# FACIAL RECOGNITION WEB - BASED APPLICATION FOR ACCESS CONTROL IN EDUCATIONAL INSTITUTIONS

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## Problem Statement

- The demand for automated security systems employing facial recognition in educational institutions has emerged due to the challenges posed by traditional access control methods.
- The project was developed due to challenges faced by traditional access control methods in educational institutions. These methods, like using physical ID cards, had limitations such as human error in visual inspections and the possibility of unauthorized access through forged ID cards. Manual checks also caused delays, especially during busy times.

## General Objective

- The main objective is to develop a Light CNN-based facial recognition system to improve security and access control in schools.

## Motivation

- The need to overcome vulnerabilities in traditional methods
- Addressing delays and inconveniences caused by manual checks
- The advancing landscape of security and privacy measures

## Justification of Research questions

- Human Error and Unauthorized Access
- Efficiency and Timeliness: minimizing delays
- Adapting to security policies by easily updating access privileges
- Biometric Authentication: lies in the advantages of facial recognition—uniqueness and elimination of physical keys.

# LFW Dataset

- The Labeled Faces in the Wild was obtained from Kaggle.
- The dataset contains 13, 000 images. 80% of the data is used for training and 20% for testing, giving 80-20 split.
- Only those individuals who have at least 70 images in the dataset are included to ensure dataset robustness and reliable representation. This is because they have a substantial number of images, contributing to a more comprehensive understanding of facial features and variations.

# LFW Dataset

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```
  Attempting uninstall: scikit-learn
    Found existing installation: scikit-learn 1.2.2
    Uninstalling scikit-learn-1.2.2:
      Successfully uninstalled scikit-learn-1.2.2
Successfully installed scikit-learn-1.3.2
```

