Eurasian National University named after L.N. Gumilyov
Faculty of «Information Technologies»
Department of «Information Systems»
To subject computer graphics and pattern recognition

INTEGRATED FACE RECOGNITION AND ANTI-SPOOFING SYSTEM FOR REAL-TIME AUTHENTICATION

IN CASE OF VIRTUAL SYSTEM

Done by: Yerassyl Iskakov
Supervisor: Prof. Zhukabayeva T.K.

INTRODUCTION

1

Traditional checking systems whether manual are often time-consuming, prone to errors, and vulnerable to fraud..

2

Face recognition offers a contactless and automated solution, but it is still susceptible to spoofing attacks using photos, videos,.

3

This project introduces a real-time face recognition system integrated with anti-spoofing mechanisms to ensure that only live, genuine users can mark their presence in virtual environment.

4

By combining deep learning-based face detection with liveness detection techniques, we aim to build a secure, efficient, and accurate system tailored for educational and organizational environment

BENEFITS

Automation. Marks people within seconds no manual effort.

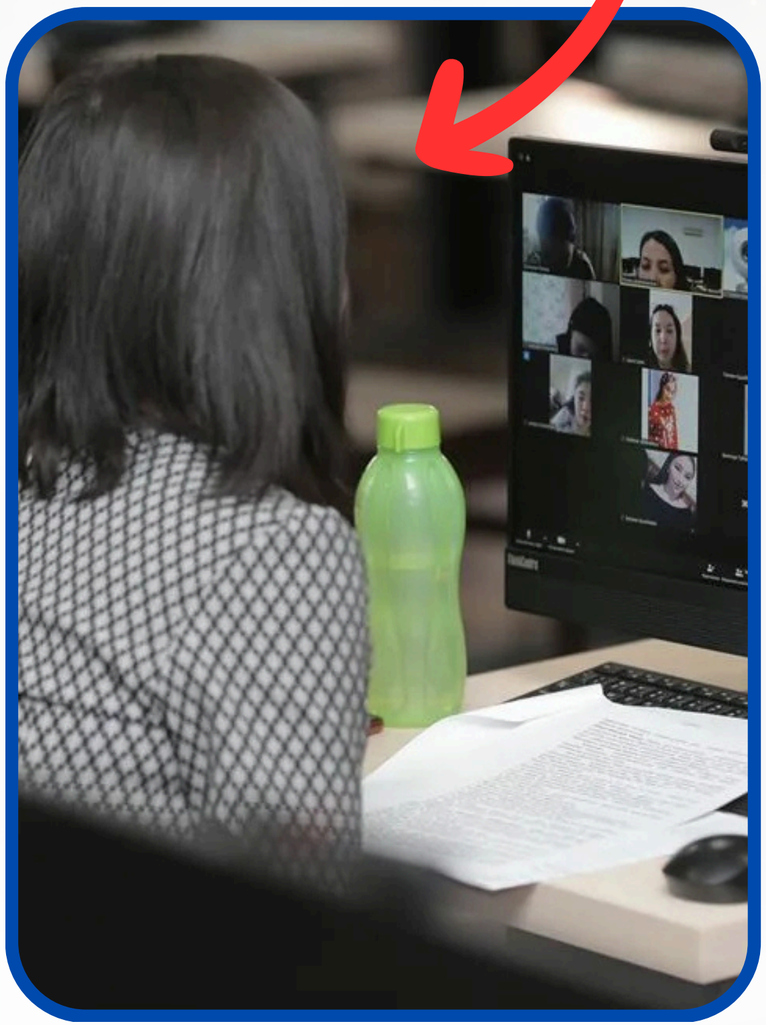
Security. Reduces proxy attendance through biometric verification.

Covid-19 case. Hygienic and ideal for post-pandemic settings.

Accurate Records. Eliminates human error in tracking.

Real-Time Monitoring. Instantly reflects status on centralized systems.

