



Team Name :- The BackBenchers

Team Leader Name : Ankit Agarwal

Problem Statement : Manual attendance is slow, error-prone, and impractical for large classes



Team Members

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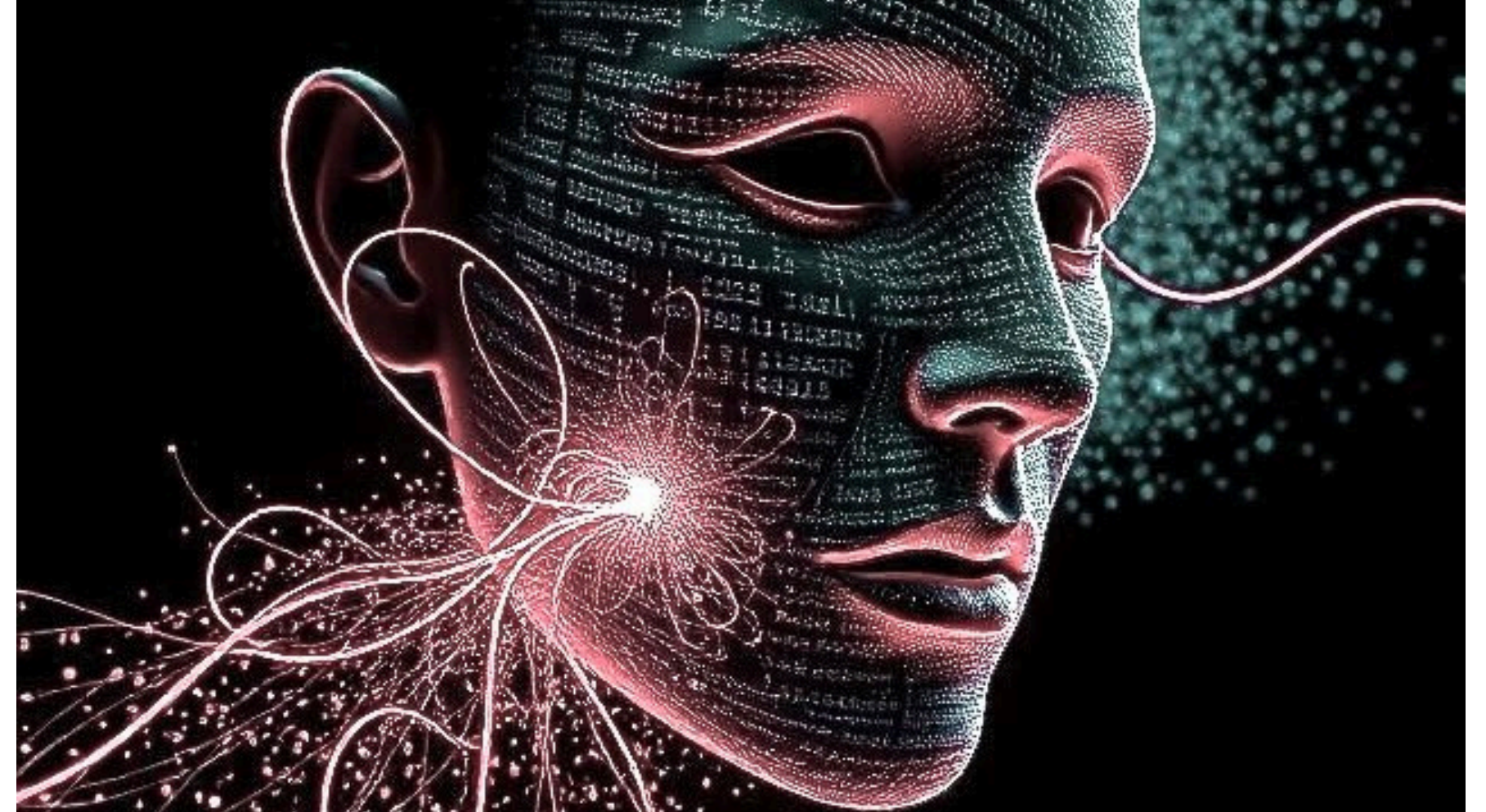
Name: SarwangSinha

