# Project Title:
# Oil Spill Detection Using Deep Learning (YOLOv8 & DenseNet)

A Deep Learning-Based Approach for Real-Time Oil Spill Detection and Classification

**TEAM MEMBERS:**

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**Under the Guidance of:**

**(Project Guide)**
B.Lalitha Rajeswari

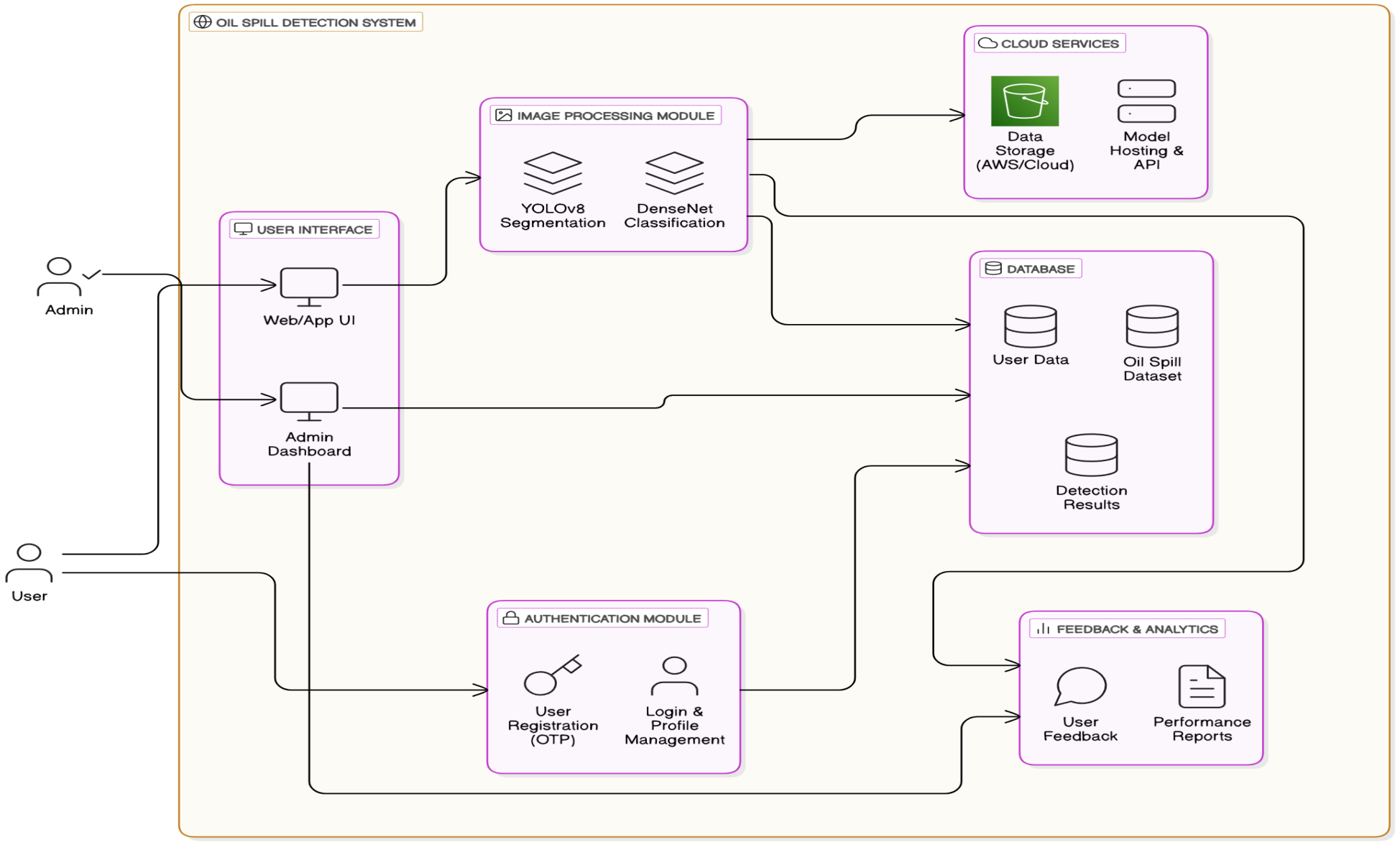
**HOD-CSM**,
Dr.K.Suresh Babu

## Abstract:

•**Overview:** Oil spill detection is crucial for minimizing environmental damage and enabling swift response actions. This project leverages deep learning to enhance detection accuracy.
•**Technology Used:** YOLOv8 for segmentation and DenseNet for classification, ensuring precise identification of oil spills in marine environments.
•**Dataset:** Trained on annotated oil spill images from Roboflow, categorized into spill types like truecolor, sheen, and rainbow.

•**Key Features:**
•Real-time segmentation of oil spills using YOLOv8
•High-accuracy classification with DenseNet (99.67%)
•User-friendly interface with OTP-based registration, profile management, and feedback analytics
•**Impact:** The system enables efficient monitoring, quick decision-making, and better response planning for environmental protection.

# System Architecture



# PROPOSED SOLUTION

The proposed solution provides an advanced deep learning-based system for real-time oil spill detection and classification. By integrating YOLOv8 for segmentation and DenseNet for classification, the system ensures precise identification of oil spills, aiding in rapid response and environmental protection.

**Functional Requirements:**

**User Registration and Authentication:**

•Secure OTP-based user registration and login.

•Admin authentication for system management.

**Real-Time Oil Spill Detection:**

•YOLOv8-based segmentation for accurate spill localization.

•High-resolution dataset trained to detect different spill types.

**Spill Classification and Analysis:**

•DenseNet model for precise binary classification.

•Categorization of spills (Truecolor, Sheen, Rainbow).

**User Dashboard & Feedback System:**

•Profile management and system performance feedback.

•Data visualization for spill analysis and monitoring.

**Software Requirements**

**1. Development Tools & Frameworks:**

- **UI Design:** Figma
- **Code Editor:** Visual Studio Code
- **Programming Languages:** Python, JavaScript (React, Node.js)

**2. Machine Learning & Model Training:**

- **Dataset Management:** Roboflow
- **Model Training & Deployment:** AWS SageMaker Notebooks

**3. Backend & API Integration:**

- **Data Format Handling:** JSON, XML
- **API Development & Testing:** Postman

**4. Cloud & Storage Solutions:**

- **Database:** MongoDB
- **Alerts & Reports:** AWS Lambda Functions

**5. User Interaction & Monitoring:**

- **User Activity Tracking:** Google Analytics
- **Communication & Notifications:** Twilio
- **Social Media Sharing:** WhatsApp & Facebook APIs

## Hardware Requirements

**Operating System:** Android 5.0 or above
**Memory (RAM):** Minimum 2GB for smooth execution
**Storage (HDD/SSD):** At least 1TB for dataset storage and model execution
**Graphics Card:** Minimum 1GB for efficient deep learning computations
**Internet Bandwidth:** 5Mbps or higher for cloud interactions, API requests, and real-time detection