Our focus task



Online class usage
(teams, zoom, meet)

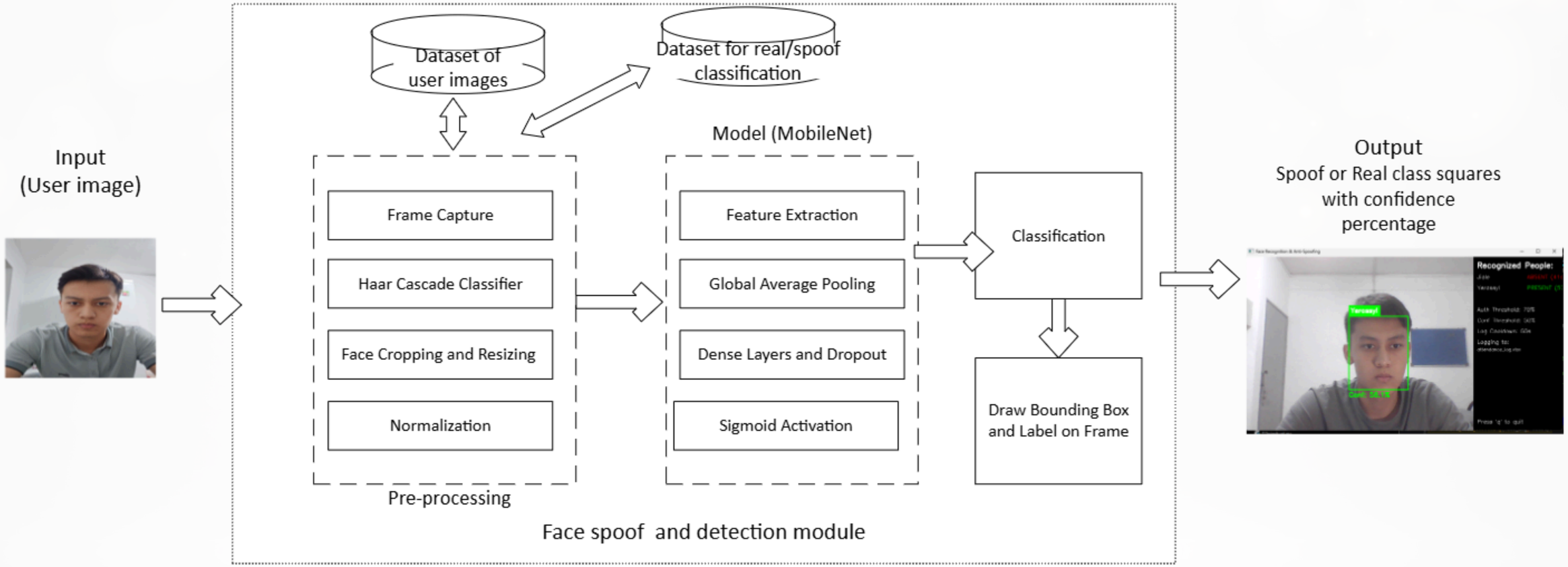
Traditional class usage

BRIEF THEORY

- Face Detection
- Face Recognition
- Anti-Spoofing
- Face Embedding
- MTCNN (Multi-task Cascaded Convolutional Networks)
- MobileNet
- SVC (Support Vector Classifier)

Term	Description
Face Detection	Identifying and locating faces in an image or video frame.
Face Recognition	Determining who the detected face belongs to, by comparing to known faces.