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PRESENCE CAM

Problem

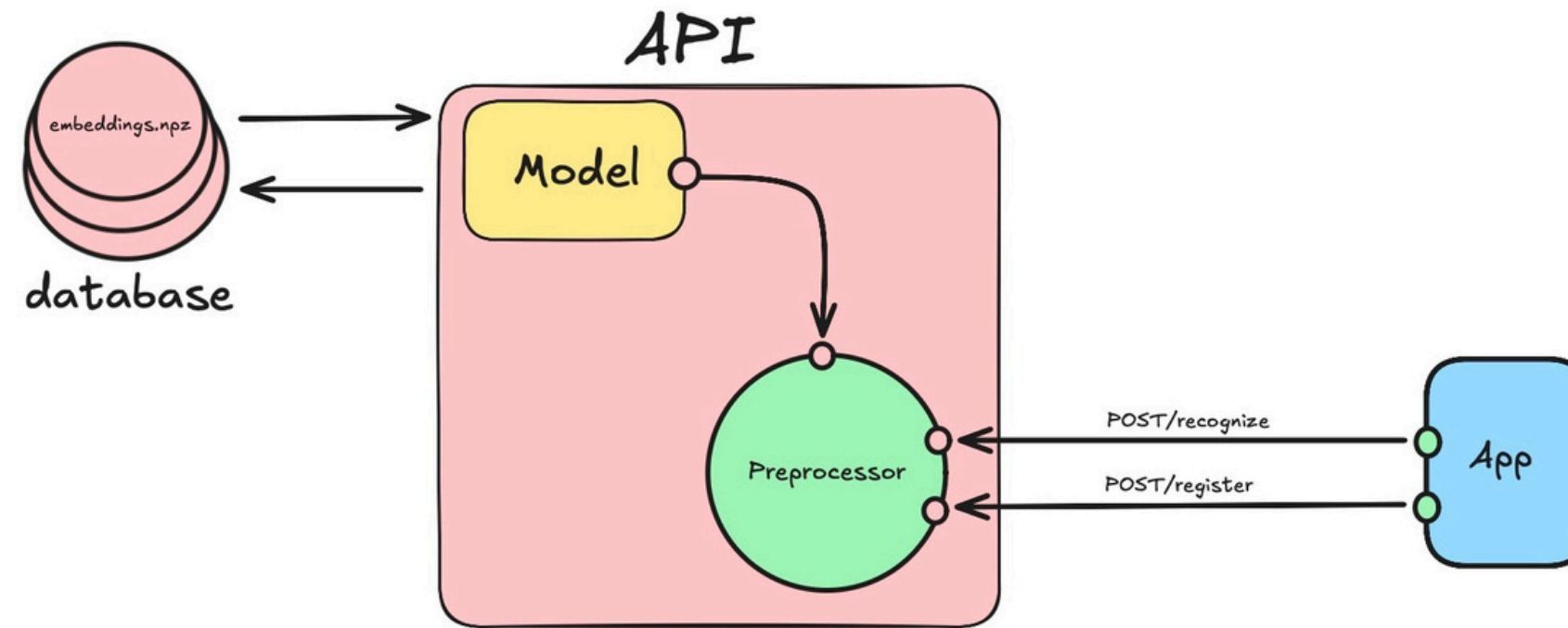
Manual attendance is **time-consuming** and often **disrupts the flow of teaching**. It also allows **proxy attendance**, which makes the process **unreliable**. In **large classes**, managing students becomes difficult and sometimes even causes **physical strain** for professors. Already **available solutions** are either **infeasible** or **hard to implement**.





Solution

Our solution is a **smart attendance app** where professors simply **capture a photo of the class** with students facing the camera. The app uses **AI-based face recognition** to instantly identify **students** and display their **Identities**, ensuring **quick, accurate, and effortless attendance**.



Project Architecture

The proposed system works through an **API-based model**. The App communicates with the API by sending requests such as **POST/register** (to add new students) and **POST/recognize** (to identify students). Inside the API, a Preprocessor handles the incoming data and passes it to the Model for face recognition. The system uses a database (embeddings.npz) to store and retrieve student face embeddings, ensuring accurate and efficient identification.

This setup allows the app to instantly recognize students and mark their attendance with **speed, accuracy, and automation**.