## Results

**Effective Oil Spill Detection:** The system accurately segments and classifies oil spills in marine environments.

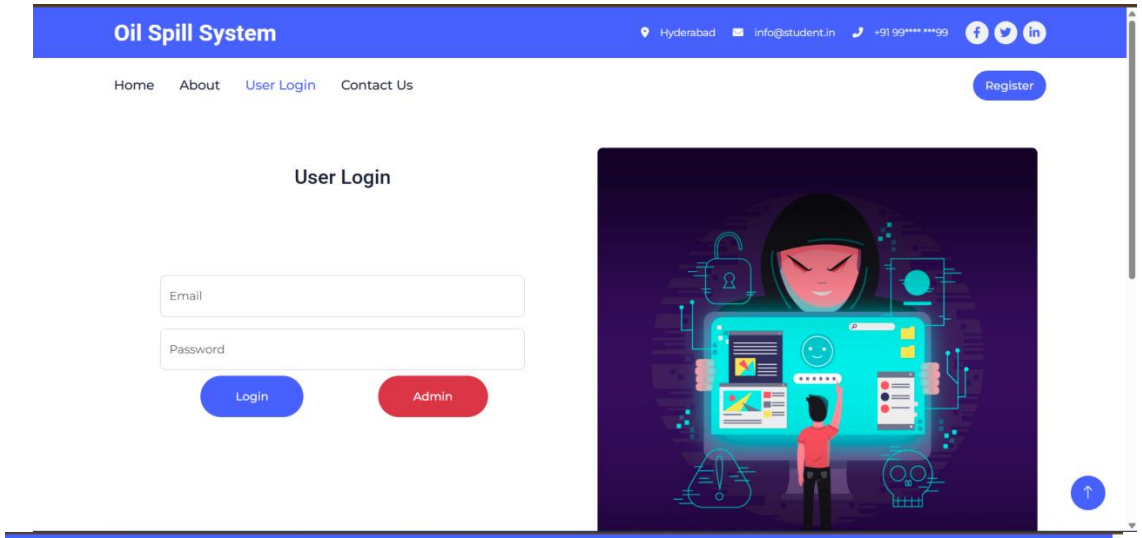
**High Accuracy:** YOLOv8 and DenseNet models achieve reliable detection with real-time segmentation and classification.

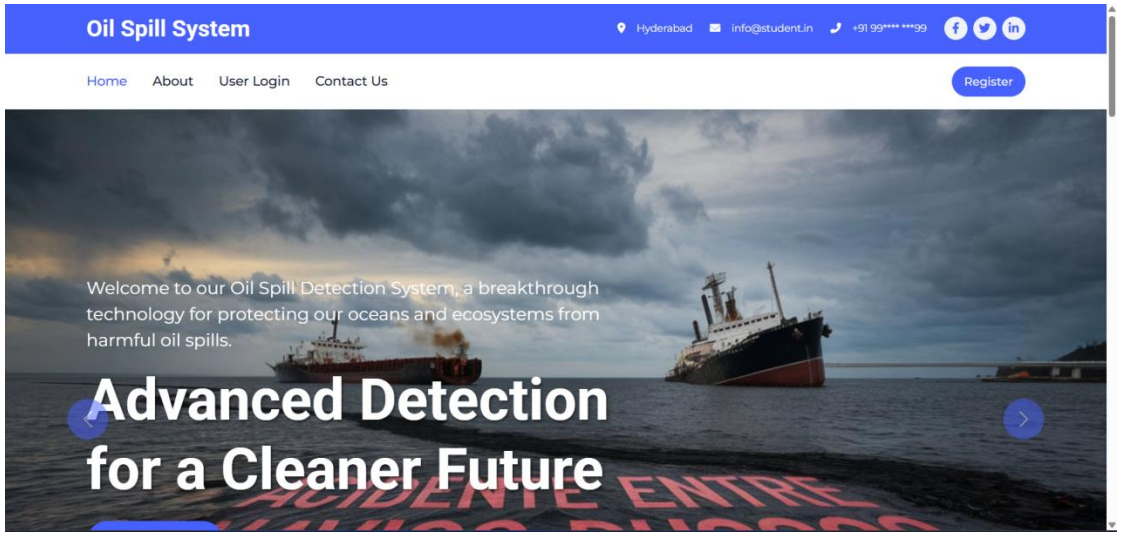
**Performance Metrics:** The model demonstrates high-speed inference and efficiency in spill identification.

