

# Smart Agri Animal Detection System

## Smart Agri Animal Detection & Face Authentication System

A FastAPI-based intelligent monitoring backend that provides:

- Face Authentication
- Animal & Intruder Detection with YOLOv8
- Intelligent Audio Response
- Snapshot Archiving and Google Drive Upload
- Twilio SMS & Call Alerts
- Chatbot using LangChain & OpenAI
- PostgreSQL Logging API

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## Features

### Face Authentication

- Uses InsightFace to recognize known users
- Compares uploaded webcam image with known face embeddings
- Prevents unauthorized access to detection system

### Animal & Person Detection

- Detects animals (sheep, bird) and unknown humans using YOLOv8
- Matches known humans using facial embeddings
- Triggers appropriate actions based on detections

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## Dynamic Sound Alerts

- Plays:
  - Tiger roar for sheep
  - Crackers for birds
  - Human alert for unknown persons

## Real-time Notifications

- Sends SMS and call alerts via Twilio when animals or intruders are detected

## Cloud Upload

- Saves image snapshots of detections to Google Drive
- Logs upload information in PostgreSQL

## Chatbot Support

- Chat interface powered by LangChain + OpenAI (gpt-3.5-turbo)
- Answers questions based on logged events (e.g., 'What happened last night?')

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## API Endpoints

/face-auth [POST] - Upload a face image to authenticate

/detect [POST] - Upload a frame for animal/human detection

/chatbot [POST] - Ask questions about database logs

/face\_logins [GET] - Recent face login history

/detections [GET] - Recent animal detection records

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/uploads [GET] - Recent uploaded snapshot records

/ [GET] - Root API check ("Chatbot is running!")

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### Directory Structure

main.py

known/ - Known face images

snapshots/ - Saved snapshots

sounds/ - Sound alerts

service\_account\_key.json

db\_loggera.py - Logging functions

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### Tech Stack

- FastAPI

- YOLOv8 (Ultralytics)

- InsightFace

- OpenAI + LangChain

- Google Drive API

- Twilio

- PostgreSQL

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## Setup

```
pip install fastapi uvicorn opencv-python insightface numpy ultralytics pygame twilio google-api-python-client  
google-auth sqlalchemy psycpg2 langchain_openai
```

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## Running the Server

```
uvicorn main:app --reload
```

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## Notes

- Face images: known/
- Sounds: sounds/ (tiger.mp3, crackers.mp3, alert.mp3)
- Snapshots older than 1 hour are cleaned

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## Future Enhancements

- Role-based access control

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- Real-time dashboard
- New animal class support
- Firebase push notifications
- Night mode support

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Author

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