

Sir Syed University of Engineering & Technology (SSUET)
Department of Software Engineering

Course Name: Software Construction and Development(SE-314L)

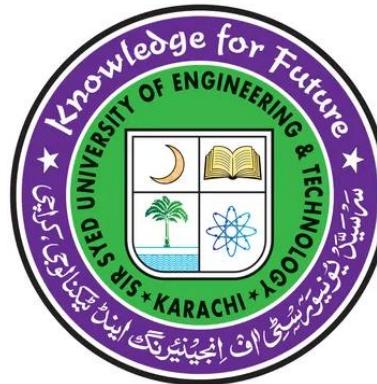
Semester: 5th

Batch: 2023F

Section: C

PROJECT REPORT

Project Title: Criminal Face Detection Model



Submitted To:

Engr. Priha Bhatti

Submitted by:

STUDENT NAME	ROLL NUMBER
KHALID HUSSAIN	2023F-BSE-191
SYED ZAIN AHMED	2023F-BSE-156
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TABLE OF CONTENTS

S. No.	TOPICS	PAGE No.
1	PROBLEM DOMAIN	1
2	PROPOSED TREATMENT	2
3	PLAN OF WORK	3-4
4	PROJECT SCHEDULING	5
5	SOFTWARE AND HARDWARE SPECIFICATIONS	6
6	BLOCK DIAGRAM	7
7	SYSTEM FLOW DIAGRAM	8
8	USER GUIDE	9-14

TEAM PROFILE

The Criminal Face Detection project was developed through the collaborative efforts of the following team members. Each member contributed according to their technical expertise and assigned responsibilities to ensure the successful completion of the project.

1. MUHAMMAD KHALID HUSSAIN

2023F-BSE-191

Roles: Project Lead, Backend Development, Backend and Frontend Integration

Responsible for overall project overview.

- Project Lead & Coordinator – Ensure project flows smoothly
- Backend Development Lead – Node.js, Express, MySQL integration
- API Development – Signup, Login, Dashboard, Projects CRUD
- Database Design & Management – Ensure secure & optimized queries
- Overall Architecture & Integration – Connect frontend with backend
- Supervise coding standards, code reviews, and merging branches

2. SHEHARYAR ALI

2023F-BSE-168

Roles: Frontend

- Complete UI/UX Development – Landing page, signup, login, dashboards
- React Components & Routing – React Router, Tailwind styling
- API Calls Integration – Connect frontend forms with backend APIs
- Ensure smooth and responsive design

3. ZAID ASIF

2023F-BSE-195

Roles: Frontend, UI testing

- Assist in Frontend Development – Components, dashboards
- Prepare Project Documentation & Report – Setup instructions, diagrams, screenshots
- Manage minor UI testing & bug fixes

4. ZAIN AHMED

2023F-BSE-156

Roles: Implement Client features

- Implement Client Features – Project add, view, update, delete
- Testing & QA – Test all flows for multiple users

1. PROBLEM DOMAIN:

Crime monitoring and identification remain major challenges for security authorities due to manual record-keeping, delayed verification, and lack of automated identification mechanisms. Traditional criminal identification methods rely heavily on human observation, manual database searches, and offline verification, which are slow, error-prone, and inefficient.

Security teams struggle to detect criminals in real-time environments such as public places, campuses, and checkpoints. Additionally, managing criminal records, violation history, warnings, and public claims is difficult due to disconnected systems and poor data organization.

Current solutions lack real-time face recognition, centralized criminal databases, automated warning systems, and integrated claim verification features. This results in delayed responses, wrongful identification, inefficient investigations, and increased security risks. Therefore, there is a strong need for a unified intelligent platform that integrates face recognition, criminal record management, warning classification, and claim verification into a single automated system.

Objectives:

1. To develop a real-time criminal face detection system using artificial intelligence and computer vision.
2. To create a centralized platform for managing criminal records, violations, and risk levels.
3. To enable administrators to add, update, and monitor criminal profiles efficiently.
4. To provide real-time alerts when a criminal face is detected through live camera feed.
5. To implement a rule-based warning system for classification of criminal behavior.
6. To allow users to submit claims and evidence for review and verification.
7. To improve security monitoring accuracy, speed, and automation.
8. To provide analytical dashboards for decision-making and investigation support.

2. PROPOSED TREATMENT:

The proposed system, **AI-Agent Based Criminal Face Detection & Monitoring System**, is a web-based intelligent platform that uses **Artificial Intelligence agents** to automate face detection, recognition, decision-making, and system coordination.