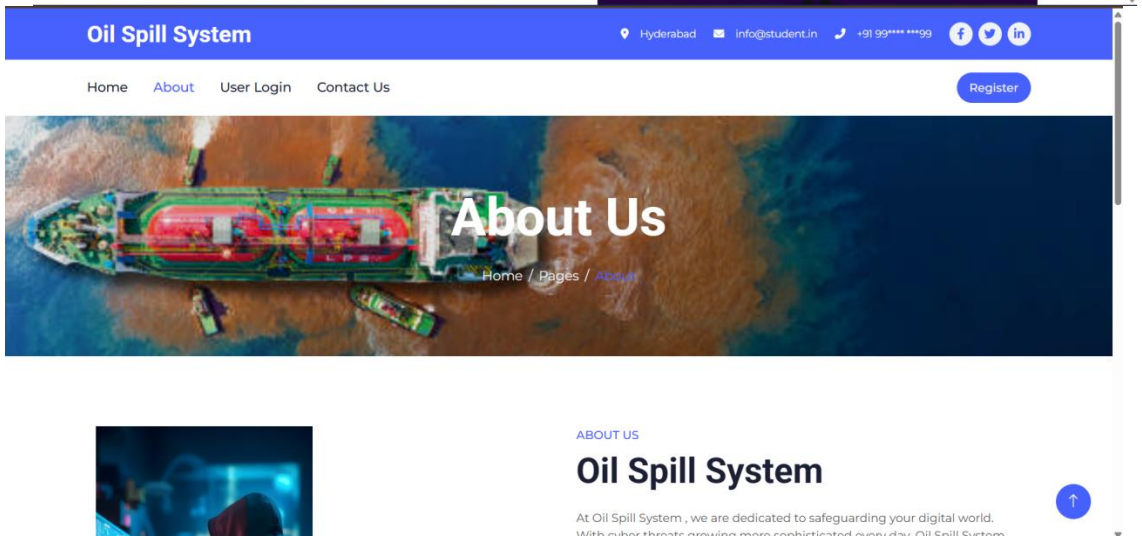
**User-Friendly Interface:** Features like OTP-based registration, profile management, and admin authentication enhance usability.

**Real-Time Monitoring:** Enables swift response to oil spills, supporting environmental protection efforts.

# Results


Oil Spill System
Hyderabad
info@student.in
Home
About
User Login
Contact Us
Register
User Login
Email
Password
Login
Admin


