بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِيْمِ

Real-time Deepfake Detection System for Video Streaming Platforms

Student Introduction

Project ID :F24PROJECT3AEBE

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Student ID: BC220422952

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Project Introduction

The increasing sophistication of deep-fake technology has brought about a critical challenge in maintaining authenticity and trust in digital video communication. With the surge in video-based platforms—be it live streaming, online meetings, or uploaded content—there arises an urgent need for systems that can distinguish between genuine and manipulated media in real time. This project aims to develop an intelligent, real-time web-based system that proactively detects deep-fake content across various video platforms, empowering users to verify the authenticity of visual media with confidence.

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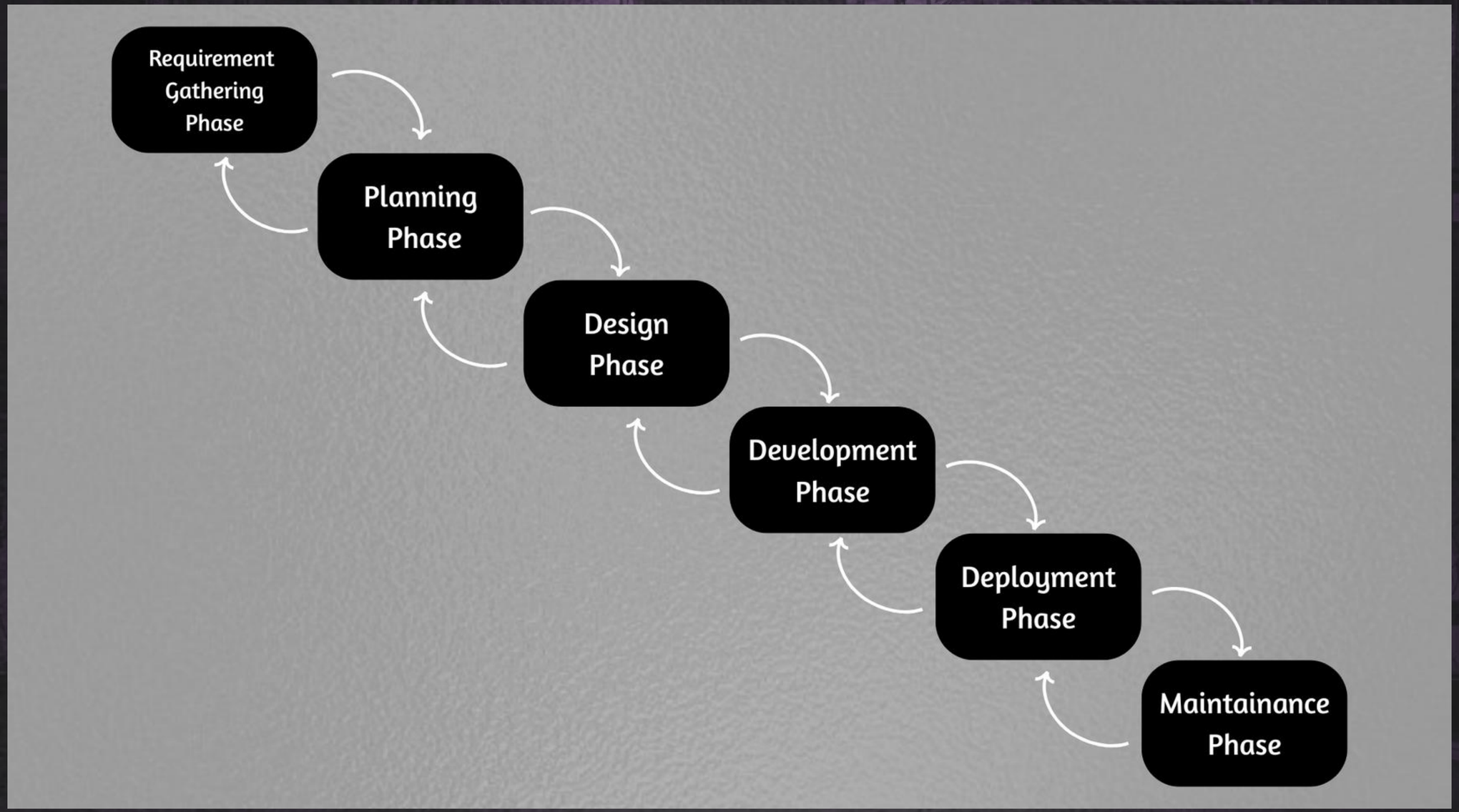
Process Diagram



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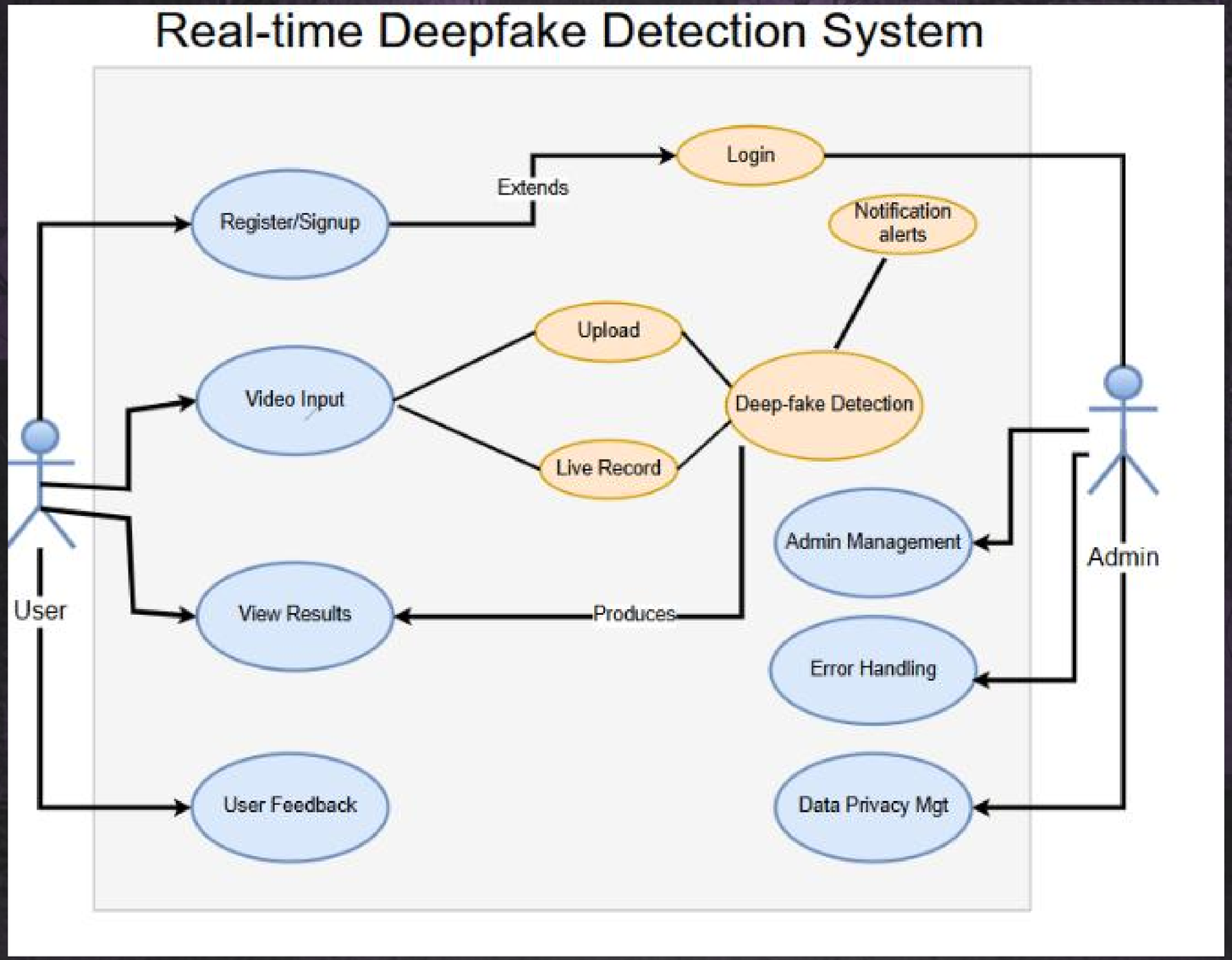
Use Case Diagram



Business Rules Catalog

1. *User Authentication and Authorization:*
   - Users will be able to create accounts by providing necessary information.
   - Authenticated users will be able to log in to the system using their credentials.
   - Users can recover passwords via password recovery mechanism
   - The system will implement role-based access control to restrict access to specific functionalities.
   - The system will enforce strong password policies.
   - Optional 2FA can be implemented for enhanced security.
2. *Video Input and Processing:*
   - The system will support integration with live streaming and video conferencing platforms.
   - The users can upload recorded videos in supported formats for analysis.
   - The system will validate video file formats and sizes to prevent malicious uploads.
   - The system will extract individual frames from input videos for analysis.
3. *Deepfake detection:*
   - The system will utilize advanced deep learning models to process frames in real-time.
   - The system will extract relevant features from video frames, such as facial landmarks,
   - eye-movements, lip syncing or motion patterns.
   - The system will classify the input video as either fake or real based on the extracted features.

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Business Rules Catalog

4. *Visualizations and Alerts:*
   - The system will also display the detected frames along with a confidence score for each classification.
   - The system, in real-time, will notify the users and administrators via alerts when a deep-fake content is detected.
   - For uploaded videos, the system will provide a detailed report with visualizations of detected deep-fake segments.
5. *User Feedback:*
   - Users can give feedback on the accuracy of the system's detection.
   - User feedback will be used to improve the performance of the system.
6. *Error Handling:*
   - The system will gracefully handle errors, such as invalid video input, model loading failures, processing delays and network issues.
   - The error messages will be informative and user-friendly.
7. *User Privacy and Data Handling:*
   - The system will process video data locally.
   - The system will ensure end-to-end encryption to maintain user privacy.
   - The system will obtain explicit user consent before processing and storing any video data.

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Architecture Diagram

Presentation Layer

- UI Components
- Authorization
- WebRTC Integration

Application Layer

- **Authorization**
- **Data Processing**
- **Deepfake Detection**

Data Layer

- **NoSQL Database**
- **Encryption**

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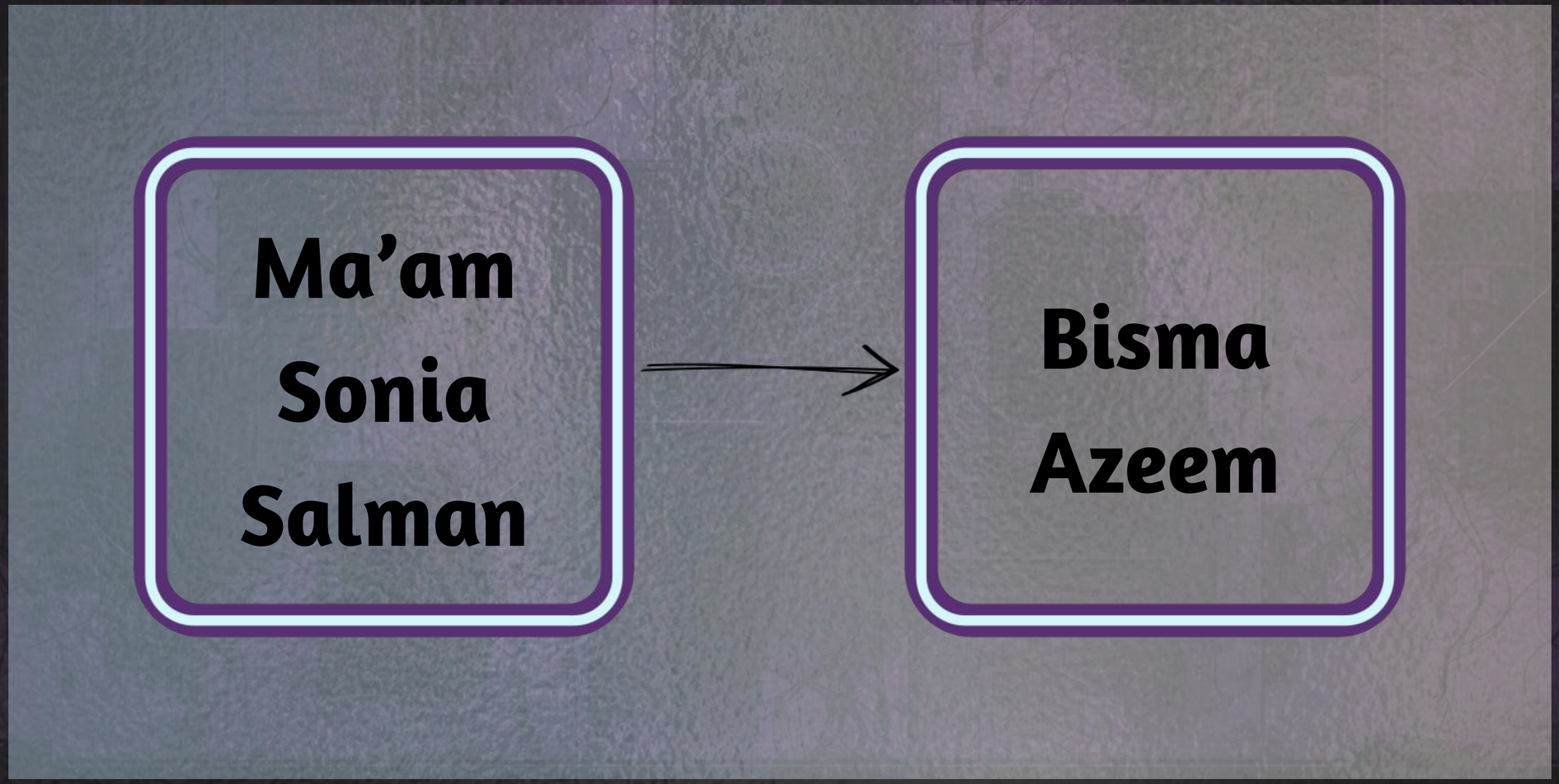
Team Structure