The system provides **role-based access** with two main dashboards: **Admin Panel** and **User Panel**, along with a **Real-Time Face Detection Module**.

System Overview:

- Face recognition is implemented using **face-api.js**, enabling real-time face detection and matching.
- Criminal classification is handled through **rule-based logic combined with AI automation**.
- The platform ensures transparency by allowing users to submit claims and view warnings.

Key Components of the Proposed Solution:

1. **User Management** – Role-based authentication for admins and users with secure login.
2. **Criminal Record Management** – Add, update, delete, and search criminal profiles.
3. **Face Recognition System** – AI-based face encoding and matching using deep learning models.
4. **Warning & Violation Tracking** – Automated classification of criminal behavior levels.
5. **Claim Management System** – Users can submit claims with evidence for review.
6. **Real-Time Alert System – Instant alerts when a criminal face is detected**.
7. **Analytics Dashboard** – Graphs and statistics for crime monitoring.
8. **Secure Data Handling** – Encrypted authentication and protected access control.

3. PLAN OF WORK:

Research:

- Study existing surveillance and face recognition systems and their limitations.
- Analyze challenges in manual criminal identification and record management.
- Understand requirements for security authorities and users.
- Review best practices for AI face recognition accuracy and system security.
- Explore concurrency and multithreading techniques for real-time processing.

Development and Testing:

1. Frontend Development:

- Design responsive user interfaces for Admin and User dashboards.
- Implement authentication, profile management, and alerts.
- Integrate real-time camera and detection interface using face-api.js.

2. Backend Development:

- Implement RESTful APIs using Node.js and Express.
- Design role-based access control and authentication.
- Integrate AI agent logic for automation.
- Implement worker threads for concurrent processing.

3. Testing:

- Functional testing of all modules.
- Face recognition accuracy testing.
- Security testing for authentication and data access.
- Performance testing under concurrent detection scenarios.

Major Project Activities:

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1. Admin Activities:

- Login and dashboard access.
- Add and manage criminal records.
- Verify or reject user claims.
- Monitor detection alerts and statistics.

2. User Activities:

- Register and login.
- View personal status and warnings.
- Track violation history.
- Submit claims with supporting evidence.

3. Integrated Activities:

- Real-time face detection and alerts.
- Automated logging of detection events.
- AI-based rule evaluation and classification.
- Secure data synchronization.

4. RULE-BASED AND AI LOGIC IMPLEMENTATION

Criminal Classification Logic:

- Violation count ≥ 5 and warnings ignored \rightarrow Criminal status assigned.

Warning System:

- 1–2 violations \rightarrow Low warning
- 3–4 violations \rightarrow Medium warning
- 5+ violations \rightarrow High warning + Criminal status

Claim Handling:

- Approved claim \rightarrow Status reset to Normal
- Violation count reset after verification