Model Architecture

The system is built on **InsightFace**, a state of the art face recognition framework.

During registration, each student's image is preprocessed using L2 normalization. The FaceAnalysis model (buffalo_l) then extracts **face embeddings** from the image, which are stored in the database as the student's unique identity signature.

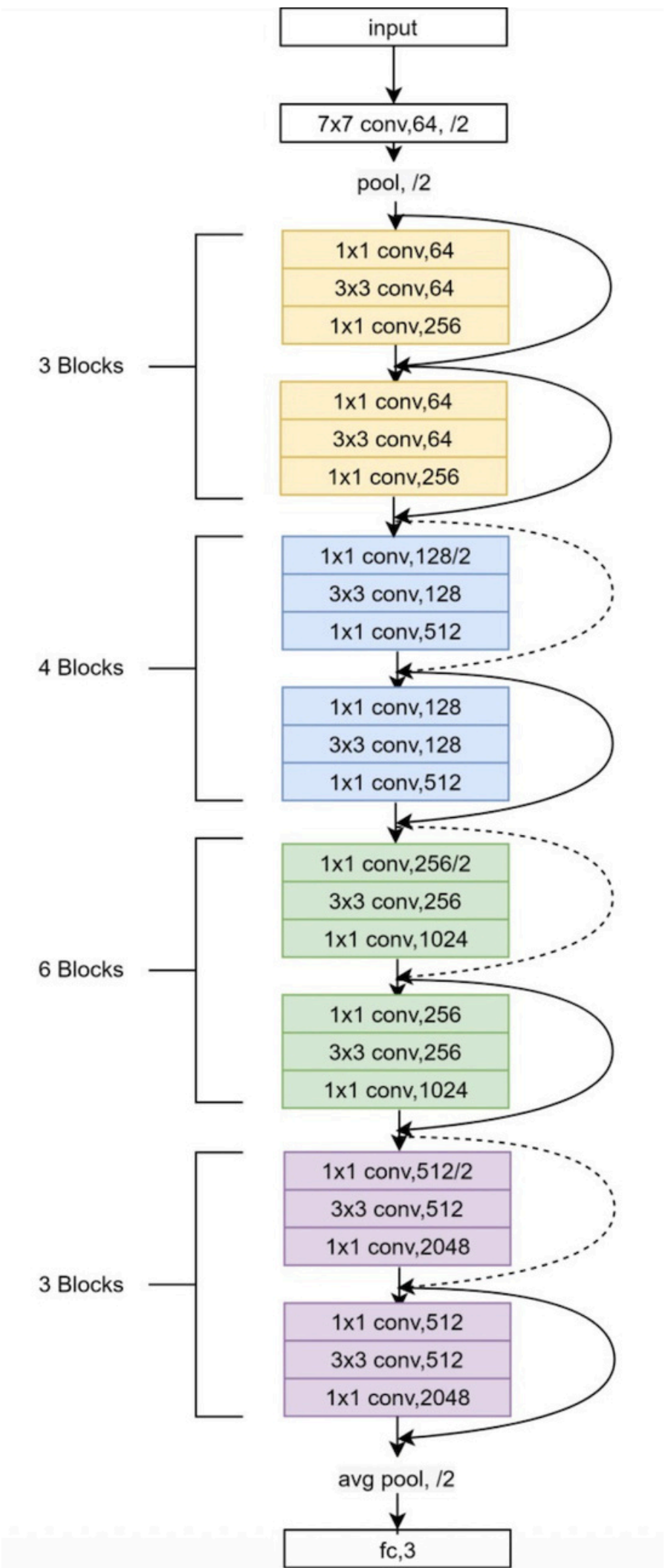
For recognition, incoming images go through the same preprocessing step. The model generates embeddings and compares them with the stored ones. Using **cosine similarity** with the **threshold**, the system ensures accurate recognition while minimising false matches.

