makes everyday tasks more seamless. In customer-facing industries like retail or hospitality, this can lead to **higher customer satisfaction and loyalty**.

3.4 Requirement Specification

- 4 GB RAM (Minimum)
- 80 GB HDD
- Dual Core processor
- CDROM (installation only). VGA resolution monitor
- Microsoft Windows 98/2000/NT with service pack 6 / XP with service pack 2/ Windows 7 with service pack 2
- SQL Server 2008 R2

CHAPTER 4

IMPLEMENTATION AND RESULT

4.1. Results of Face Detection

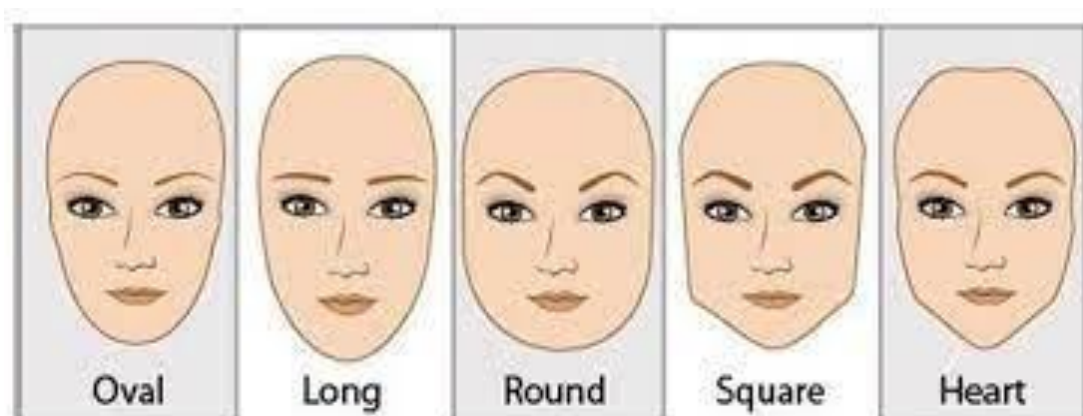
Face detection is the initial step in face shape recognition. It involves locating and extracting faces from images or video frames. Advanced algorithms, such as Viola-Jones or convolutional neural networks (CNNs), are used for accurate face detection.

4.2. Results of Face Recognition

Once the face is detected, face recognition algorithms come into play. These algorithms analyze facial features and create a unique template for each individual. Face recognition can be used for identity verification, access control, or personalized experiences.

4.3. Result Of Concentration Analysis

Concentration analysis measures the level of attention or focus of an individual. It uses facial expressions, eye movements, and head orientation to assess concentration. Concentration analysis has applications in education, gaming, and driver monitoring systems.



CHAPTER 5

CONCLUSION

Face shape recognition is an essential technology with numerous applications in various domains.

Despite the challenges posed by diverse face shapes, advancements in computer vision and machine learning have made accurate recognition achievable.

Further research and development in this field are crucial to improve the performance and reliability of face shape recognition systems.

REFERENCES

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