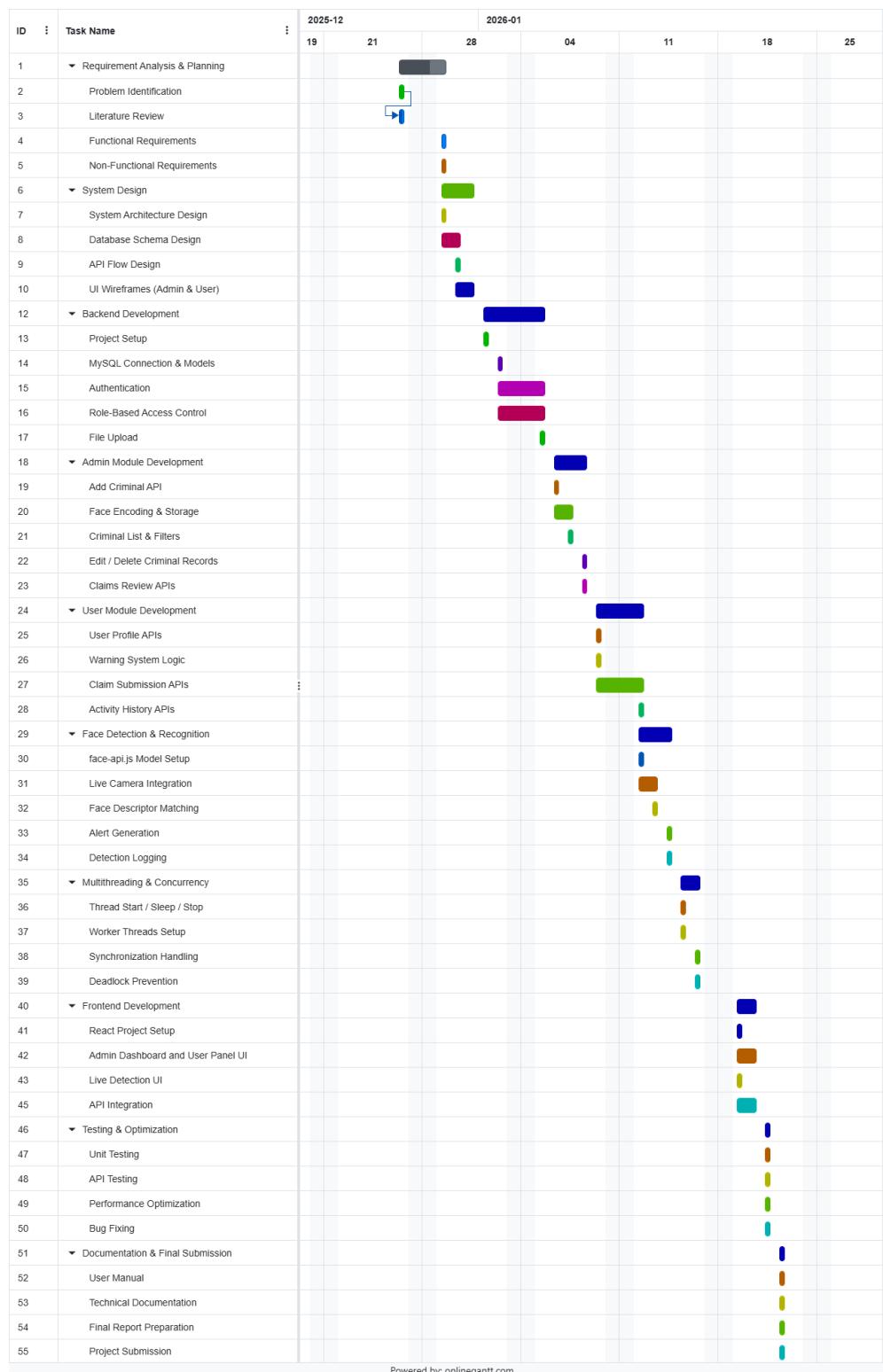
AI Agent Role:

- Automates backend logic generation
- Optimizes API flow and concurrency

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4. PROJECT SCHEDULING

Gantt chart:



5. SOFTWARE AND HARDWARE SPECIFICATIONS:

Following are the hardware and software requirements for the project

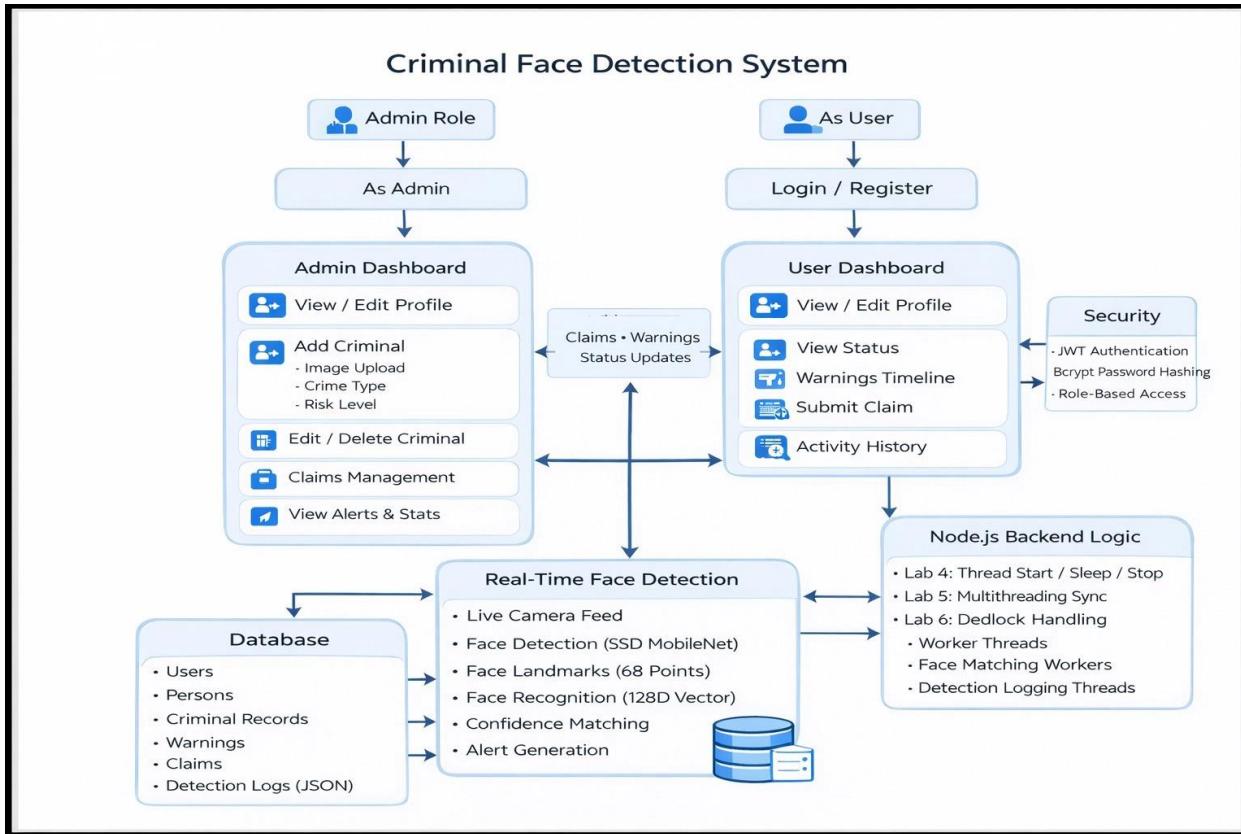
Hardware Requirements:

- Processor: Intel Core i3 or higher
- RAM: 4 GB or more
- Storage: 250 GB SSD
- Camera: HD Webcam
- Network: LAN/Wi-Fi

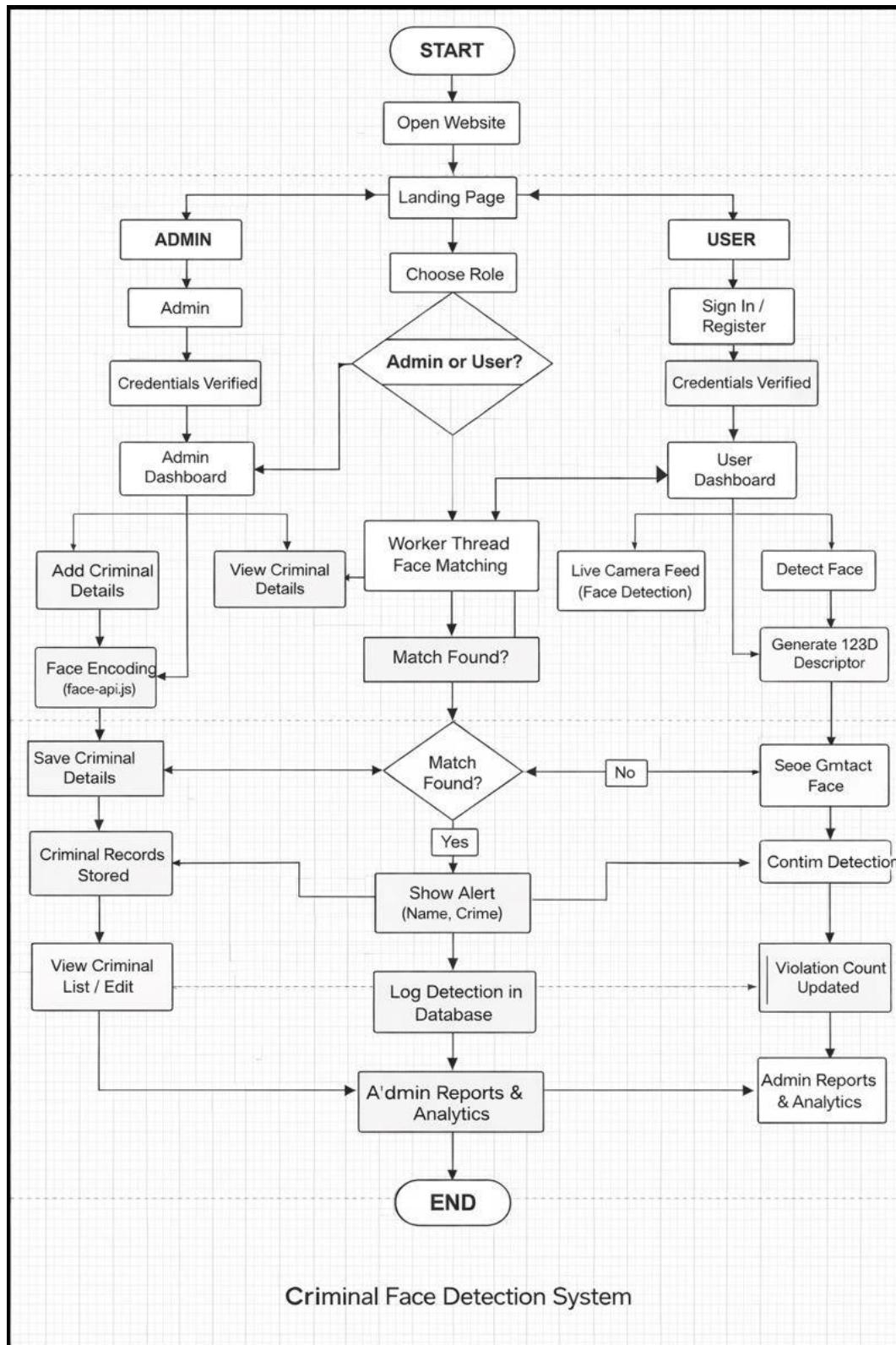
Software Requirements:

- Frontend: React.js, Tailwind CSS, HTML, CSS, JavaScript
- Backend: Node.js, Express.js
- Database: MySQL
- AI & Face Recognition: face-api.js
- AI Agent Tools: Cursor .
- Development Tools: VS Code, Postman.
- Optional: Git for version control

6. BLOCK DIAGRAM



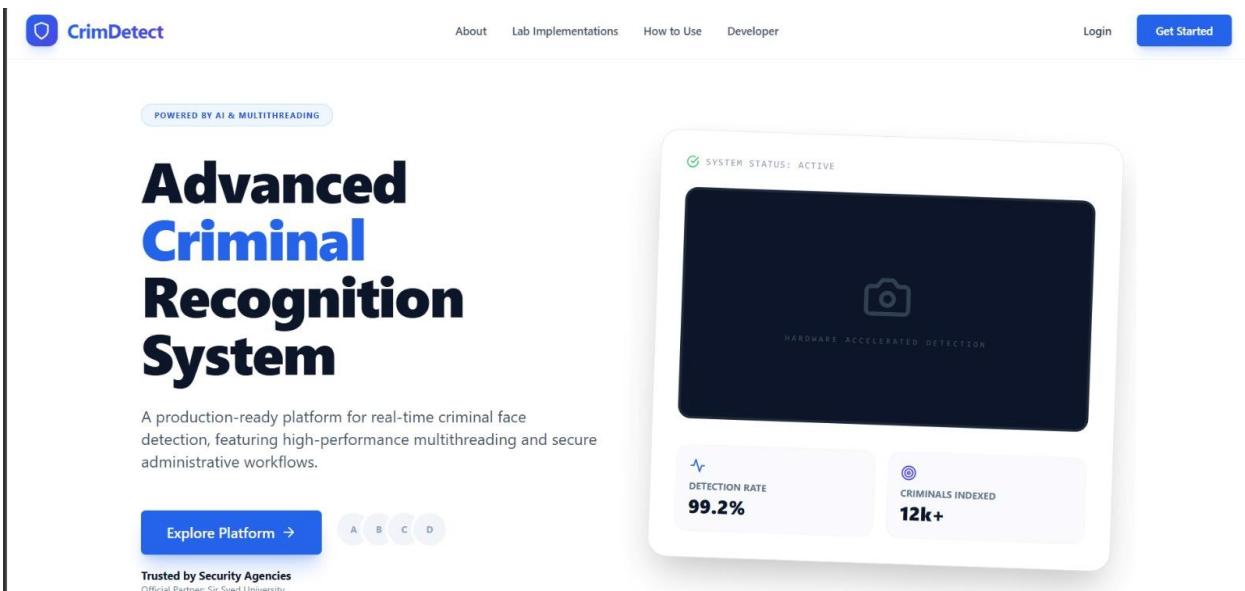
7. SYSTEM FLOW DIAGRAM



8. USER GUIDE

Explain through screenshots, how the end users will interact with your developed project. Describe the whole process step by step.

1. HomePage:



A screenshot of a section titled "Backend Engineering & Multithreading". The subtitle says: "Comprehensive implementation of computer science fundamentals optimized for production-grade performance." Below this are three cards: "Lab 4: Start, Sleep & Stop", "Lab 5: Synchronization", and "Lab 6: Deadlock Prevention". Each card has an icon (a square with a play button, a lock, and a circular arrow), a title, a brief description, and a bulleted list of features or implementations.