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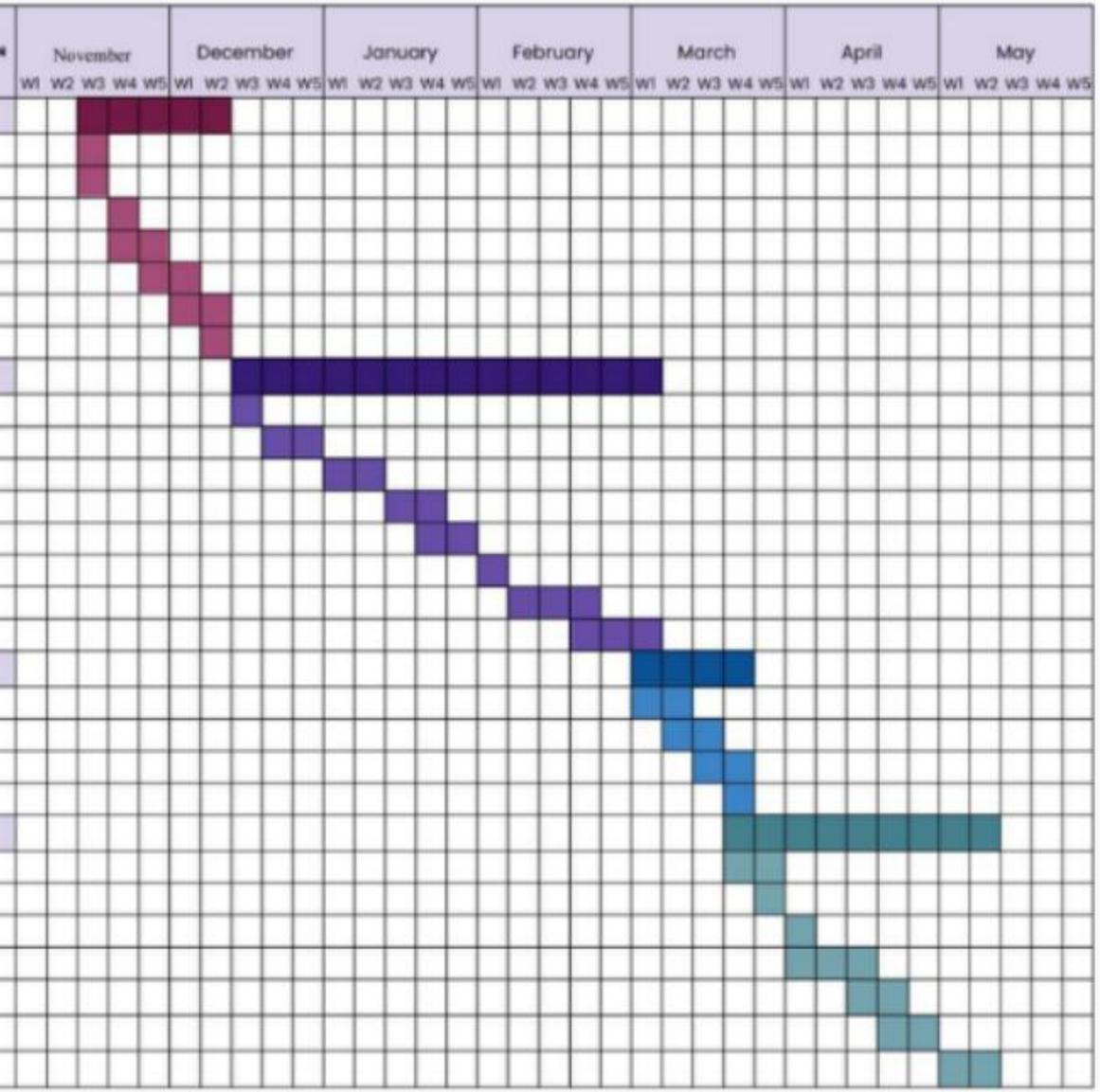
Project Schedule

WBS NUMBER	TASK TITLE	START DATE	DUE DATE	DURATION
1	**SRS Document**	**11/12/2024**	**12/8/2024**	26
1.1	Scope	11/12/2024	11/12/2024	0
1.2	Functional Requirements	11/13/2024	11/14/2024	1
1.3	Non Functional Requirements	11/15/2024	11/15/2024	0
1.4	Usecase Diagram	11/16/2024	11/18/2024	2
1.5	Usage Scenarios	11/19/2024	11/24/2024	5
1.6	Adopted Methodology	11/25/2024	11/30/2024	5
1.7	Work Plan	12/1/2024	12/3/2024	2
2	**Design Document**	**12/9/2024**	**3/3/2025**	84
2.1	Introduction	12/21/2024	12/24/2024	3
2.2	ERD	12/25/2024	12/31/2024	6
2.3	Sequence Diagram	1/1/2025	1/11/2025	10
2.4	Architecture Design Diagram	1/12/2025	1/22/2025	10
2.5	Class Diagram	1/23/2025	1/31/2025	8
2.6	Database Diagram	2/1/2025	2/6/2025	5
2.7	Interface Diagram	2/7/2025	2/19/2025	12
2.8	Test Cases	2/20/2025	2/28/2025	8
3	**Prototype**	**3/4/2025**	**3/17/2025**	13
3.1	Problem Statement	3/4/2025	3/5/2025	1
3.2	Design	3/6/2025	3/8/2025	2
3.3	Development	3/9/2025	3/15/2025	6
3.4	Final Prototype	3/16/2025	3/17/2025	1
4	**Final**	**3/18/2025**	**5/9/2025**	51
4.1	Model Design	3/18/2025	3/23/2025	5
4.2	Web App Layout	3/24/2025	3/27/2025	3
4.3	Web App Development	3/28/2025	3/31/2025	3
4.4	Coding	4/1/2025	4/15/2025	14
4.5	Testing	4/16/2025	4/23/2025	7
4.6	Final Development	4/24/2025	4/30/2025	6
4.7	Final Report	5/1/2025	5/9/2025	8



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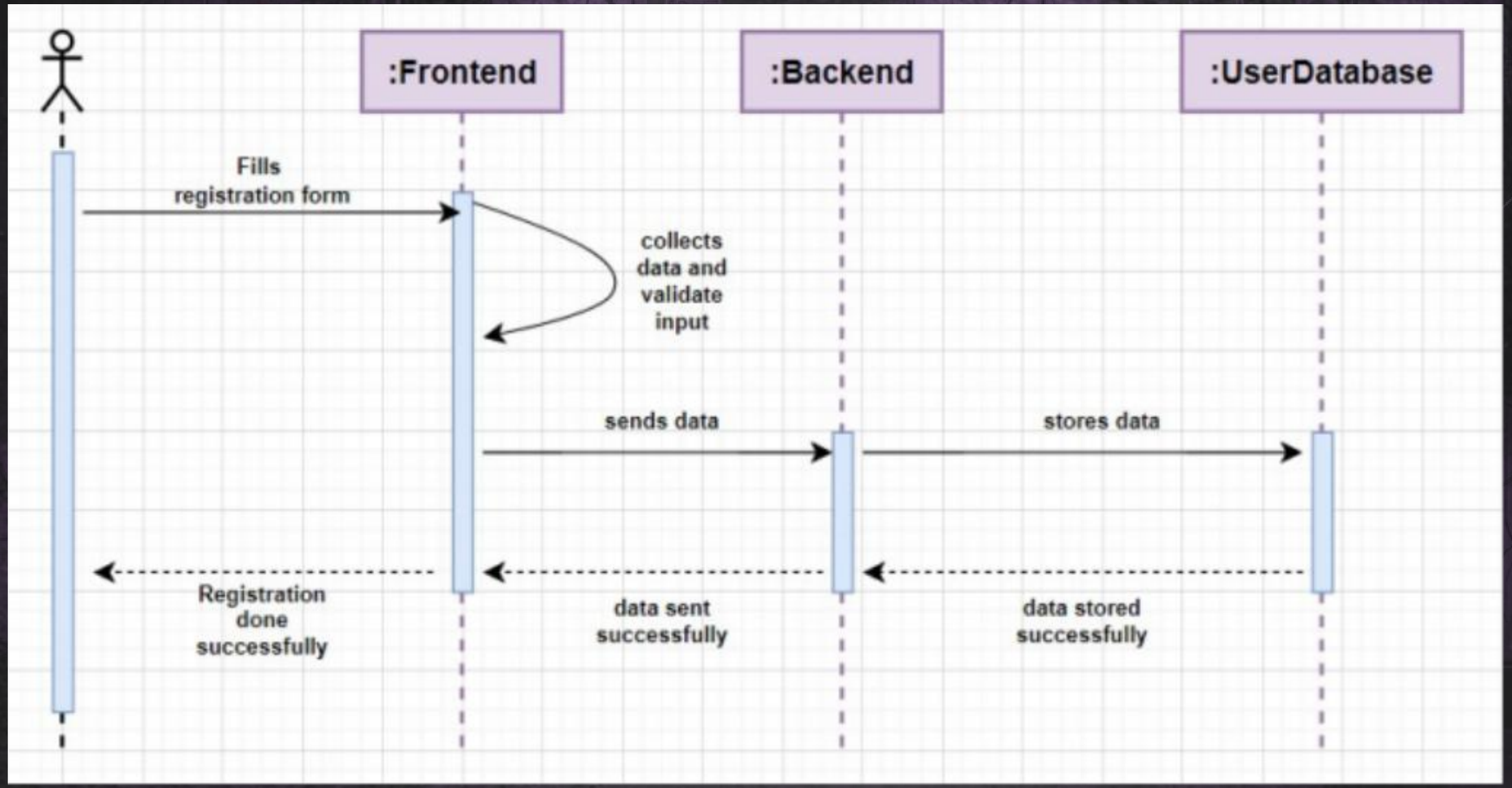
Sequence Diagrams

Register:



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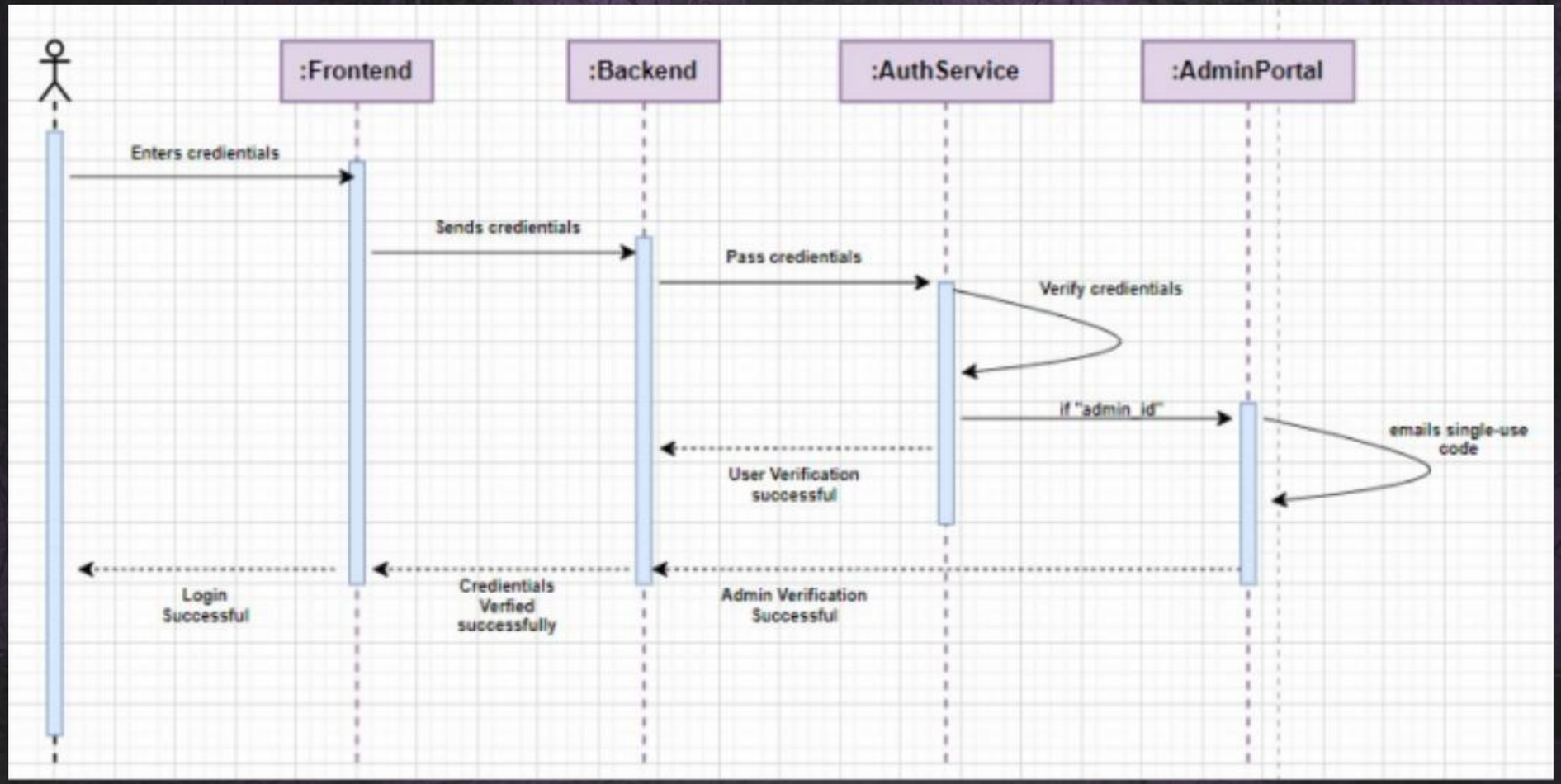
Sequence Diagrams

Login:



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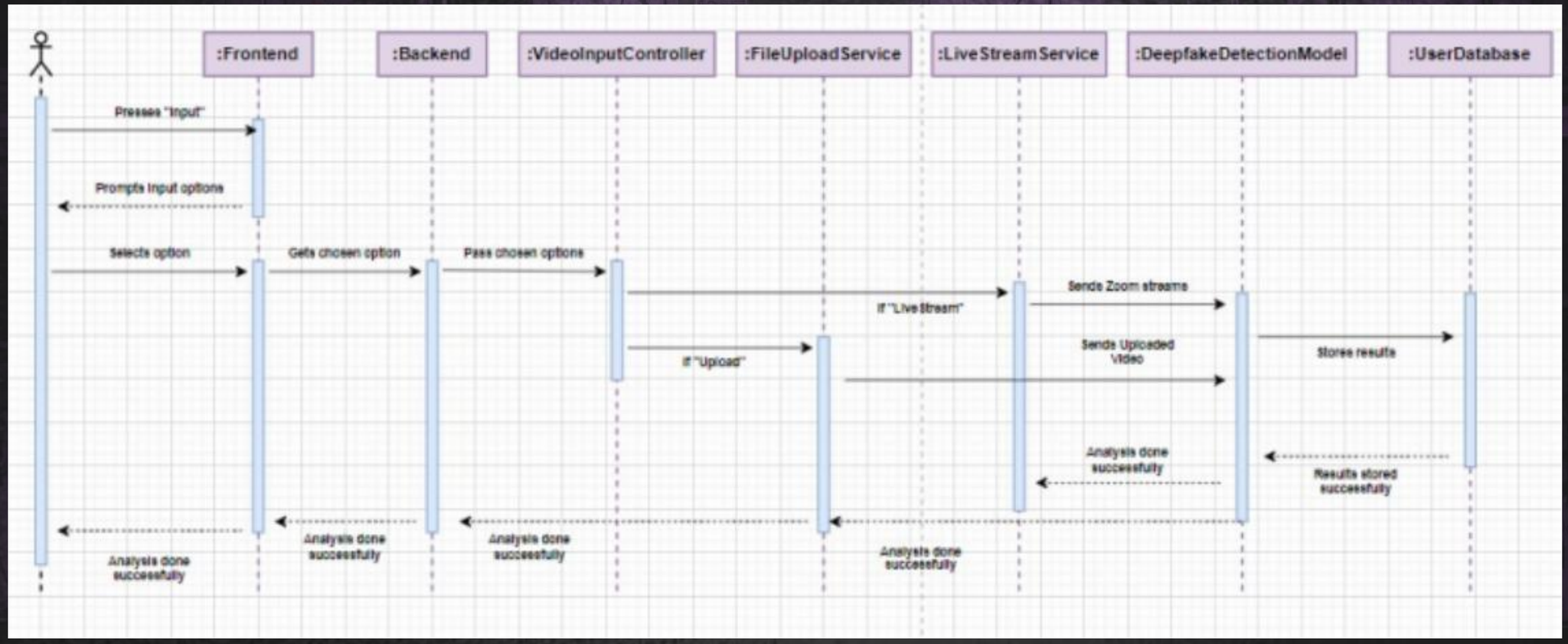
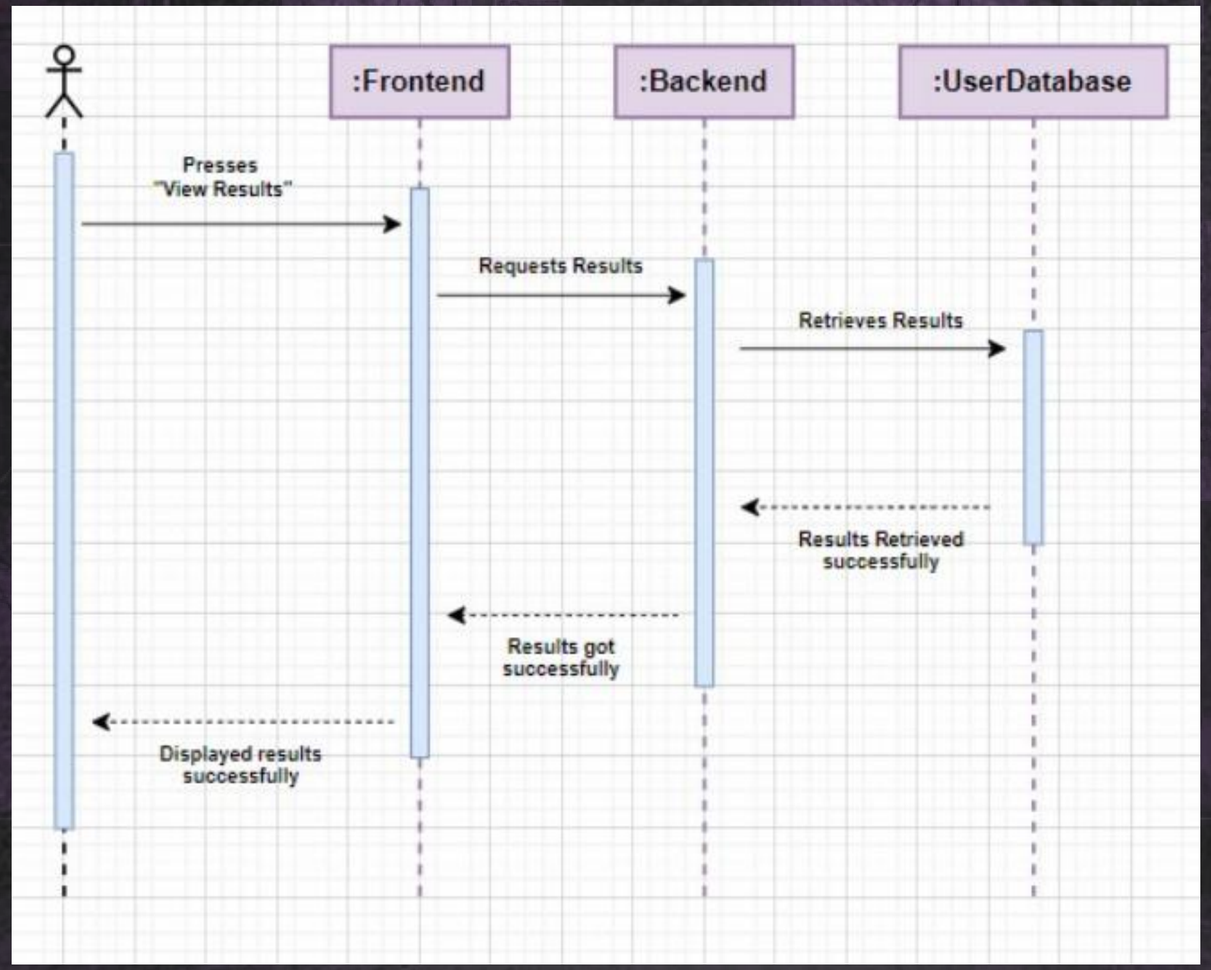
Sequence Diagrams

Video Input and Processing:



Sequence Diagrams

View Results:



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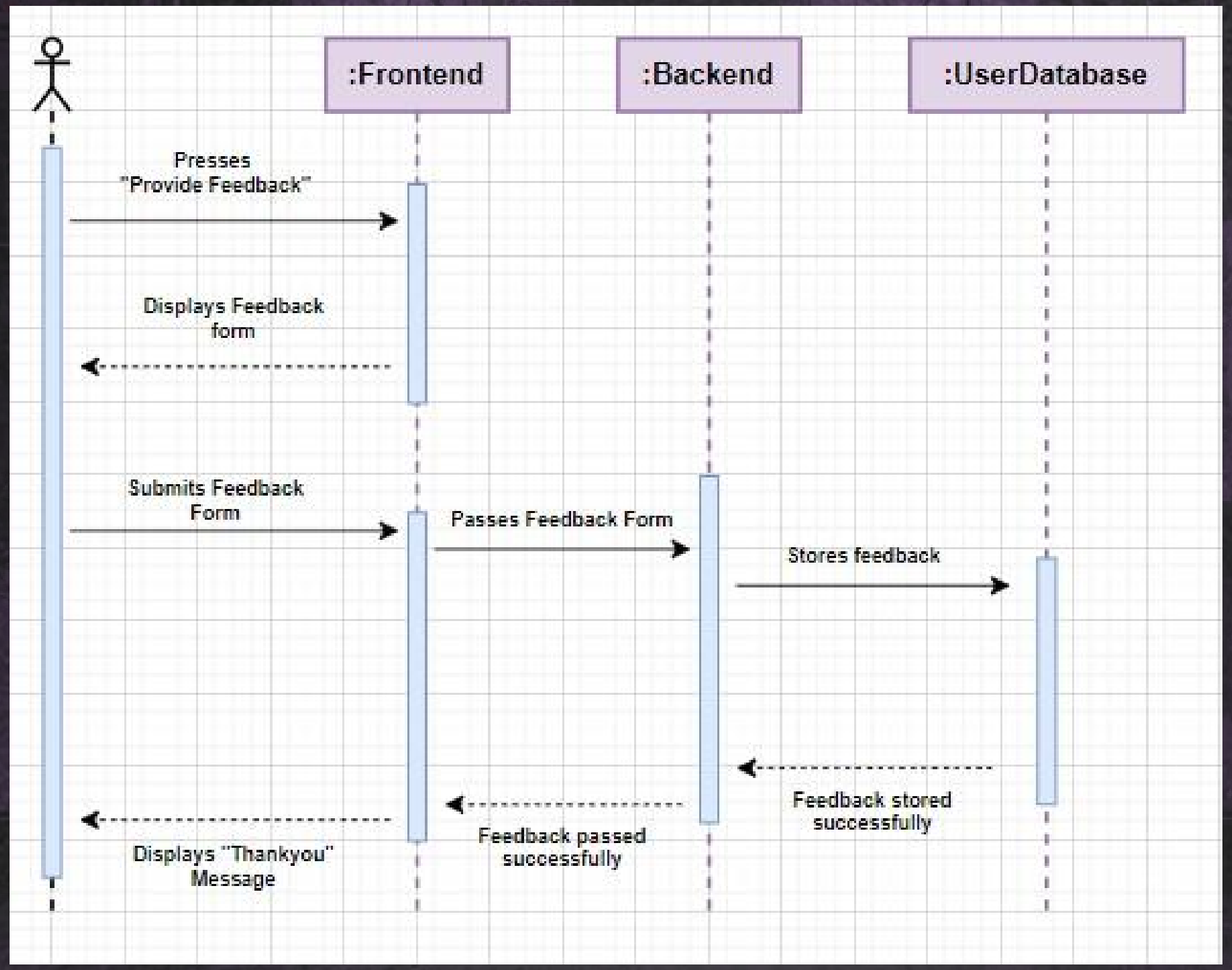
Sequence Diagrams

User Feedback:



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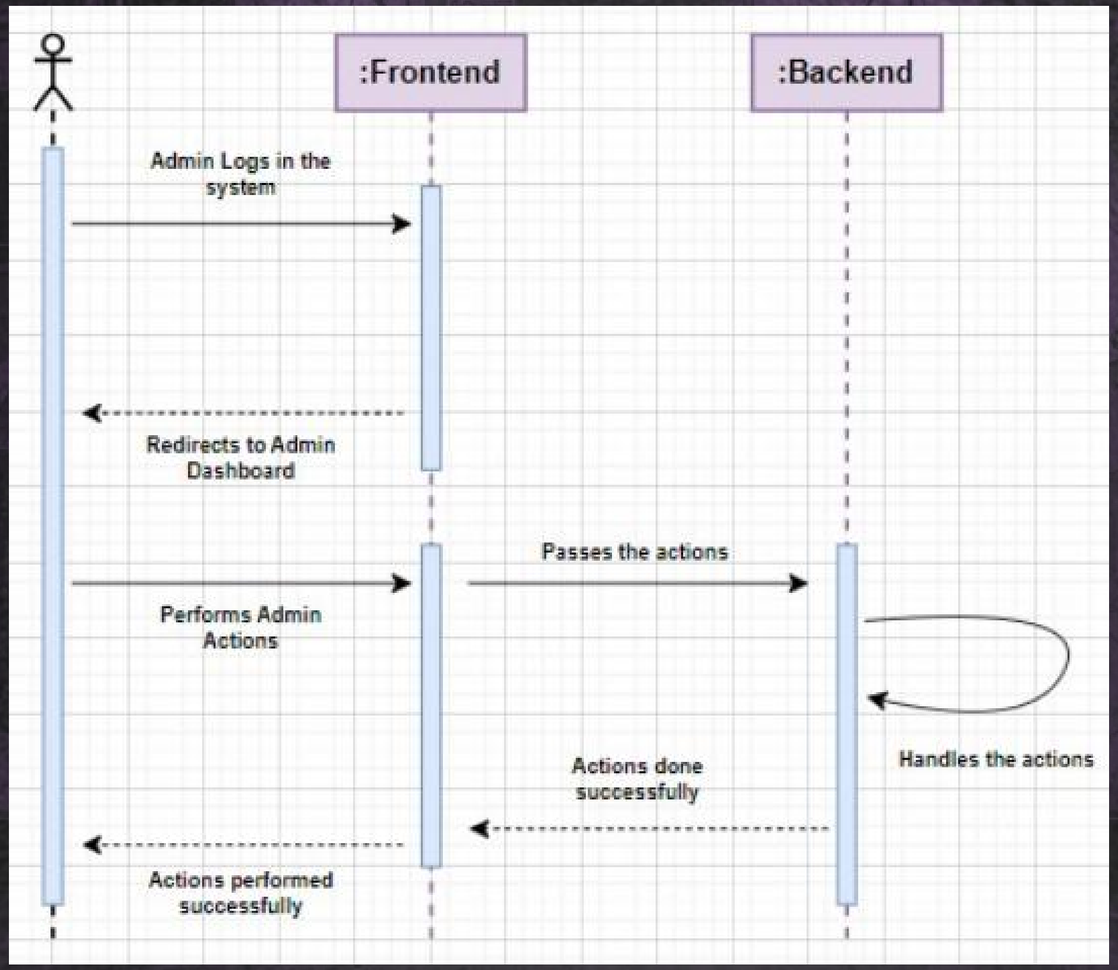
Sequence Diagrams

Admin Management:



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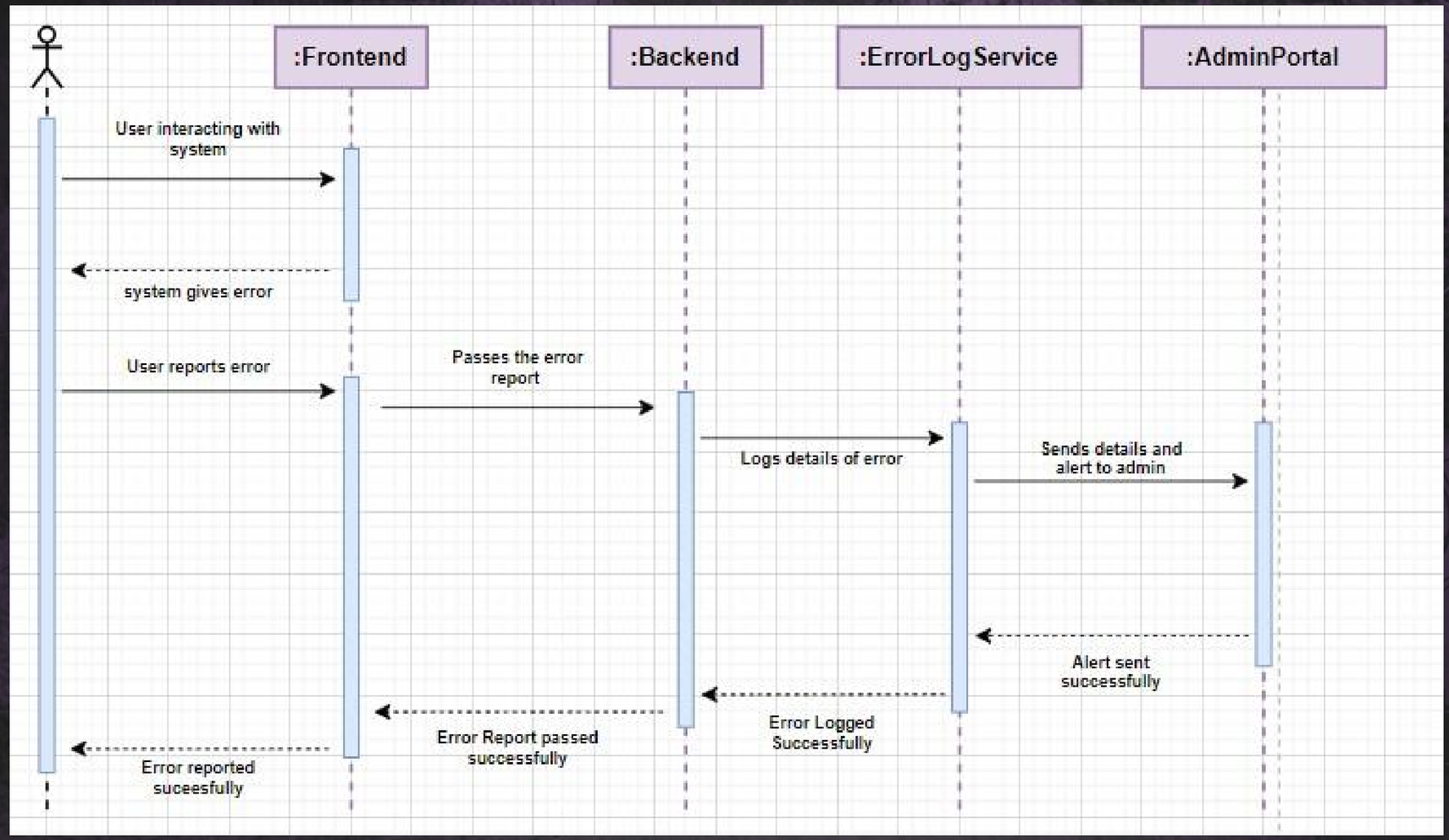
Sequence Diagrams

Error Handling:



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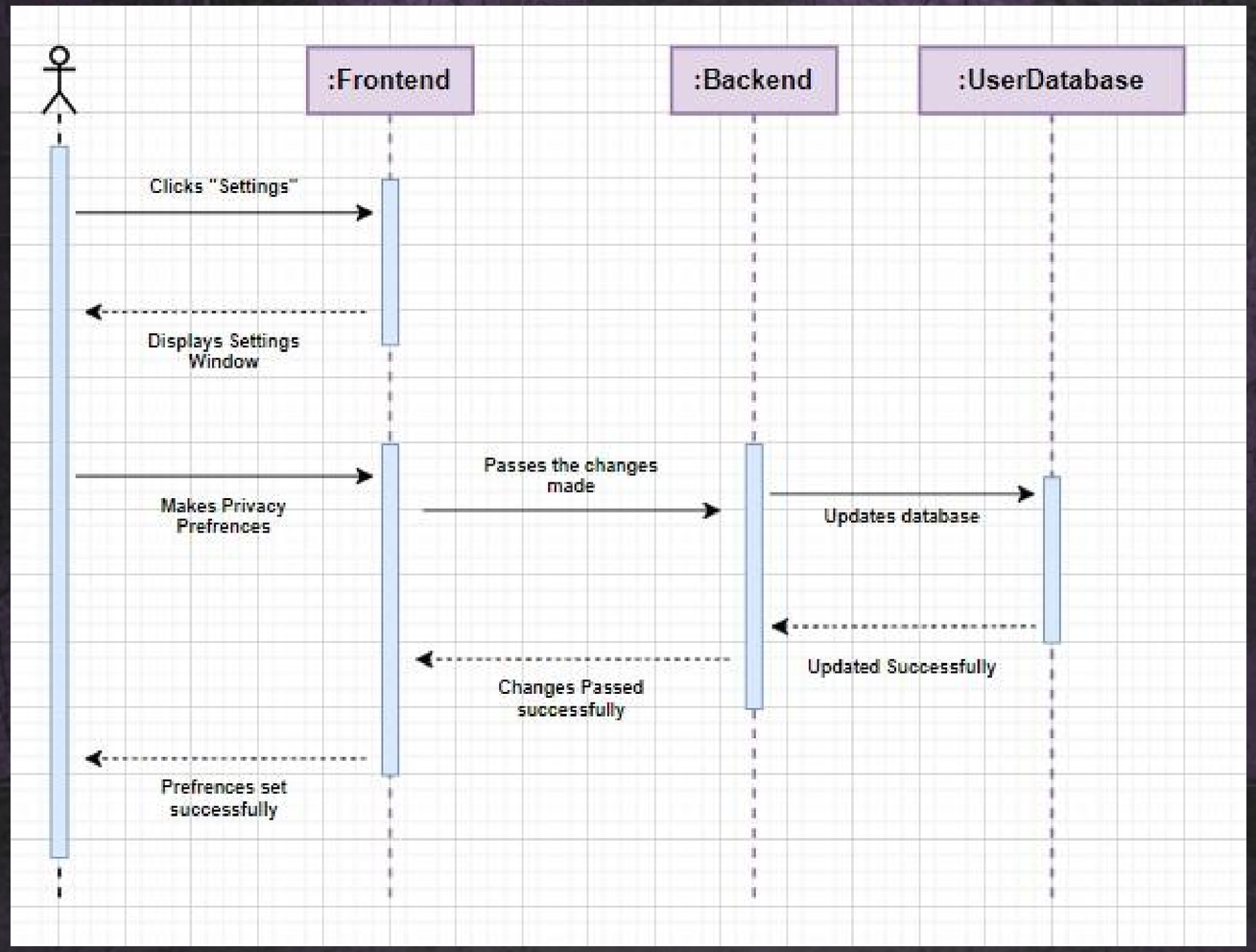
Sequence Diagrams

Data Privacy Management:



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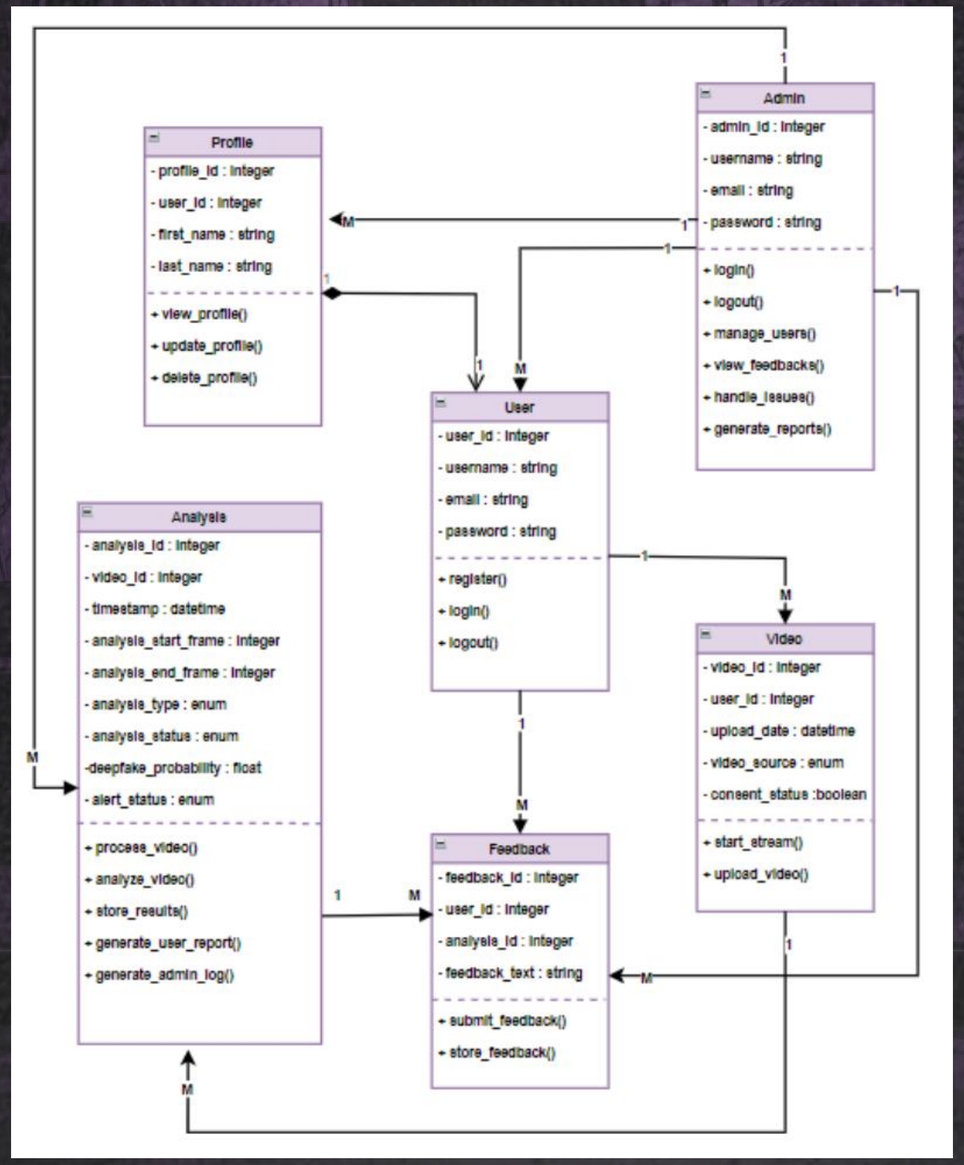
Class Diagram



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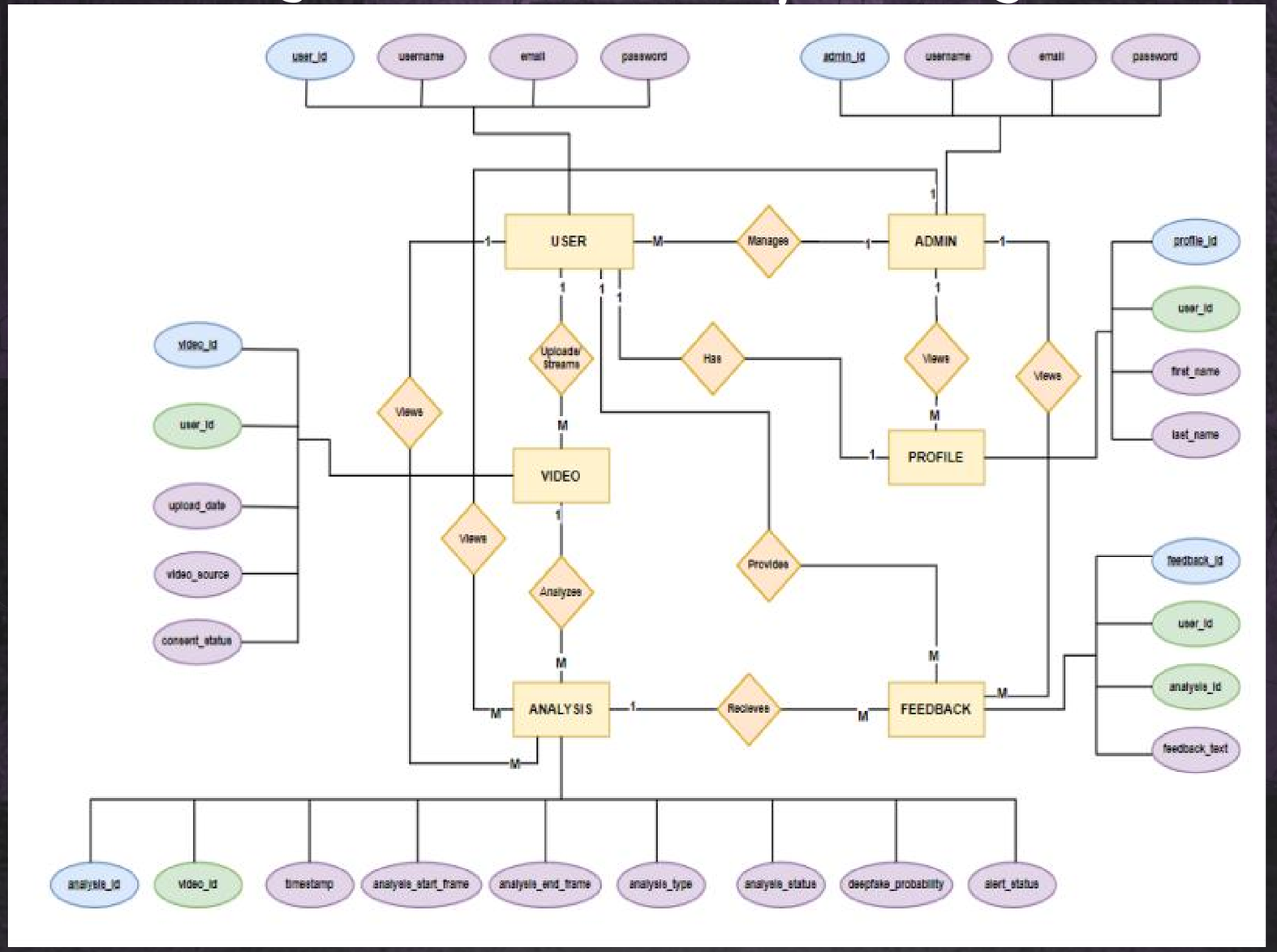
Entity Relationship Diagram



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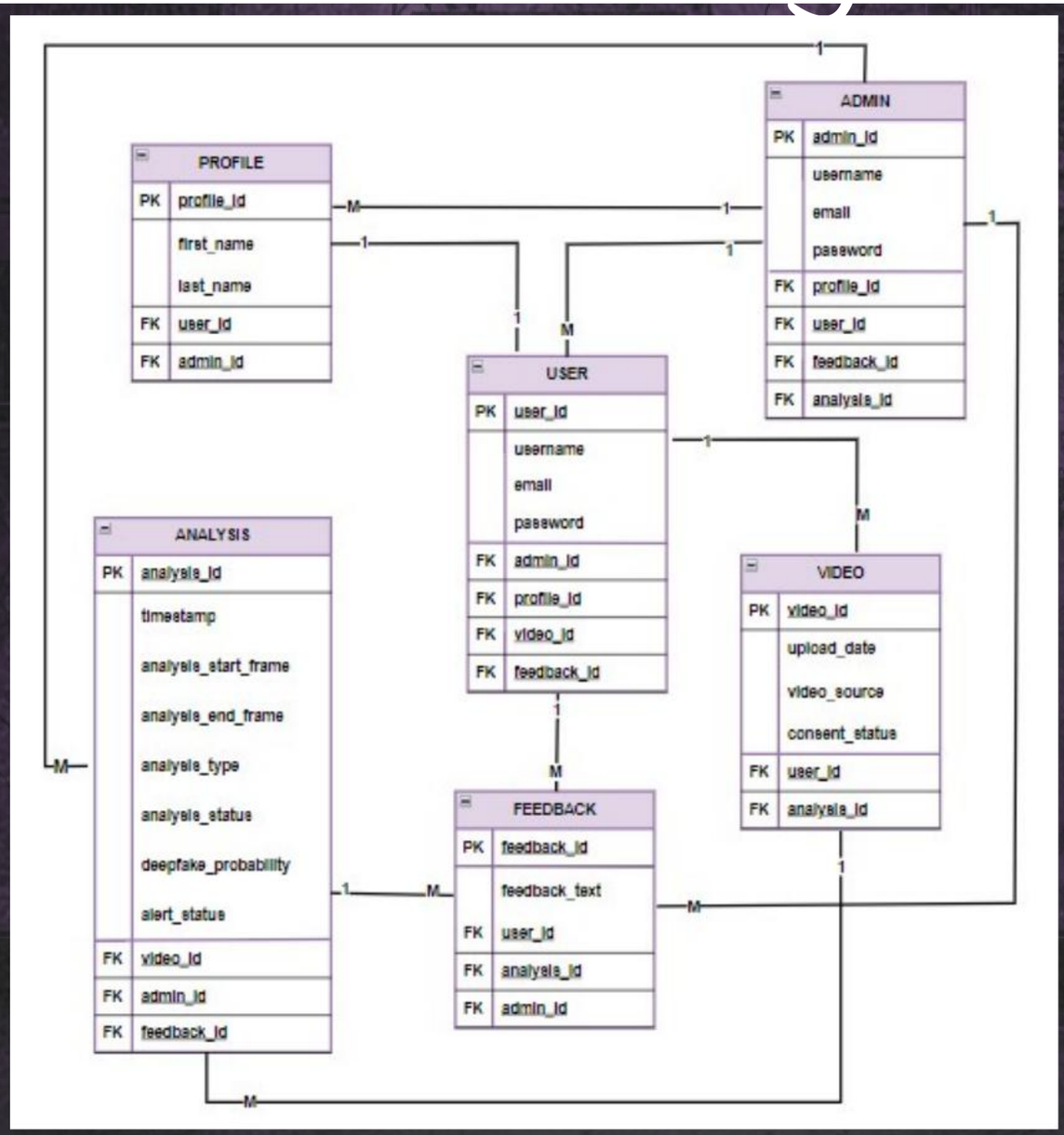
Database Diagram



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User Interface:

WebApp Logo:

User Interface:

Homepage:

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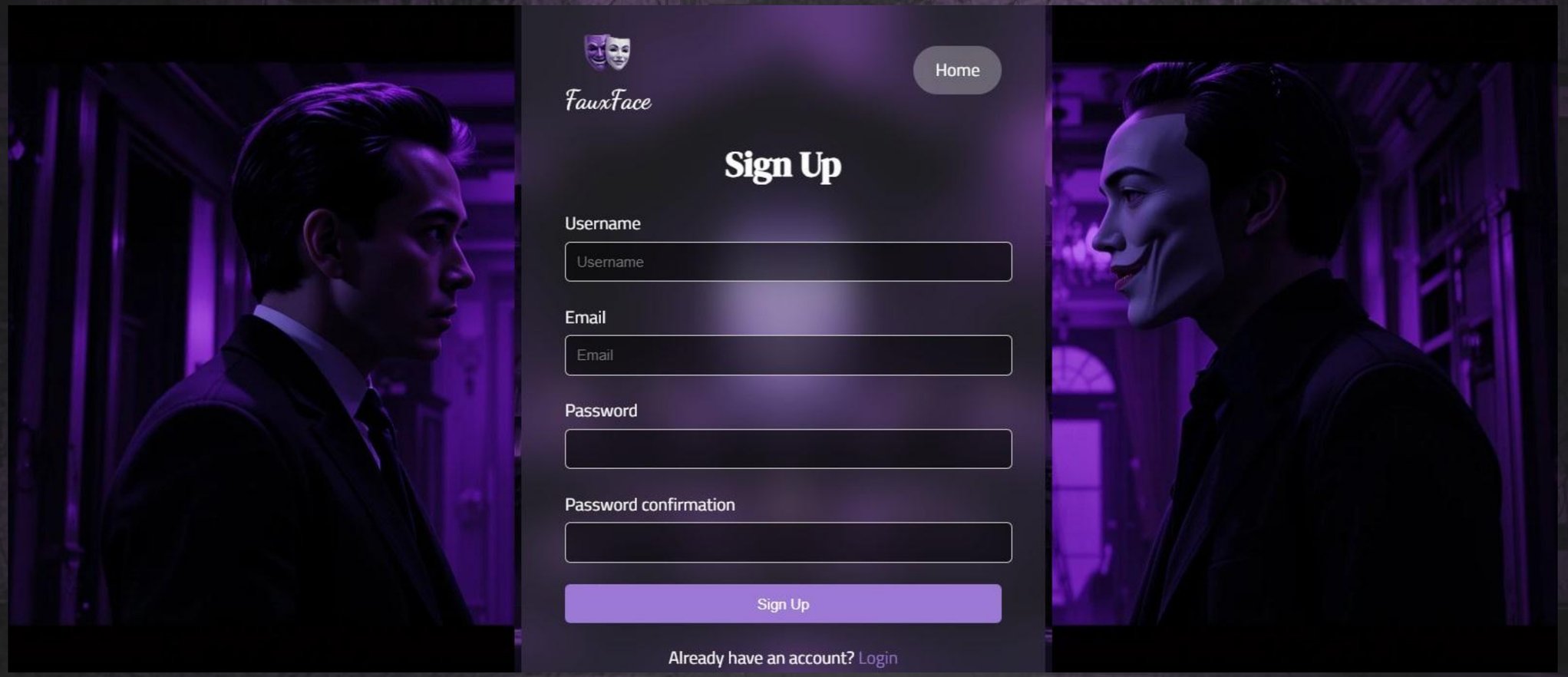
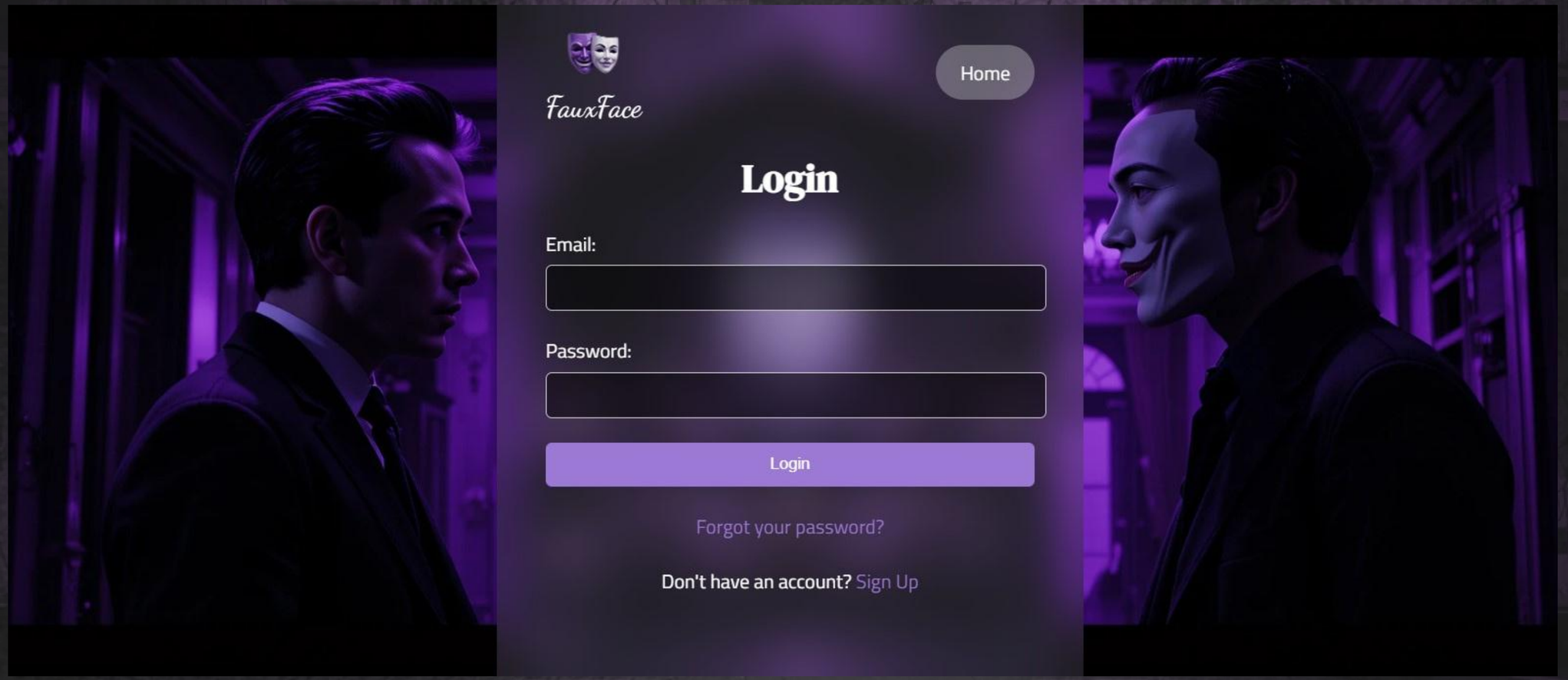
User Interface:

Signup:



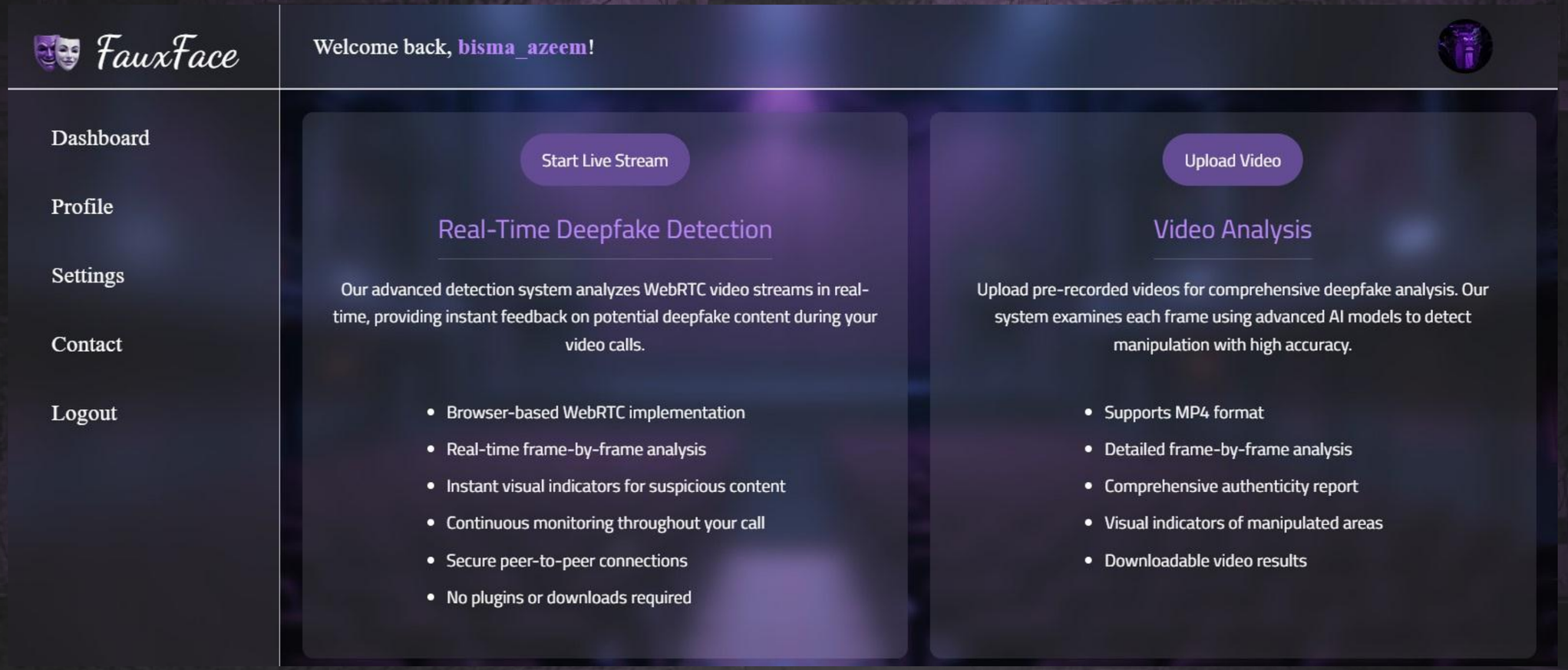
User Interface:

Login:



User Interface:

Dashboard:



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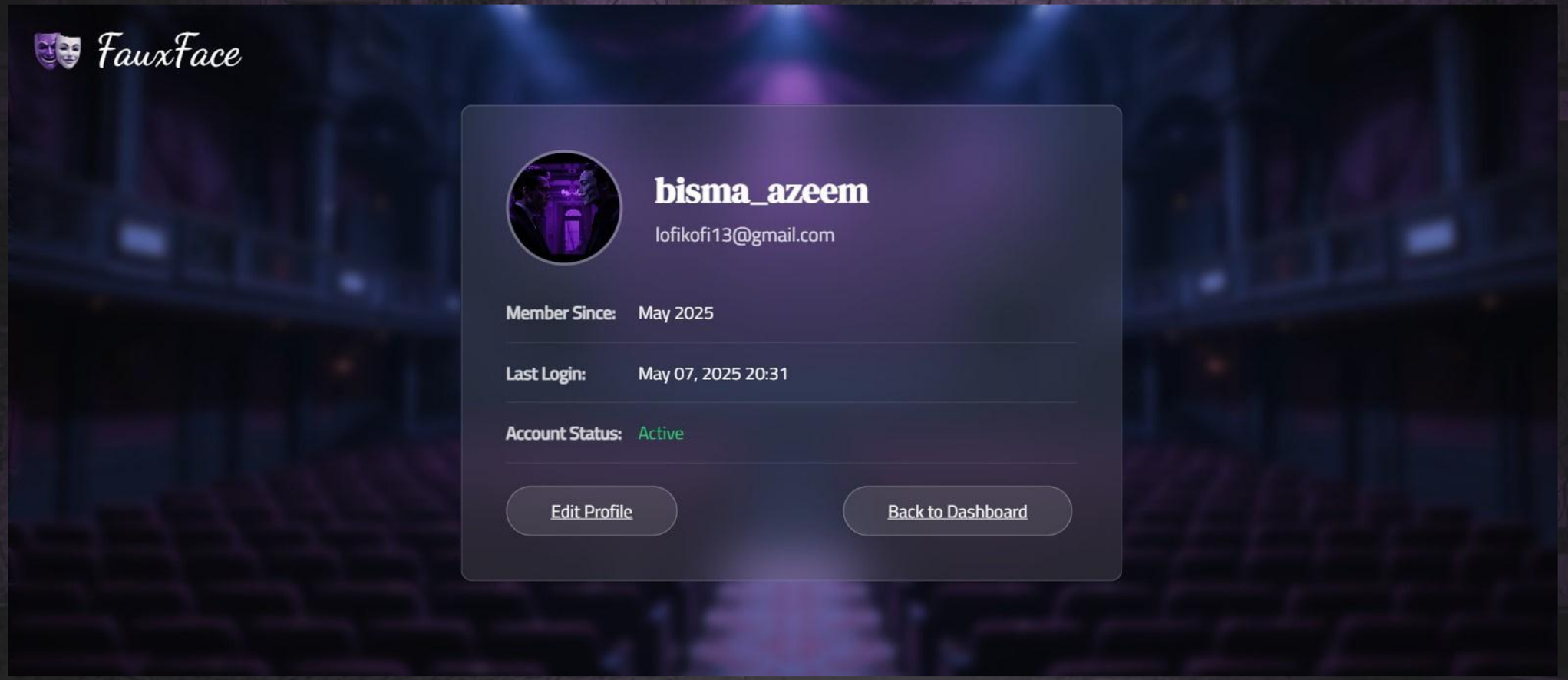
User Interface:

Profile:



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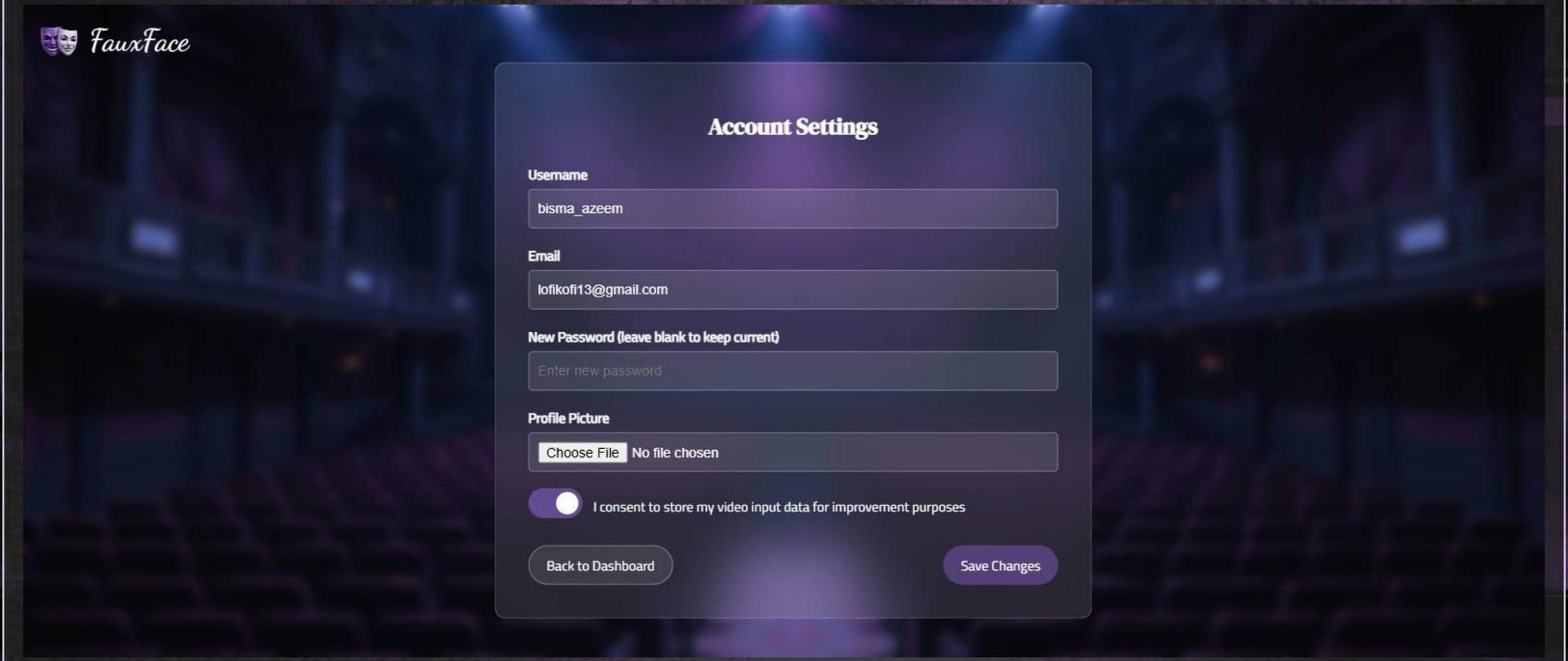
User Interface:

Account Settings:



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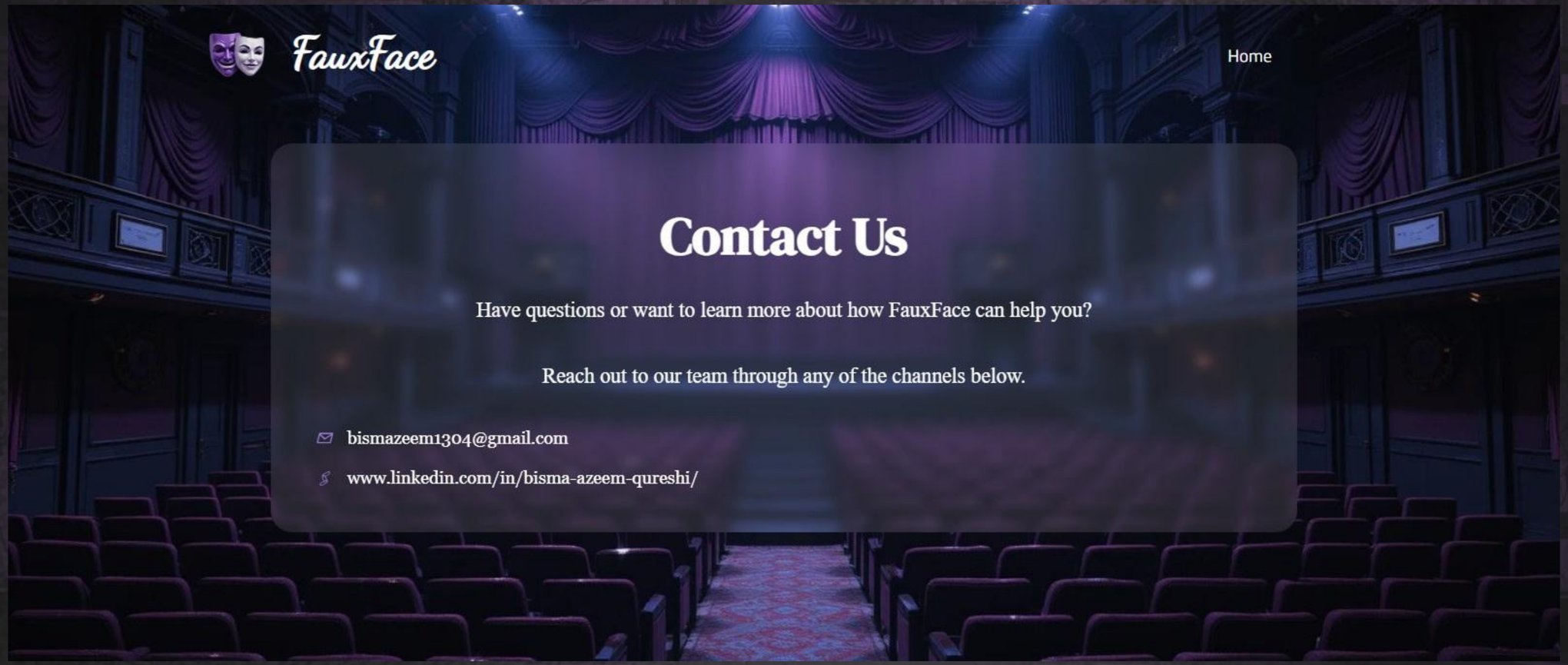
User Interface:

Contact Us:



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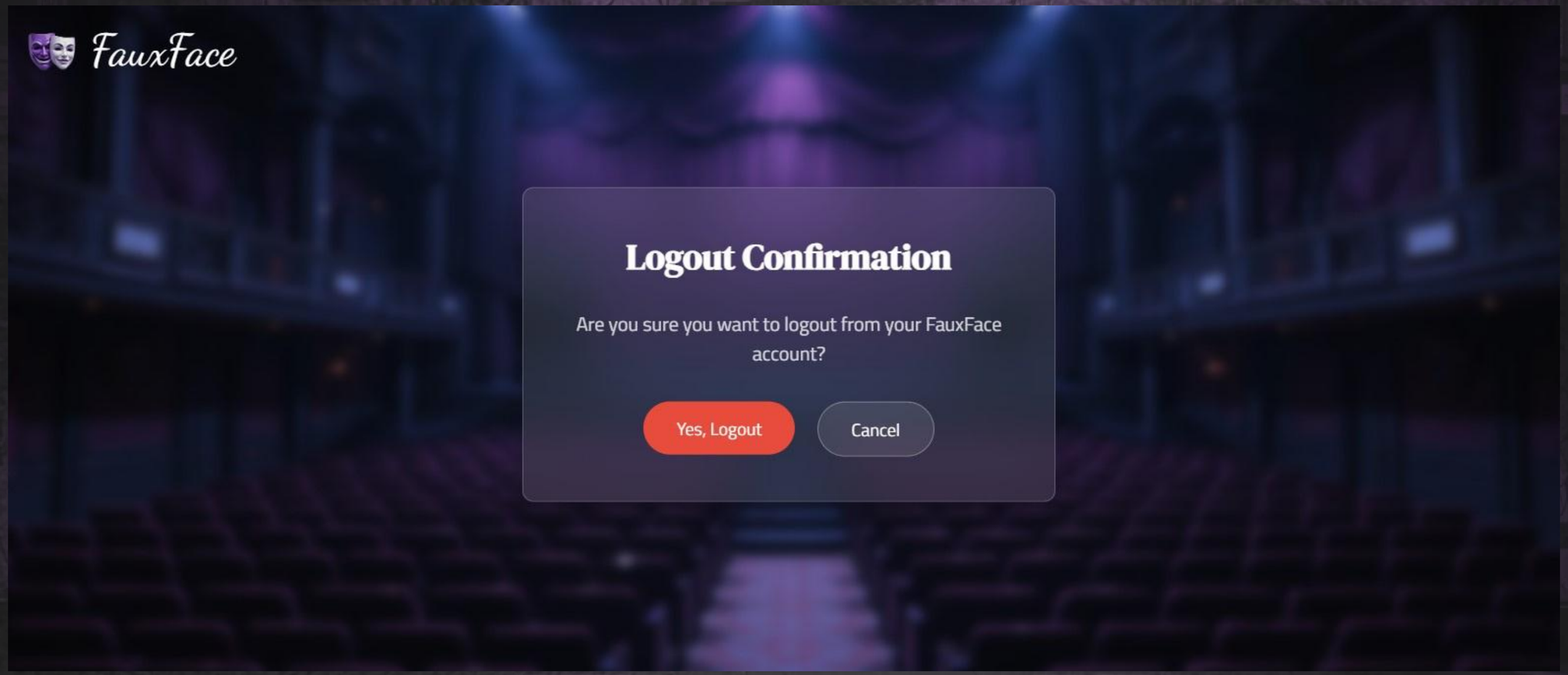
User Interface:

Logout:



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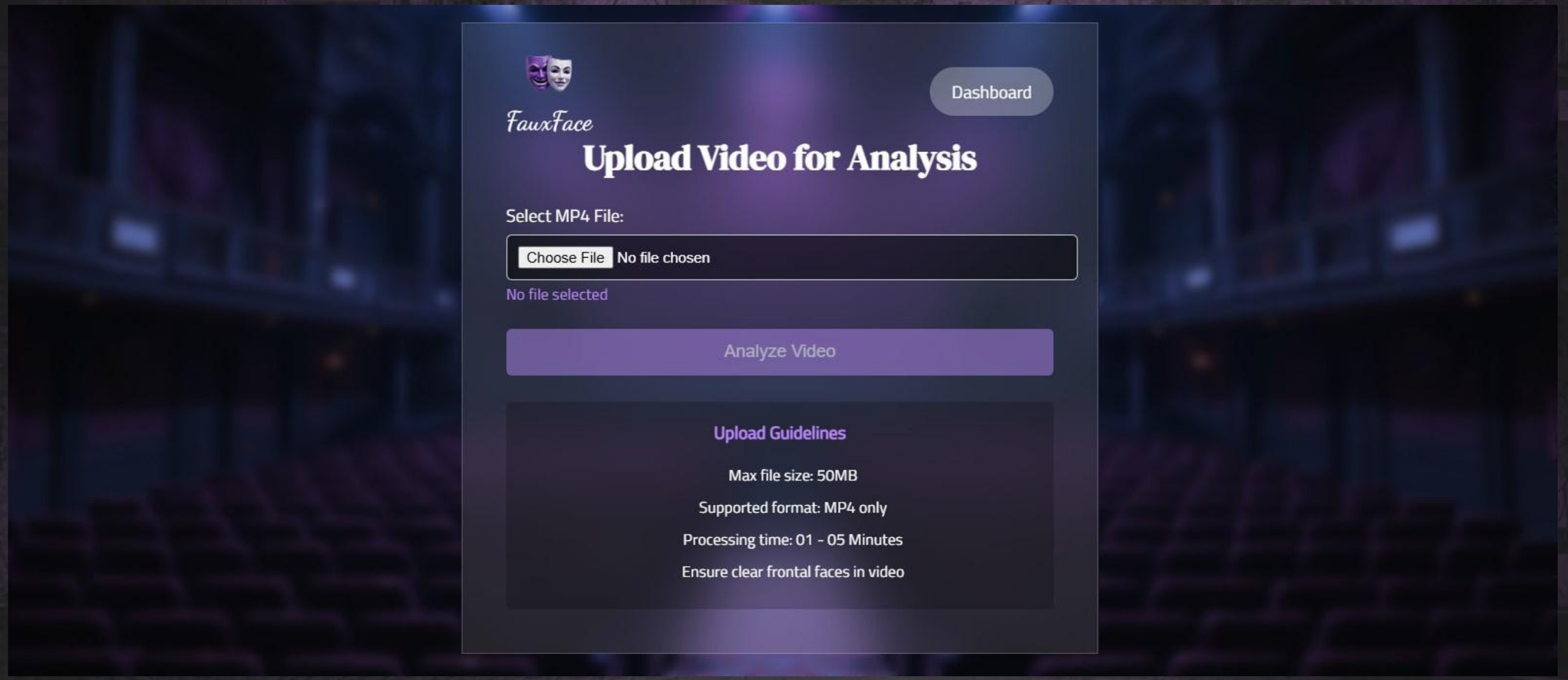
User Interface:

Upload Video:



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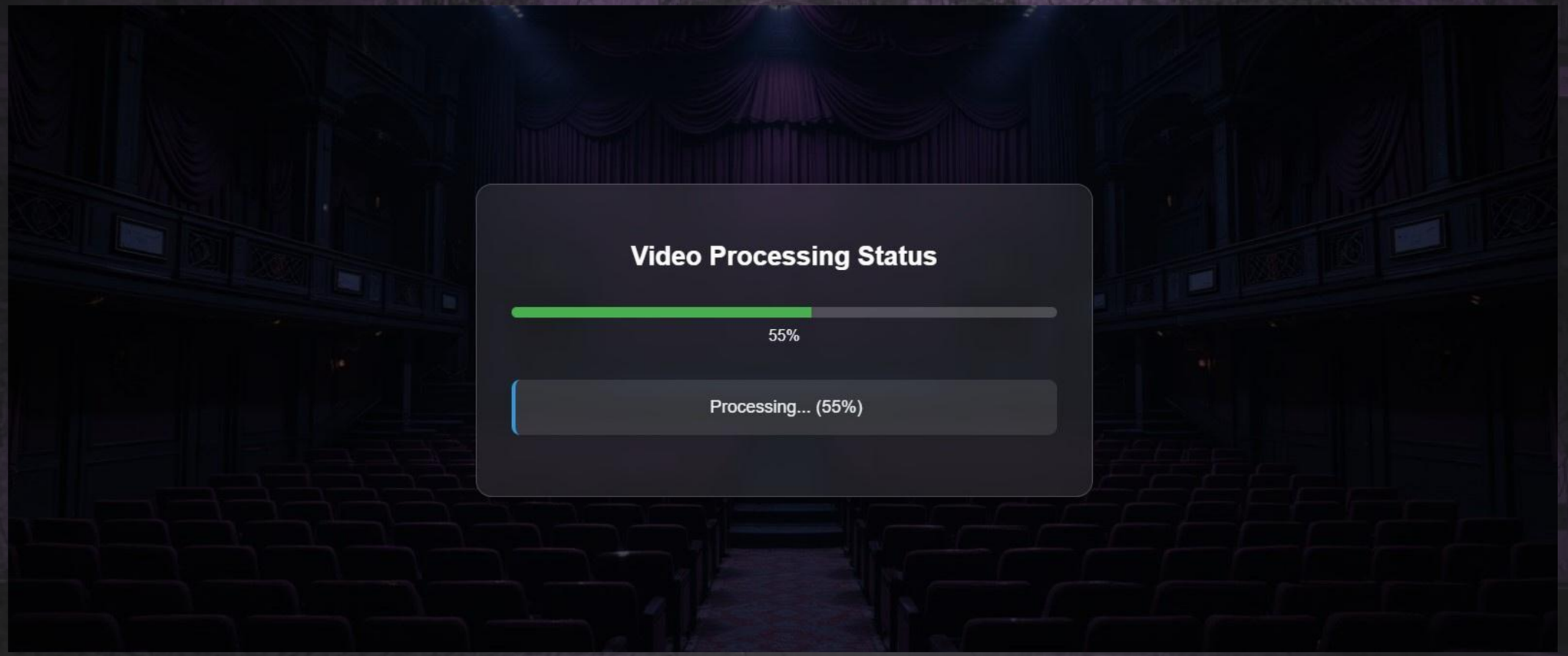
User Interface:

Video Processing Status:



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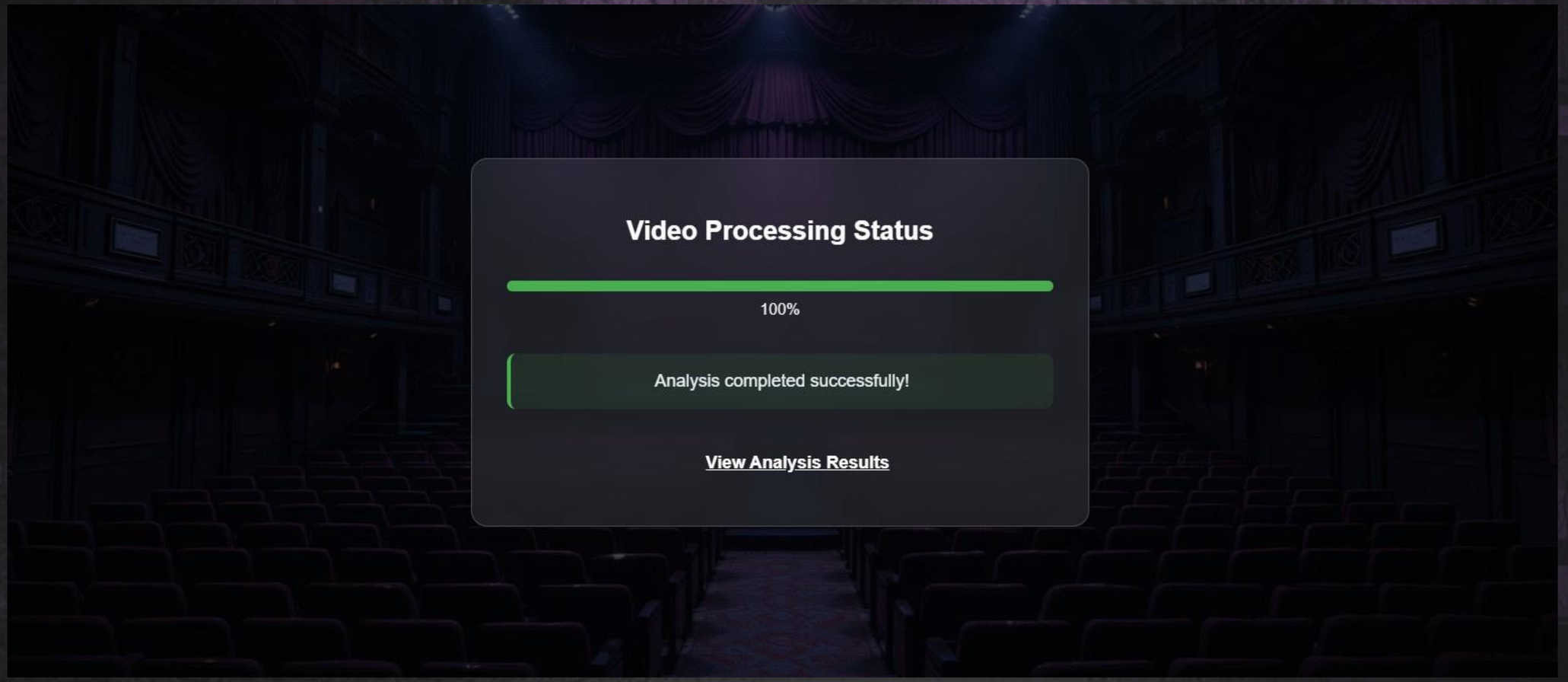
User Interface:

Video Processing Complete:



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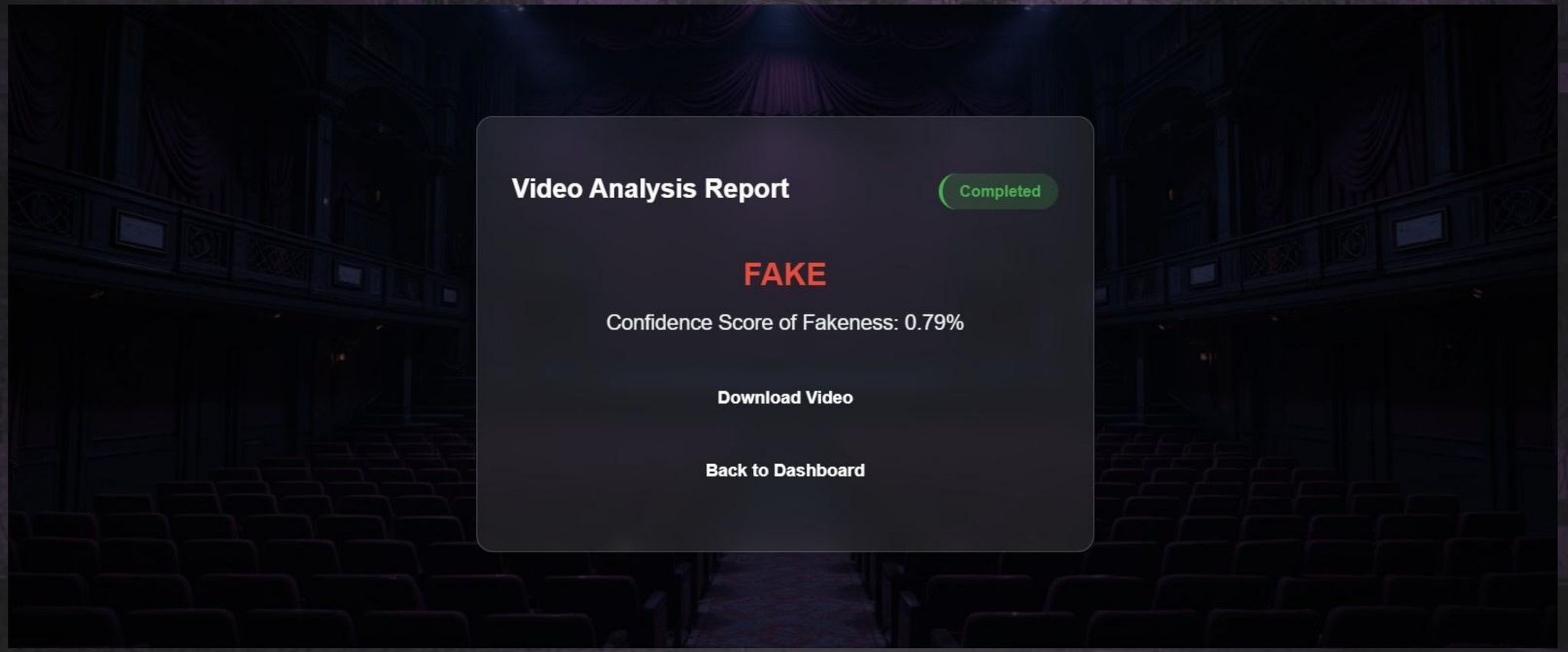
User Interface:

Video Analysis Report:



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User Interface:

A Frame from Processed Video:

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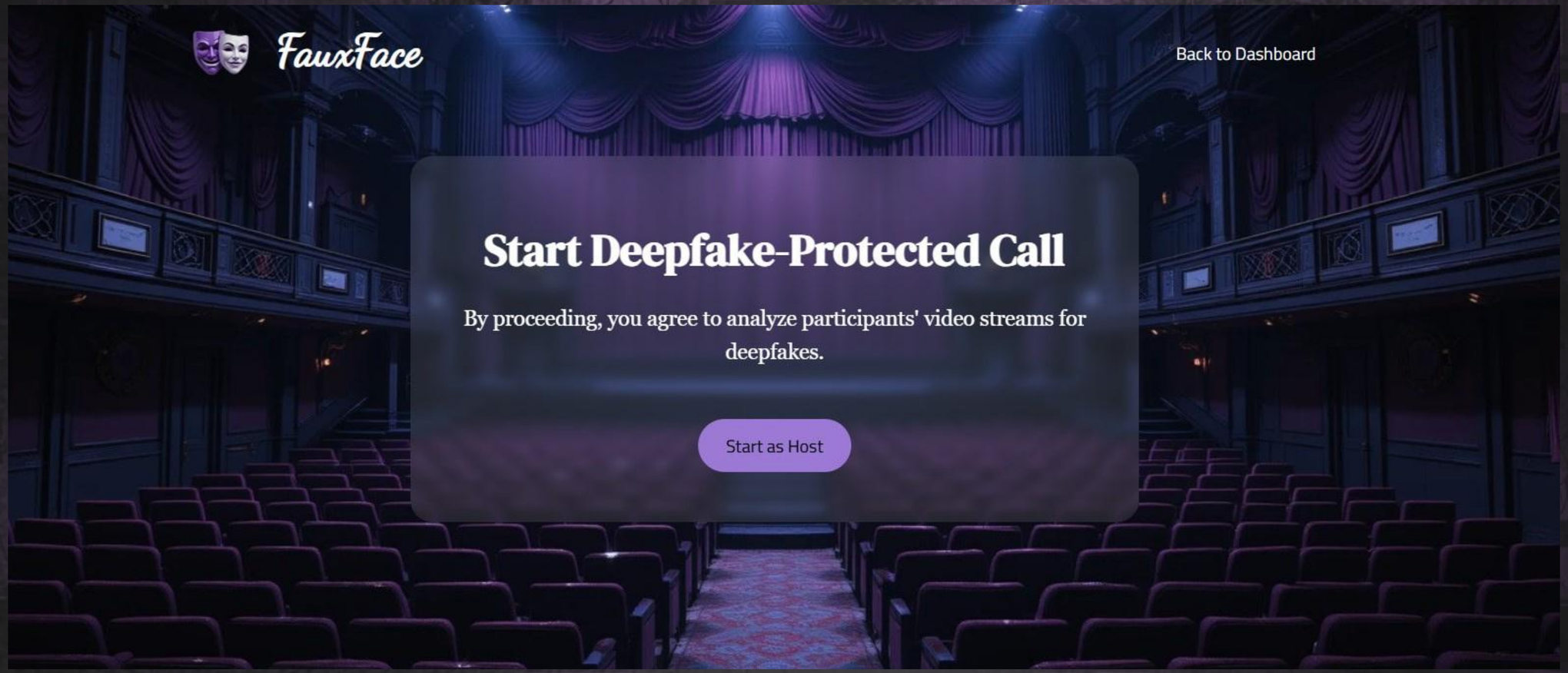
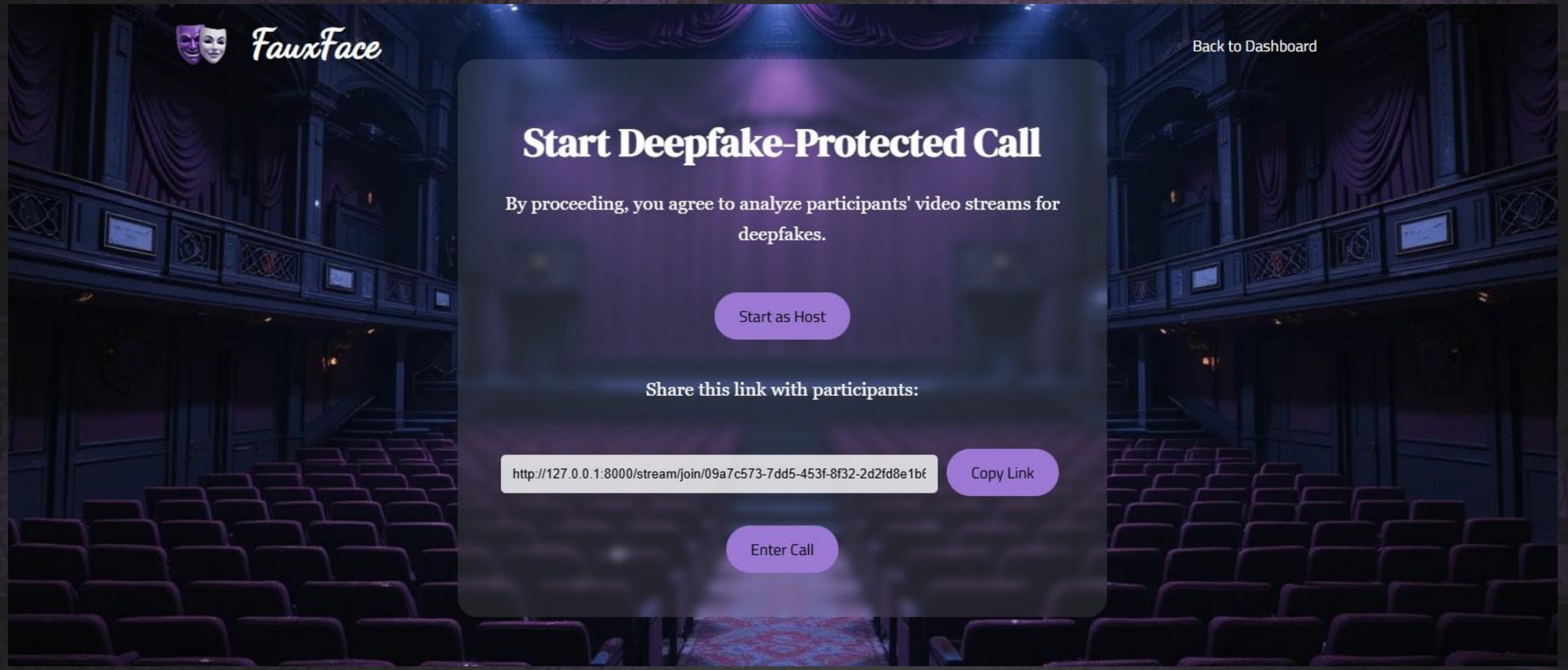
User Interface:

Host Consent Page:



User Interface:

Host link for the Participant:



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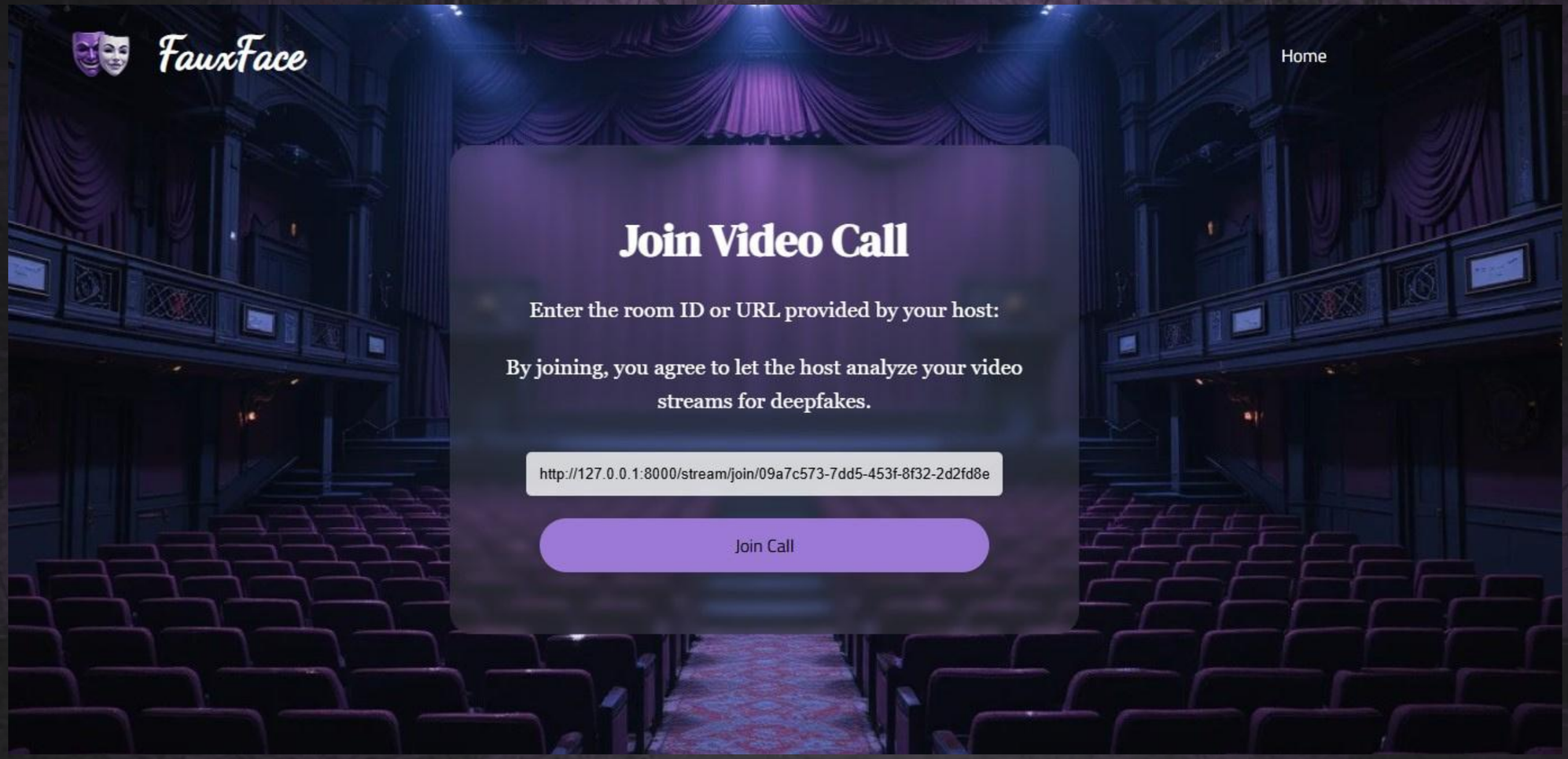
User Interface:

Participant Consent and Join Call:



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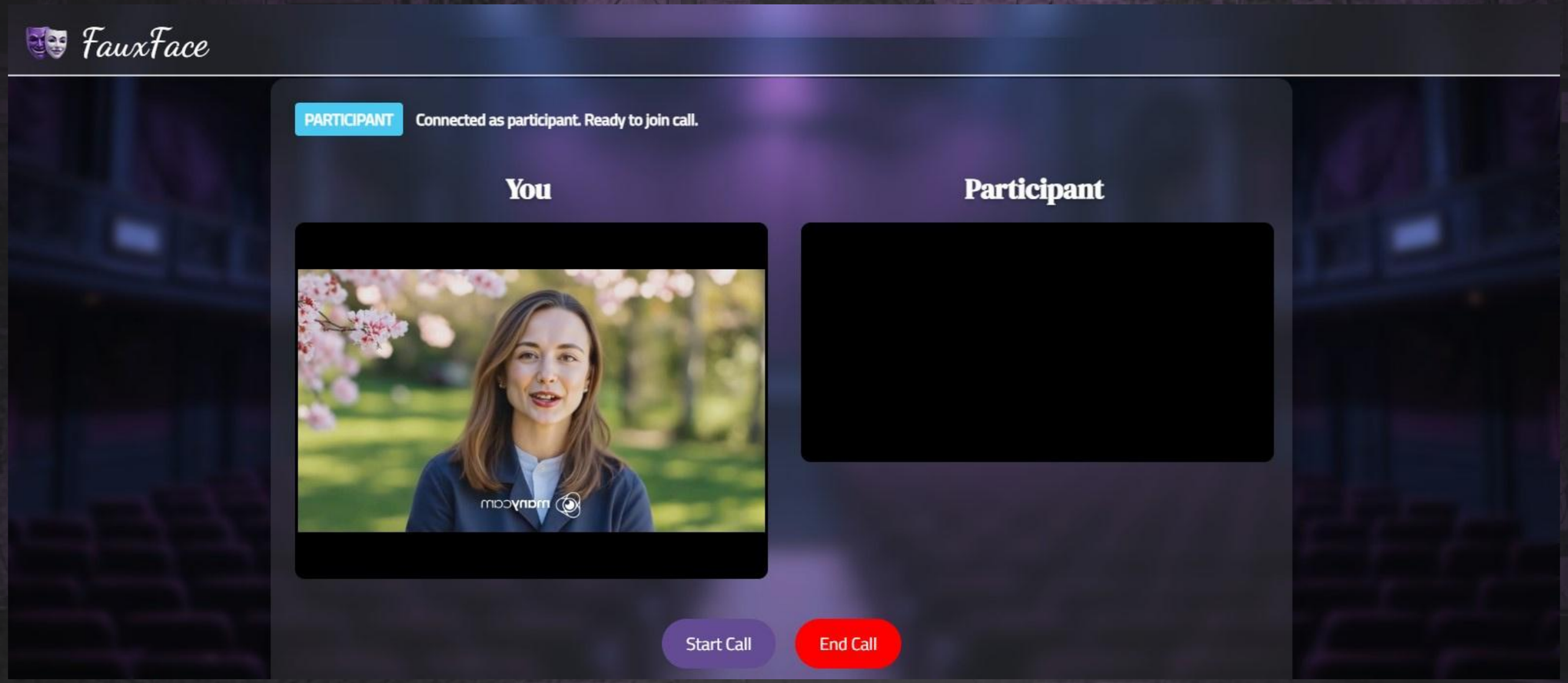
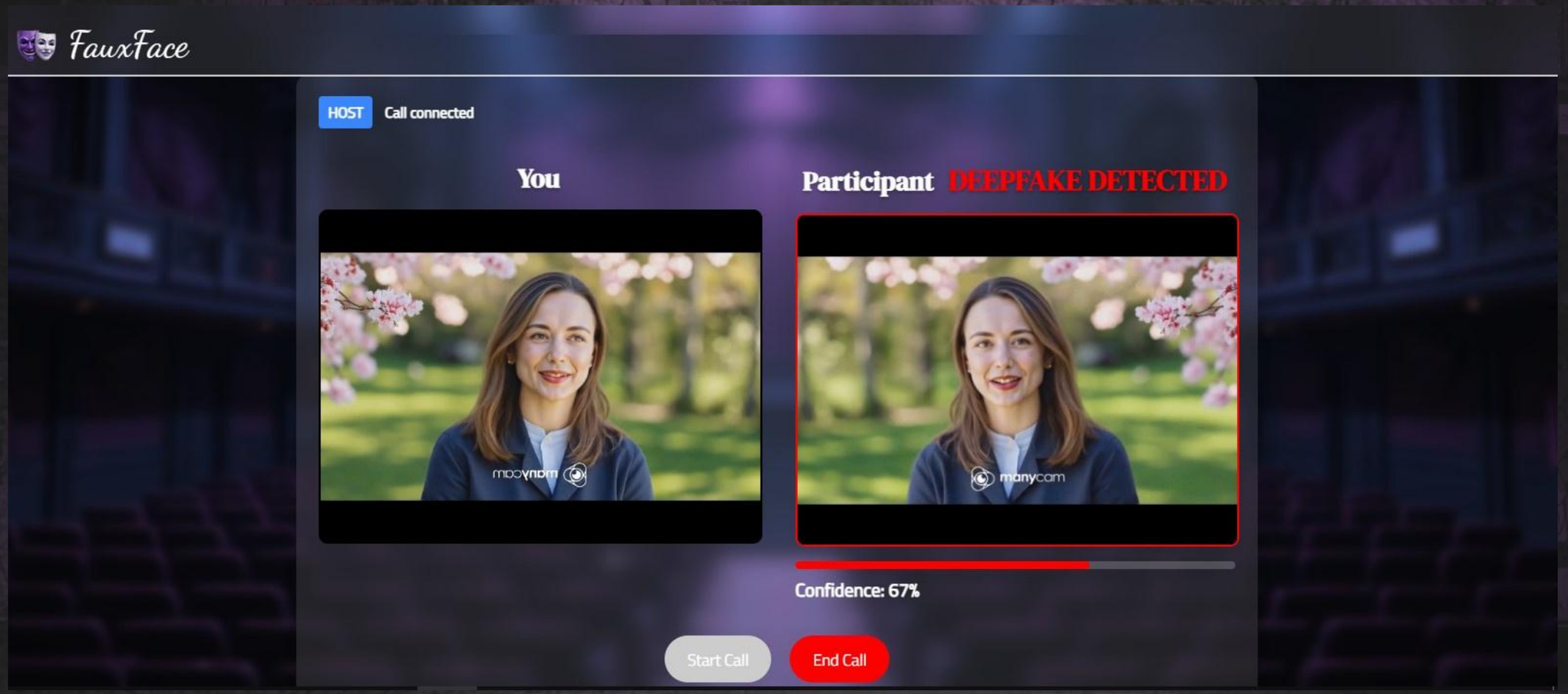
User Interface:

Participant Side Establishing Connection:



User Interface:

Call Started and Detection Started Immediately:



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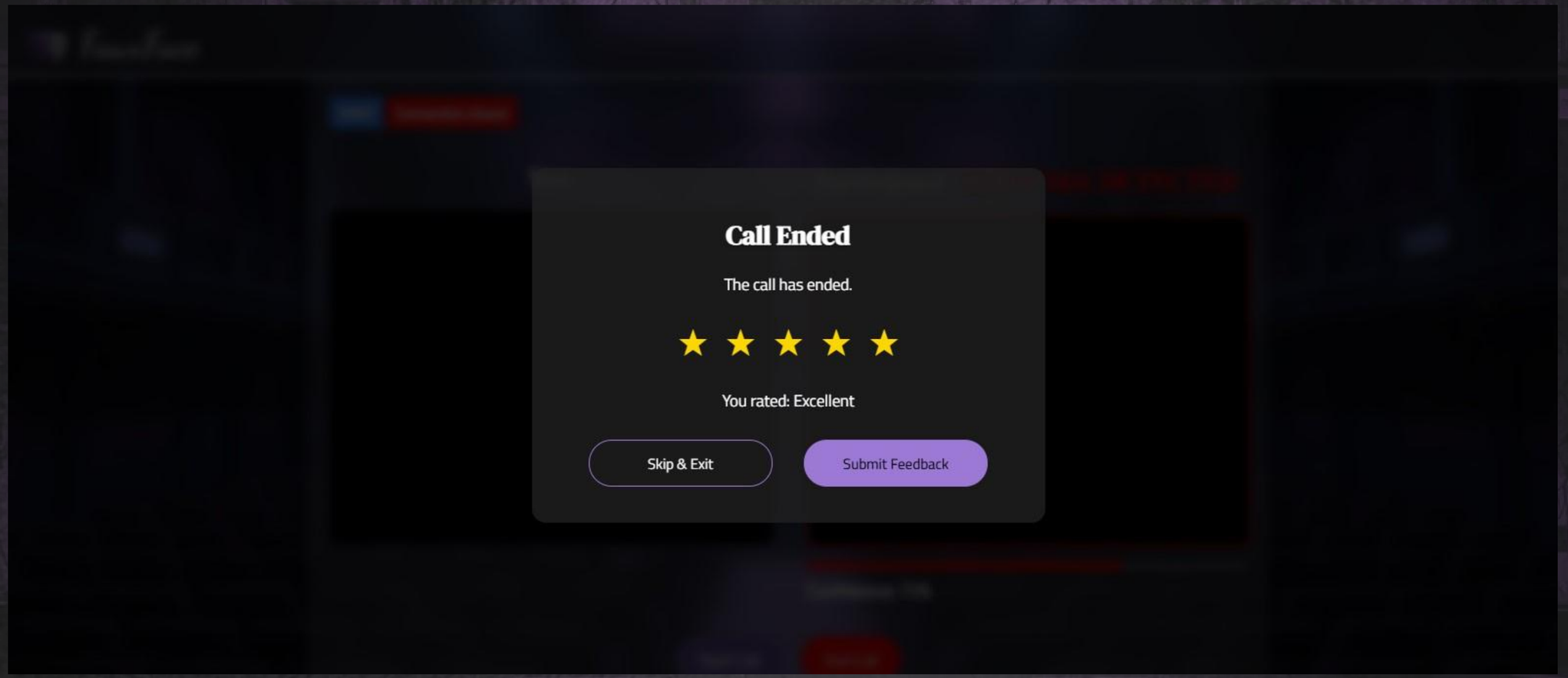
User Interface:

Call End and Feedback (Host Side):



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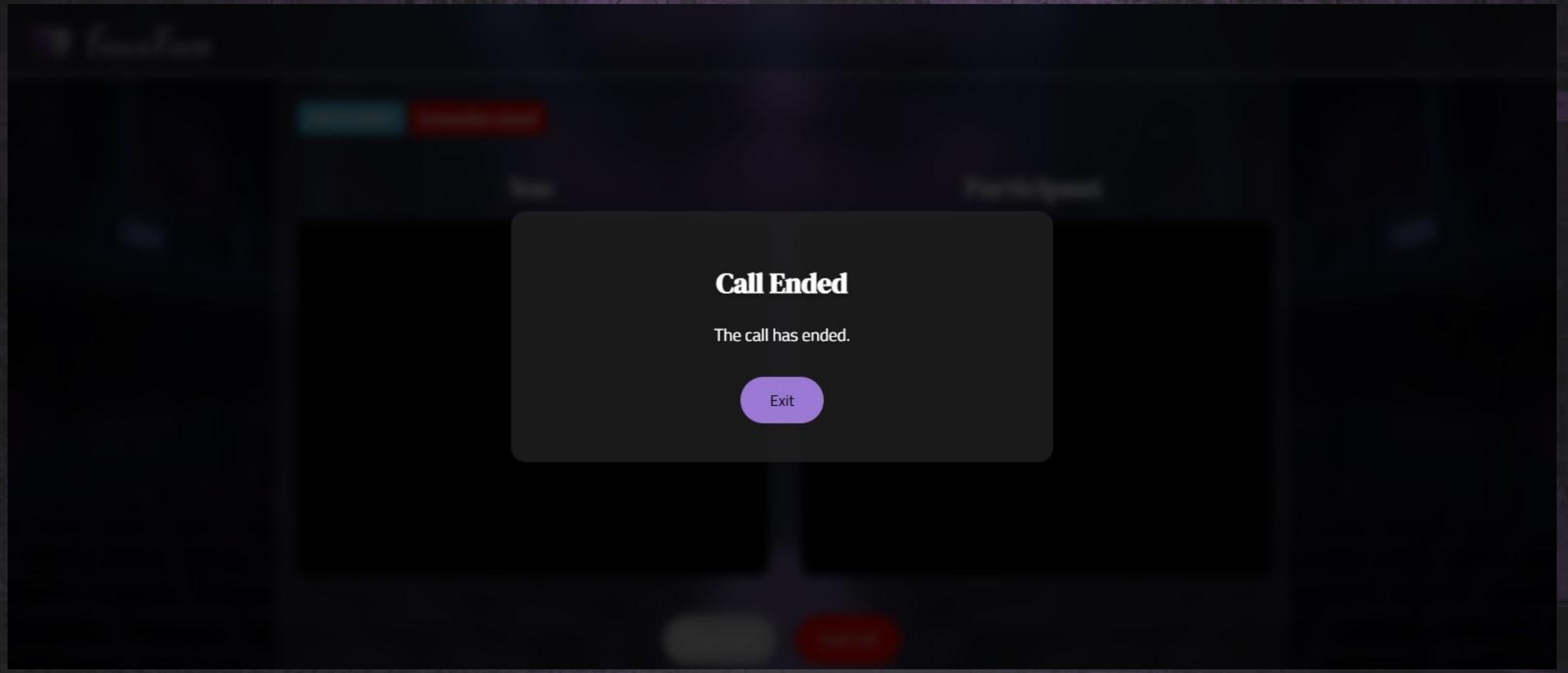
User Interface:

Call End Pop-up (Participant Side):



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Tools Used:

Frontend	Backend	Others
• HTML • CSS • JavaScript	• Python • Django • Django Channels • WebRTC • SQLite3	• Tensorflow & Keras • OpenCV • Pandas • Google Colab Pro + • VS Code

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Thank You

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