```
[2] from sklearn.datasets import fetch_lfw_people
```

```
[3] lfw_dataset = fetch_lfw_people()
```

```
[4] data, target = lfw_dataset.data, lfw_dataset.target
```

```
[5] num_images = data.shape[0]
```

```
print(f"Number of images in the LFW dataset: {num_images}")
```

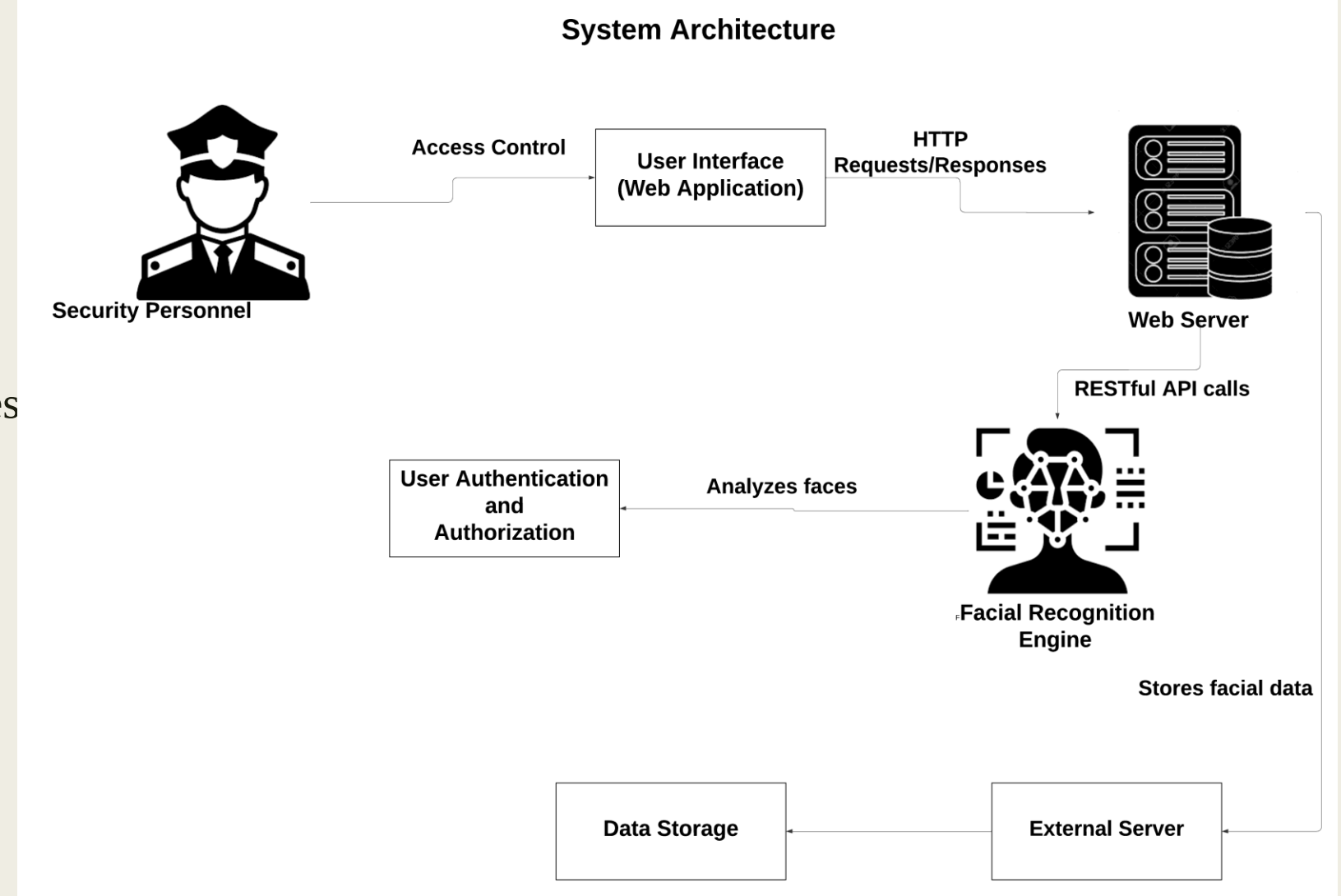
```
Number of images in the LFW dataset: 13233
```

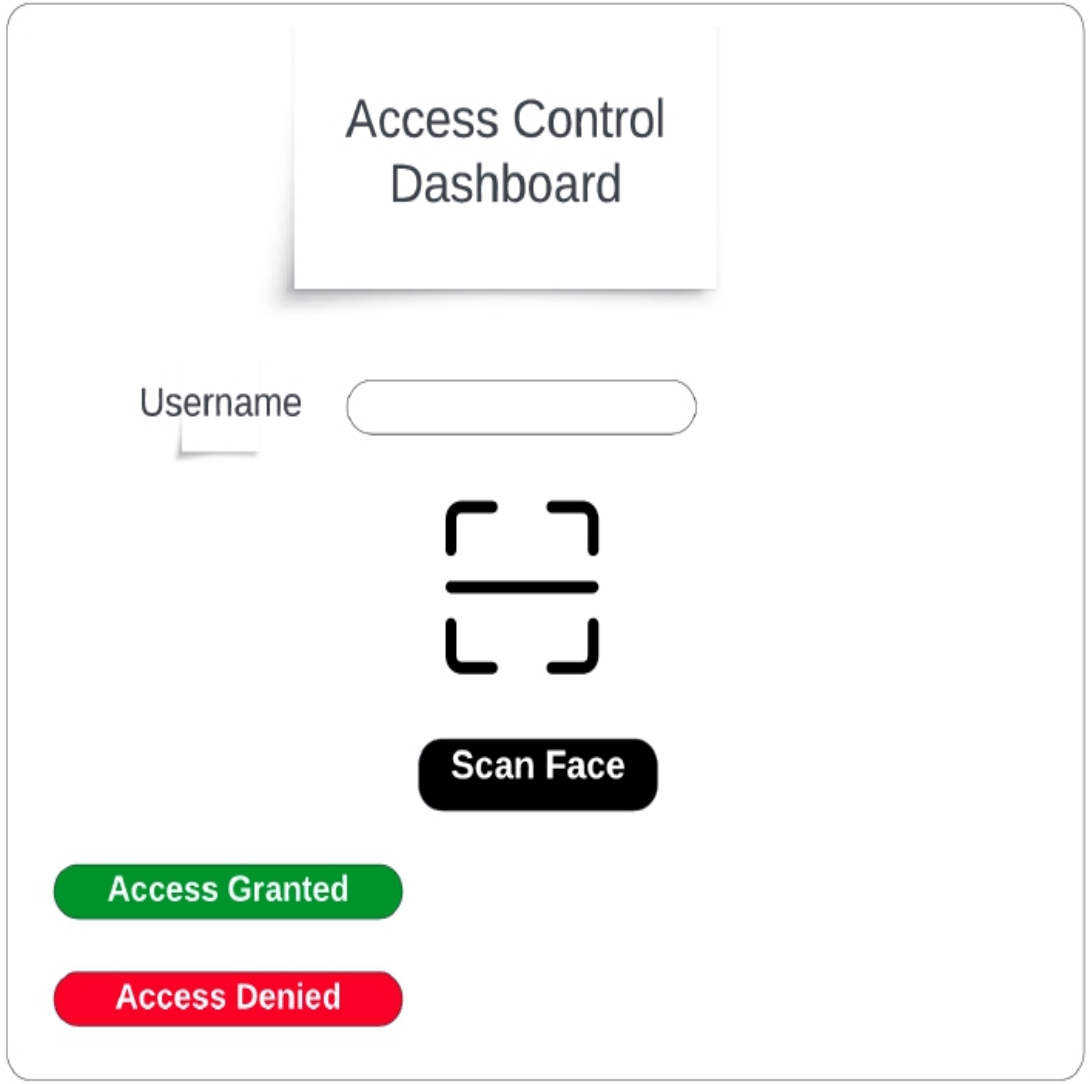
## Training Dataset

- A light CNN trained on LFW data with "adam" optimizer and "sparse_categorical_crossentropy" loss achieved 86.43% test accuracy in 10 epochs. After 100 epochs, the accuracy improved to 90.31%, demonstrating notable training advancements.
- The following model training enhances face recognition with data augmentation, batch normalization, dropout. Achieving 95.35% accuracy, it outperforms the first model (90.31%).

## System Architecture

- The architecture includes a web application, web server, database, user authentication, facial recognition engine, data storage.




Access Control Dashboard
Username
Scan Face
Access Granted
Access Denied

# THANK YOU