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 **CrimDetect**

About Lab Implementations How to Use Developer Login [Get Started](#)



Khalid
FULL STACK AI ENGINEER

Muhammad Khalid Hussain, a proactive software developer at Sir Syed University, specializing in building scalable web applications using React, Node.js, and modern frameworks. Active member of GDSC SSUET, contributing to student tech initiatives, creating platforms like SSUETNotes and SSUETConnect, and mentoring peers in web development and AI projects. Passionate about turning complex ideas into practical solutions that benefit the university community.

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ACADEMIC & PROFESSIONAL TRUST

SIR SYED UNIVERSITY

 **CrimDetect**

Redefining public safety through advanced facial recognition and distributed computing technologies.

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PROJECT	RESOURCES	DEVELOPER
Live Detection	Lab 4: Controls	Contact Me
Admin Panel	Lab 5: Sync	Portfolio
API Docs	Lab 6: Timeouts	Support
Thread Manager	Case Studies	About

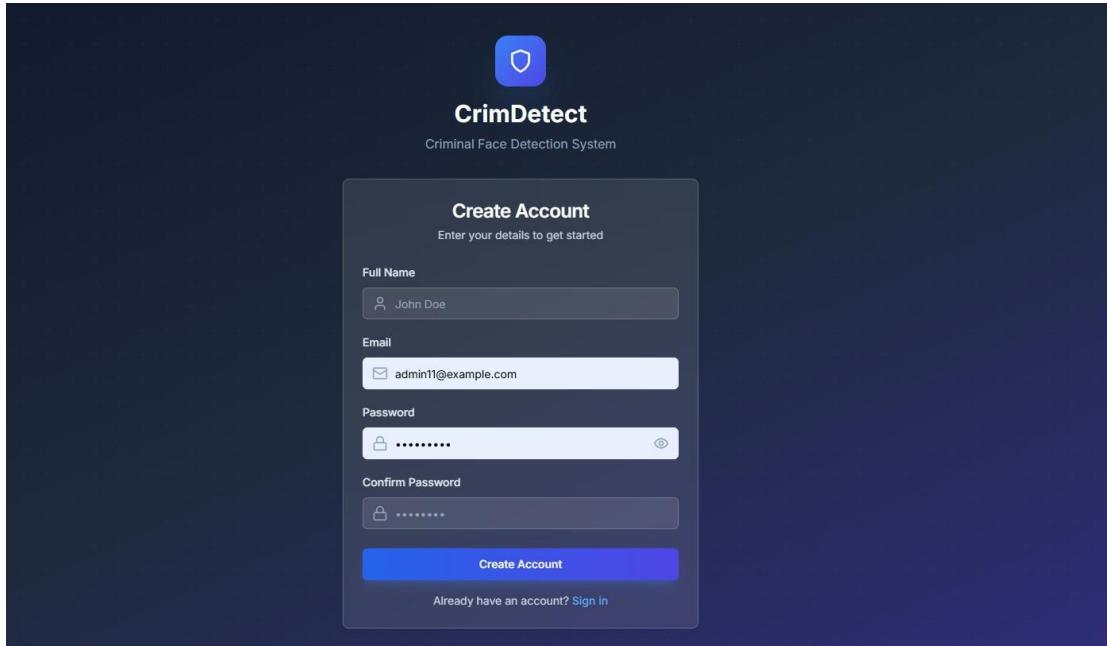
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[TERMS](#) [PRIVACY](#) [COOKIES](#)