Oil Spill System
Hyderabad
info@student.in
Home
About
User Login
Contact Us
Register
Welcome to our Oil Spill Detection System, a breakthrough technology for protecting our oceans and ecosystems from harmful oil spills.
Advanced Detection for a Cleaner Future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Home
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User Login
Contact Us
Register
About Us
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ABOUT US
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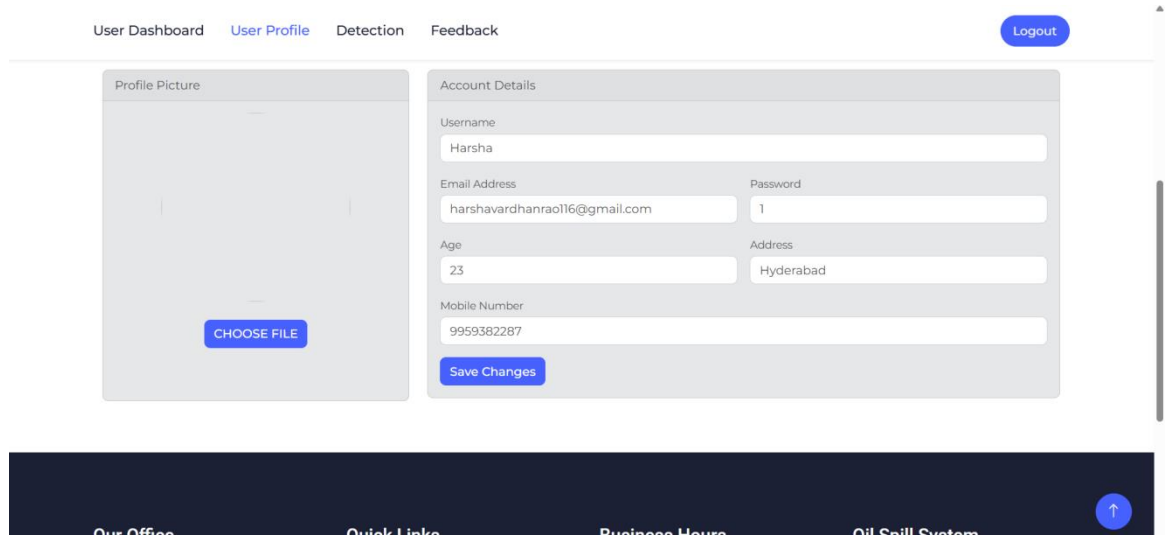
User Dashboard
User Profile
Detection
Feedback
Logout
Profile Picture
CHOOSE FILE
Account Details
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Mobile Number
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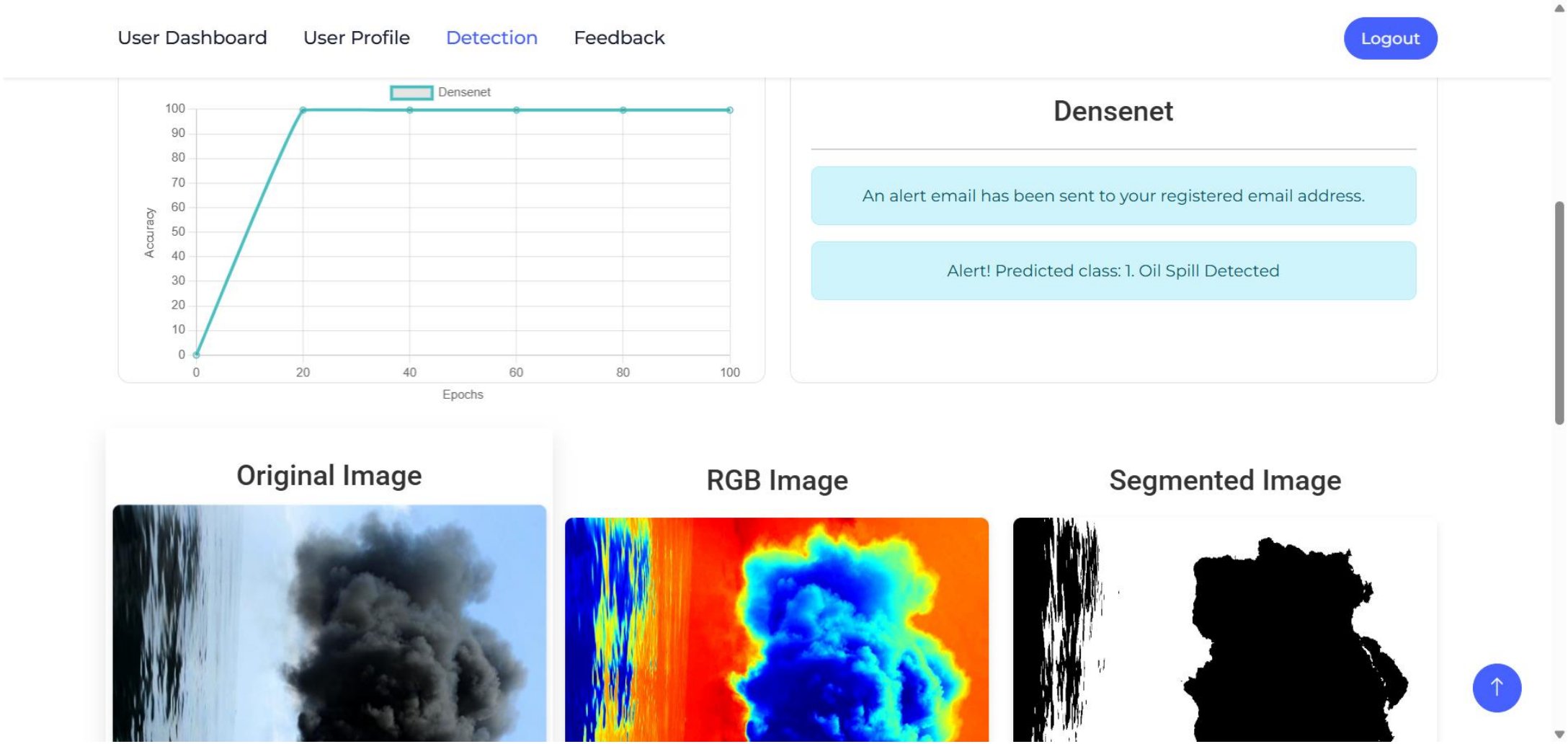
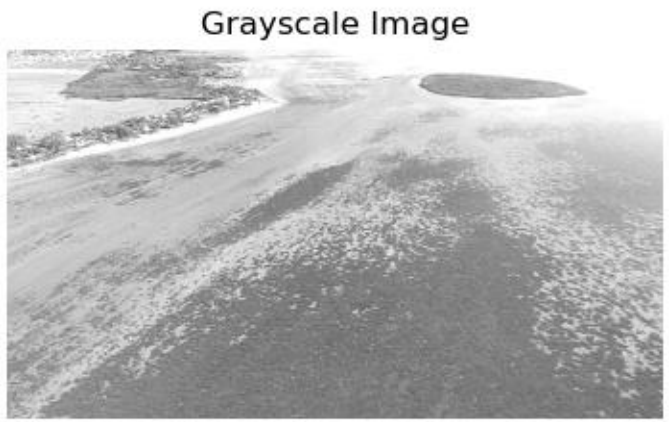
Save Changes