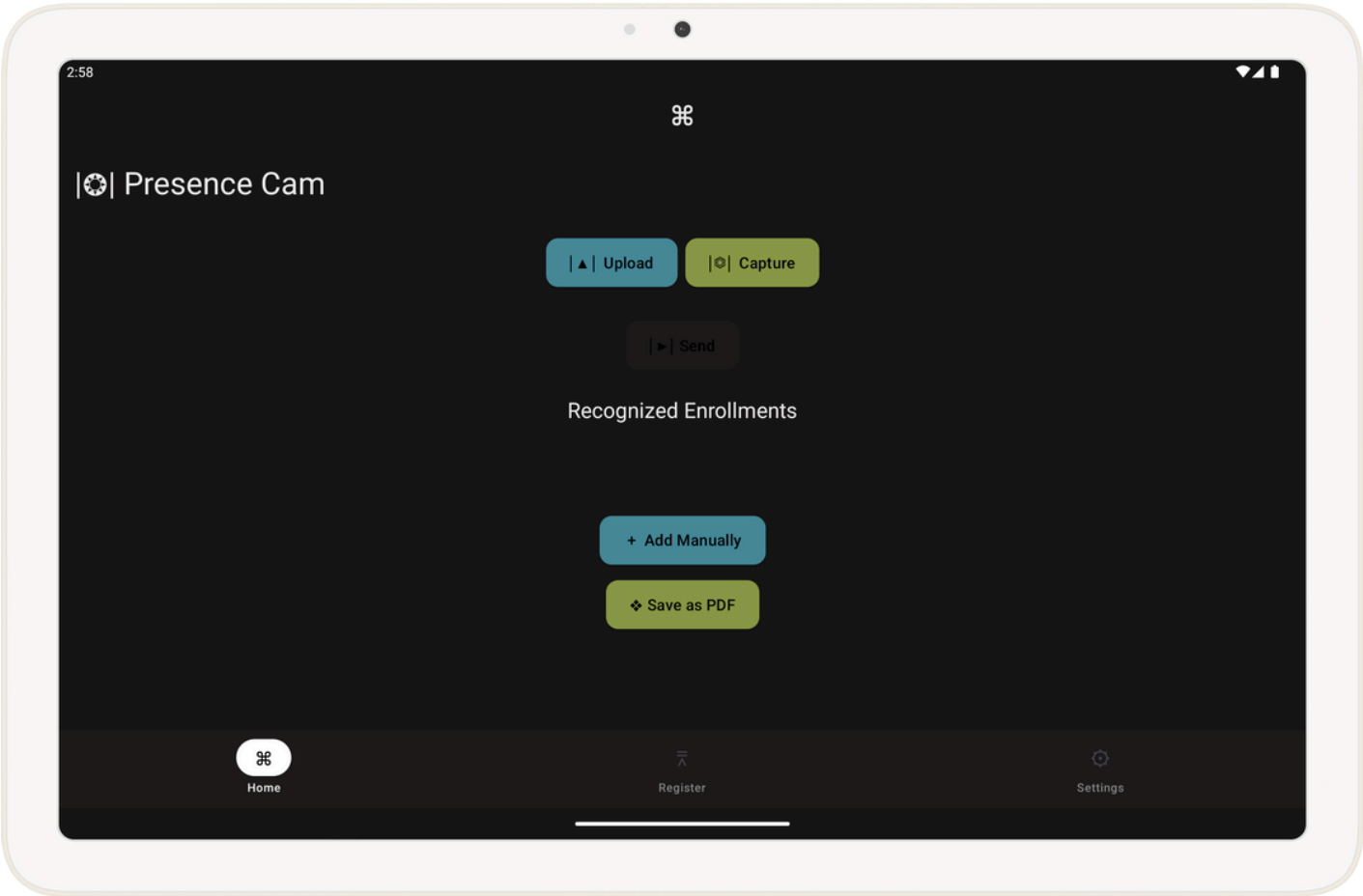
About InsightFace

At its core, InsightFace relies on **deep convolutional neural networks**, using **ResNet** backbones for robust feature extraction. It employs **ArcFace loss** (Additive Angular Margin Loss), which projects embeddings onto a hypersphere, enhancing the separation between different identities while keeping features of the same person compact.

Each face is represented as a **512 dimensional** embedding vector, capturing fine-grained identity details.

The chosen variant, buffalo_l, offers an optimal balance of accuracy and speed, making it well suited for real time attendance systems.