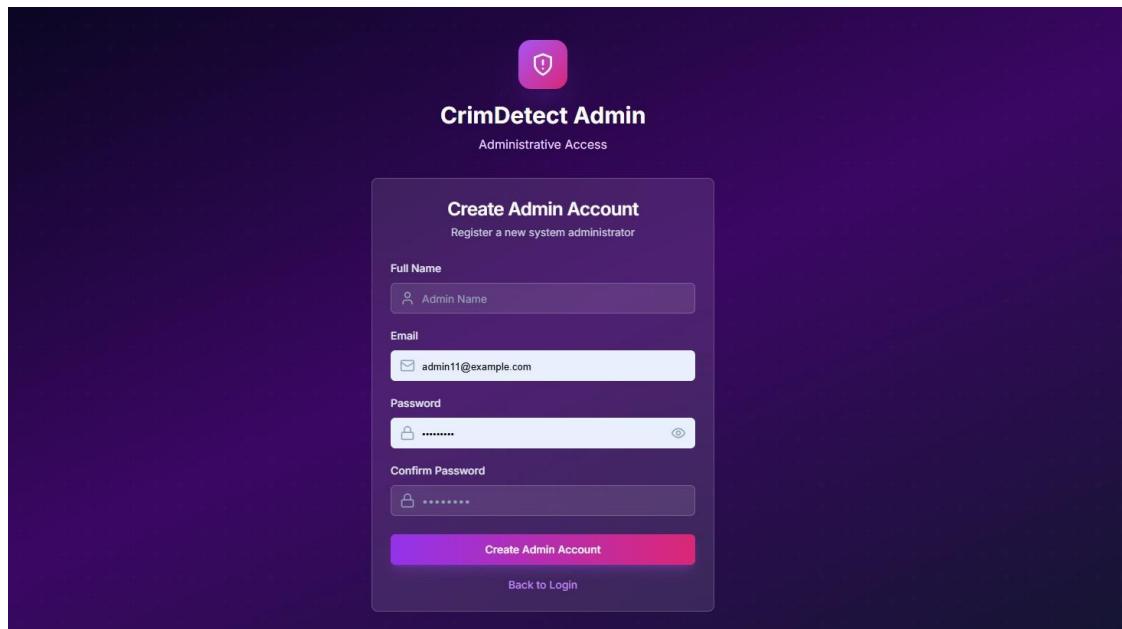
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2. Registration Pages:

Register as a normal User or Admin.



The screenshot shows the 'Create Account' page for the CrimDetect system. The header displays the CrimDetect logo and the text 'Criminal Face Detection System'. The main form is titled 'Create Account' with the sub-instruction 'Enter your details to get started'. It contains four input fields: 'Full Name' (placeholder 'John Doe'), 'Email' (placeholder 'admin11@example.com'), 'Password' (placeholder '*****'), and 'Confirm Password' (placeholder '*****'). Below the form is a blue 'Create Account' button. At the bottom, there is a link 'Already have an account? Sign in'.

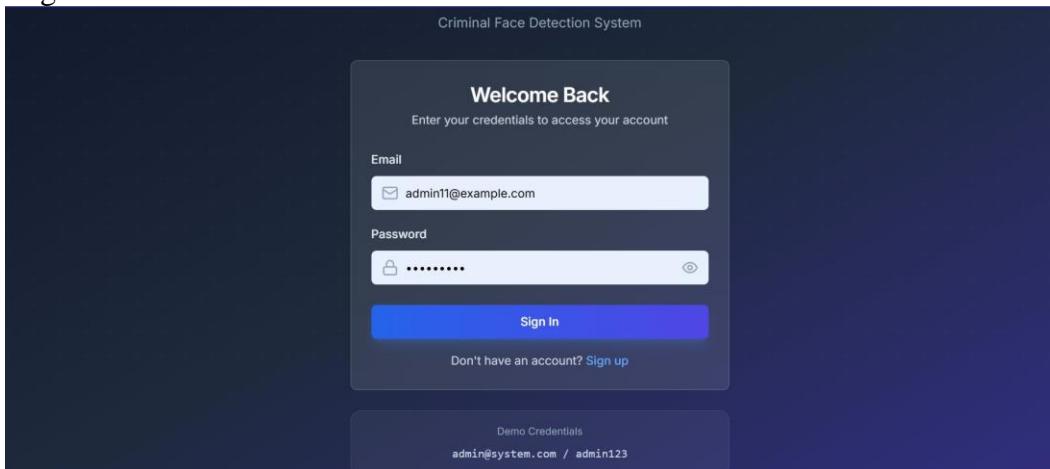


The screenshot shows the 'Create Admin Account' page for the CrimDetect system. The header displays the CrimDetect logo and the text 'CrimDetect Admin' and 'Administrative Access'. The main form is titled 'Create Admin Account' with the sub-instruction 'Register a new system administrator'. It contains four input fields: 'Full Name' (placeholder 'Admin Name'), 'Email' (placeholder 'admin11@example.com'), 'Password' (placeholder '*****'), and 'Confirm Password' (placeholder '*****'). Below the form is a purple 'Create Admin Account' button. At the bottom, there is a link 'Back to Login'.

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3. Login Page:

Login as Client or as a Admin.