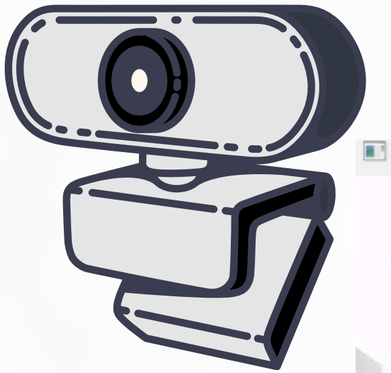
METHODOLOGY

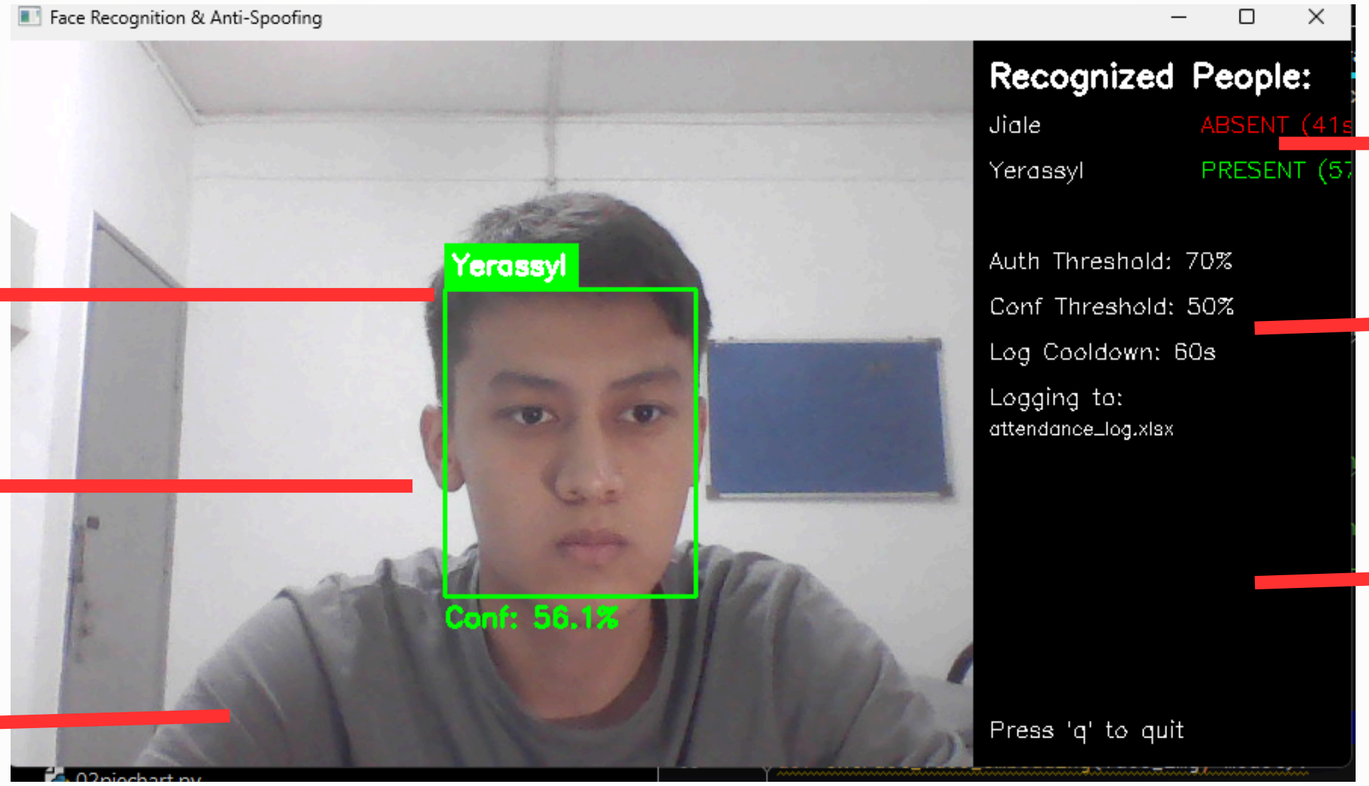


Used MTCNN to detect faces from live camera frames and photos.

Anti-Spoofing Model was built using MobileNet with data augmentation.