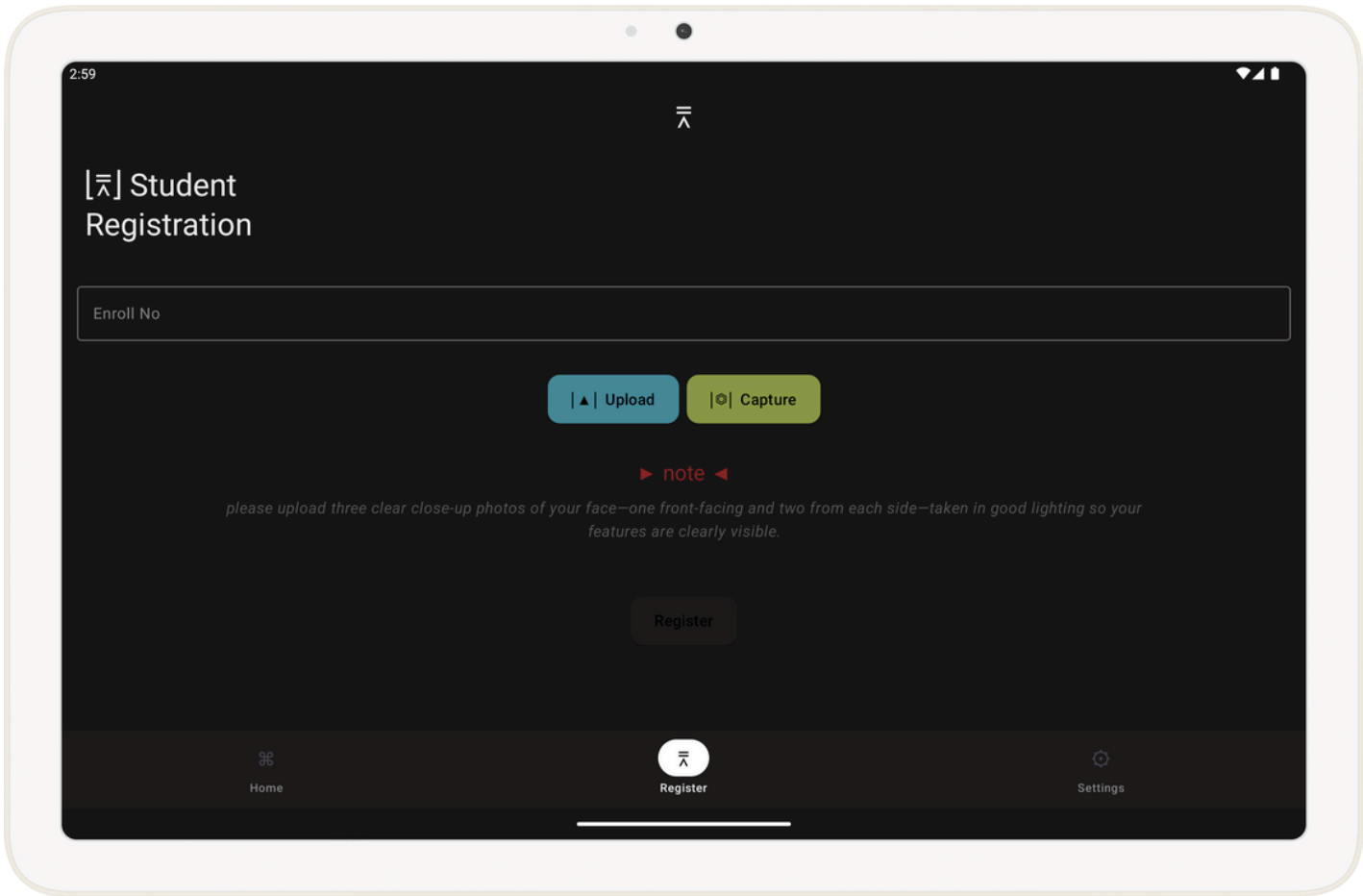


Registration Screen

The Registration screen allows students to be enrolled by entering their details and uploading or capturing face images. Simple instructions guide the process, ensuring fast and accurate registration.

Home Screen

The Home screen offers a clean, dark-themed layout where professors can upload or capture class images. Recognised students are displayed instantly, with quick options to add entries manually or export attendance as a PDF.



THANK YOU