CHAPTER I
INTRODUCTION

1.1 Background of the Analysis

A face recognition system for a MySQL face database requires a deep understanding of computer vision, machine learning, and database management. The system integrates algorithms for face detection, feature extraction, and recognition, considering efficiency, accuracy, and scalability. It addresses challenges like lighting conditions, pose, and facial expressions, ensuring robust performance across diverse environments. A well-structured MySQL database schema is used for storage and retrieval of facial data, facilitating seamless integration with the system architecture. The system includes database connectivity, image preprocessing, and user interface design, ensuring accurate identification while adhering to ethical principles and data privacy regulations.

Furthermore, the background design of such a system involves a comprehensive review of existing literature and methodologies in the field of facial recognition, surveying recent advancements in algorithm development, database management techniques, and ethical considerations to inform the research framework and design decisions. Additionally, considerations for the deployment environment, including hardware constraints, network connectivity, and user requirements, guide the system architecture design and implementation strategy, ensuring compatibility and usability across different platforms and devices. Ethical considerations, including data privacy, consent, and potential biases in face recognition algorithms, are integrated into the design process, reflecting a commitment to responsible innovation and the protection of individual rights. Through a comprehensive background design approach, the facial recognition system is poised to address practical challenges, leverage technological advancements, and uphold ethical principles in its implementation.

1.2 Current status of development in domestic and abroad

In Indonesia, the design and implementation of face recognition systems has made significant progress in various sectors, driven by technological innovations, government initiatives and private sector investments. Government agencies, including law enforcement and transportation authorities, are increasingly implementing facial recognition technology to strengthen security measures and improve operational efficiency. Smart urban projects in major urban centers such as Jakarta and Surabaya are using facial recognition for traffic management, public safety monitoring and intelligent payment solutions, contributing to the development of more connected and efficient urban environments. Furthermore, the financial services industry adopts facial recognition for biometric authentication, enabling secure and seamless transactions through ATMs, mobile banking applications, and digital payment platforms. Medical providers are also adopting facial recognition systems to simplify patient identification processes, improve the management of medical records and facilitate telemedicine services, especially in remote and disadvantaged areas. Despite these advances, efforts to ensure data privacy and regulatory compliance remain crucial, and there are ongoing initiatives to establish clear guidelines and safeguards for the responsible use of facial recognition technology in Indonesia.

Internationally, the design and implementation of face recognition systems is at the forefront of technological innovation and has made many progress in different regions and industries. In countries such as the United States, China and Europe, the focus is increasingly on leveraging deep learning techniques and neural network architectures to improve the accuracy and effectiveness of facial recognition algorithms. Government agencies and law enforcement agencies are increasingly adopting facial recognition technology for surveillance, border control and public safety applications, raising concerns about privacy and civil liberties. In the commercial sector, from retail, health care, finance, entertainment, and other industries, they integrate facial recognition systems into their operations to improve customer experience, improve safety measures, and personalize services. Collaborative efforts

between researchers, industry stakeholders and policy makers are underway to address technical challenges, mitigate biases and establish ethical guidelines for responsible development and deployment of facial recognition systems globally.

1.3 Main content of the research project

This research project focuses on the design and implementation of a face recognition system using OpenCV, database and tkinter. The project also involved dataset acquisition, preprocessing, and management to ensure high-quality data for training and testing. The implementation aspect included the development of a robust software infrastructure, including database integration, system architecture design, and user interface development. Ethical considerations, such as privacy protection, fairness, and social impact, were also integrated into the research framework. The project involved designing a simple face recognition system capable of recognising faces in a MySQL face database, creating and managing the database, developing software modules for image preprocessing, and evaluating the performance of the system in terms of accuracy, speed, and scalability.

Research on face recognition concludes that face detection is the first step for face identification or face recognition which aims to obtain better and higher accuracy for localization and normalization of facial images because face detection provides the location and scale limits of each face image that can be detected. Referring to research that has been carried out previously, the first step in face recognition is to take a face image and then carry out feature extraction or facial image identification. After the facial image is detected, we can process and store the facial image in a database which we will later program.