4. Client Dashboard:

User Dashboard

My Dashboard

Welcome back, Khalid Hussain

Profile Overview

Khalid Hussain
khalid1234@gmail.com
Status: CRIMINAL CNIC: 4228163477555

CRIMINAL
Violations: 185
Warnings: 1
Submit Claim

Total Warnings 1 ⚠️ Unacknowledged 1 ⚠️ Warning Level HIGH ▲

Khalid Hussain
User
Logout

Dashboard

Profile

Face Detection

Logout

User Dashboard

Recent Warnings

You have been marked as a criminal record: Traffic Violation. Please contact administration if this is an error. 4 minutes ago
HIGH Acknowledge

My Claims

No claims submitted yet
View All >

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4. Client Profile:

The screenshot shows the 'User Dashboard' for 'CrimDetect'. On the left sidebar, there are links for 'Dashboard', 'Profile' (which is highlighted in blue), and 'Face Detection'. The main content area is titled 'My Profile' with the sub-section 'Personal Information'. It displays the following details:

Information	Value
Full Name	Khalid Hussain
Email	khalid1234@gmail.com
Age	21
CNIC	4220163477555
Status	CRIMINAL
Warning Level	HIGH
Violation Count	185
Total Warnings	1

On the right side of the dashboard, there is a 'Submit Claim' button and an 'Edit' button. At the bottom left, it shows 'Logout'.

6. Admin Dashboard:

The screenshot shows the 'Admin Panel' of 'CrimDetect'. On the left sidebar, there are links for 'Dashboard' (highlighted in blue), 'Criminals', 'Claims', and 'Face Detection'. The main content area is titled 'Dashboard' with the subtitle 'Overview of the criminal detection system'. It features four cards at the top:

Category	Value	Icon
Total Criminals	2	👤
Pending Claims	0	📄
Under Observation	0	🕒
Total Detections	338	📸

Below these cards are two charts: 'Detection Timeline (24h)' and 'Risk Distribution'.

Detection Timeline (24h): A line chart showing the count of detections over a 24-hour period. The Y-axis ranges from 0 to 200, and the X-axis shows time from 0:00 to 2:00. A callout box indicates a count of 195 at 2026-01-22 02:00:00.

Risk Distribution: A horizontal bar chart showing the distribution of risks across different categories. The categories are color-coded: green for Low, yellow for Medium, and red for High. The bars are very thin, suggesting low counts for each category.

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7. Criminal Management:

The screenshot shows the 'CrimDetect Admin Panel' interface. On the left, a sidebar menu includes 'Dashboard', 'Criminals' (which is highlighted in blue), 'Claims', and 'Face Detection'. The main content area is titled 'Criminal Management' with the subtitle 'Manage criminal records in the database'. It features a search bar, filters for 'All Crime Types' and 'All Risk Levels', and a table listing two criminals: Eisha and Khalid. Each entry includes a profile picture, name, crime type (Traffic Violation), risk level (LOW), violations (2 for Eisha, 90 for Khalid), date added (Jan 22, 2026), and edit/delete actions. A blue button at the top right says '+ Add Criminal'. The bottom left of the sidebar shows the user is 'Admin'.

8. Claims:

The screenshot shows the 'CrimDetect Admin Panel' interface. The sidebar menu includes 'Dashboard', 'Criminals', 'Claims' (highlighted in blue), and 'Face Detection'. The main content area is titled 'Claims Management' with the subtitle 'Review and verify user claims'. A modal window is open for a claim from 'Khalid Hussain' (khalid1234@gmail.com). The modal shows the 'Claim Details' for Khalid Hussain, with current status 'CRIMINAL' and claim status 'PENDING'. It includes fields for 'Reason for Claim' (please review), 'Proof/Evidence' (View uploaded proof), and 'Your Response' (Enter your response (optional)...). At the bottom are 'Reject' and 'Approve' buttons. In the background, a smaller view of the same claim details is visible on the main page. The bottom left of the sidebar shows the user is 'Admin'.

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9. Face Detection:

CrimDetect Admin Panel

Face Detection
Real-time criminal face recognition

176 Total Scans | 149 Matches Found | 2 In Database | Active Status

Live Camera Feed

Khalid (45.2%)

CRIMINAL DETECTED!

Khalid Traffic Violation **45.2%**
CNIC: 4220163477555
Email: khalid1234@gmail.com
Violations: 0

Recent Detections

- Khalid 45.2% Just now
- Khalid 48.7% Just now
- Khalid

Logout

Admin