OVERVIEW OF THE SYSTEM DESIGN





Face Detection

Anti-Spoofing Model

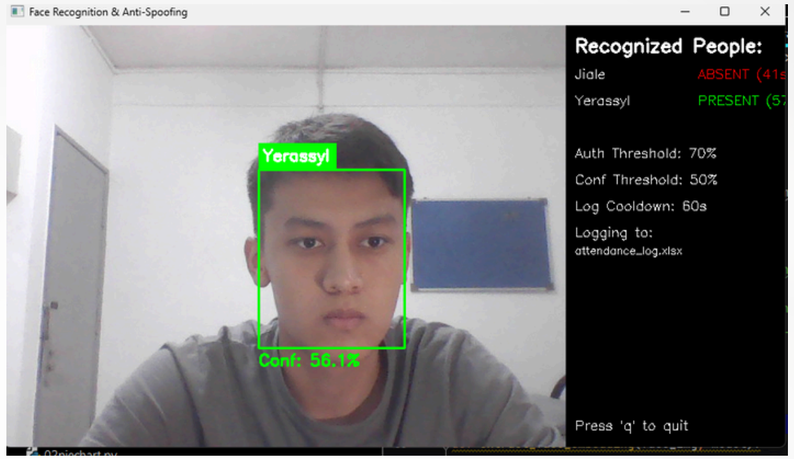
Real-Time Recognition

Face Recognition

Persantage of each function

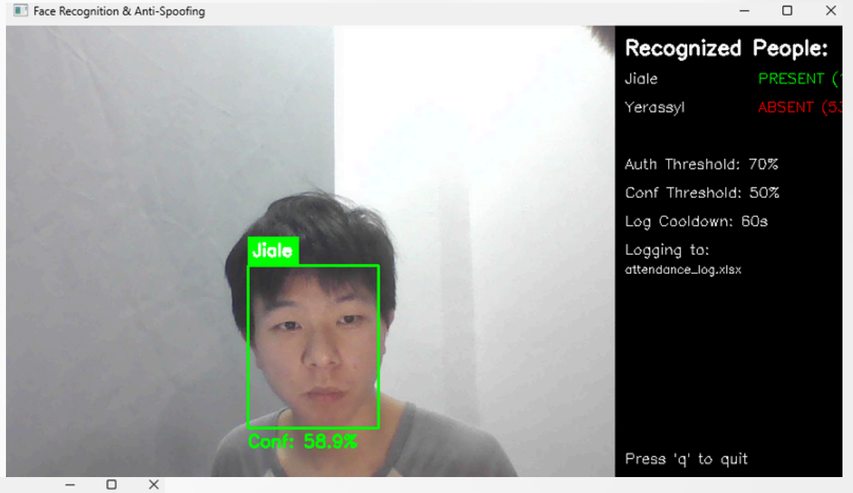
UI information desk

CHALLENGES AND LIMITATIONS

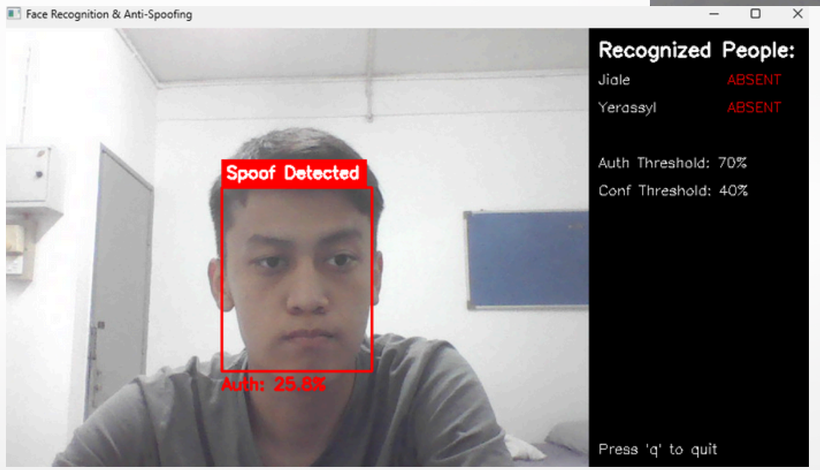


The model is trained on a relatively small dataset

Facial expressions (e.g., smiling,) reduce cosine similarity accuracy.



Overfitting issue.



Performance drops in poor or inconsistent lighting

CONCLUSION

Ensuring the authenticity of participants is important in the context of online attendance systems in order to prevent identity fraud. This project presents an integrated real-time face recognition and anti-spoofing system designed to enhance authentication accuracy in virtual environments. The system leverages deep learning techniques to perform both identity verification through face recognition and liveness detection to differentiate between real and spoofed faces. By combining these capabilities, the proposed solution offers a secure, efficient, and scalable method for real-time attendance verification, significantly reducing the risk of spoofing attacks and unauthorized access.

THANK YOU