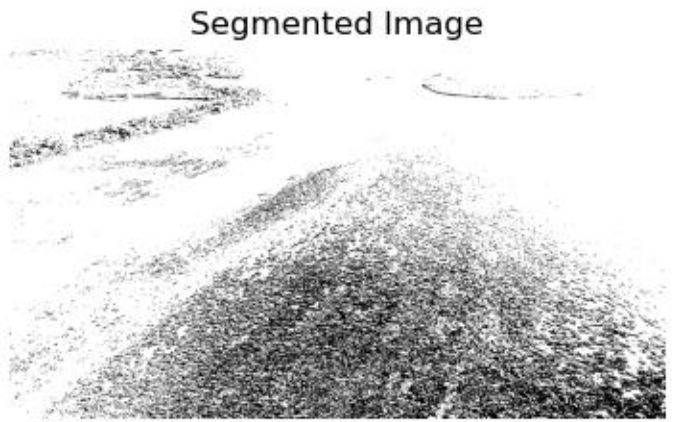
## Results

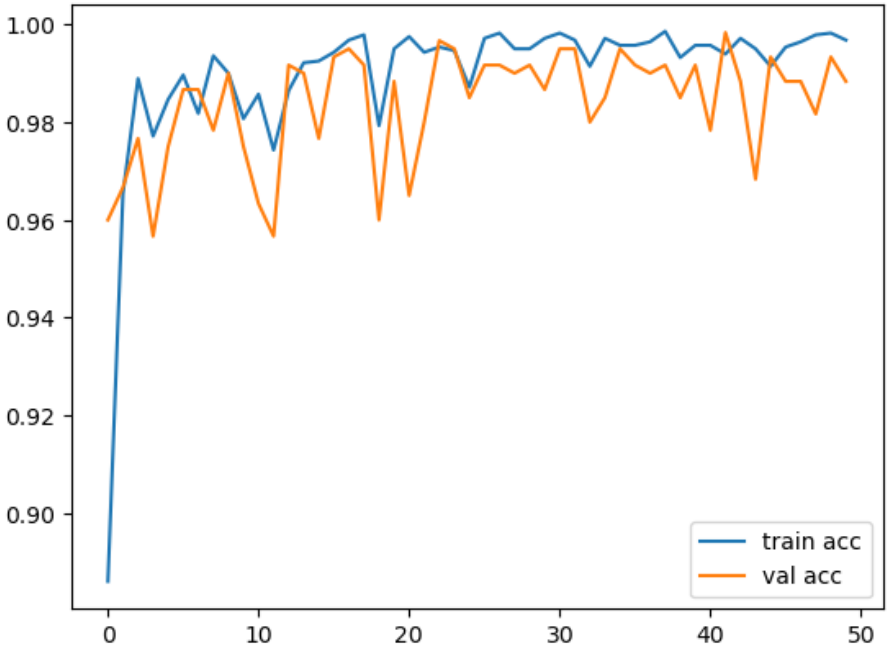

User Dashboard
User Profile
Detection
Feedback
Logout
Densenet
Accuracy
Epochs
Densenet
An alert email has been sent to your registered email address.
Alert! Predicted class: 1. Oil Spill Detected
Original Image
RGB Image
Segmented Image

## Results


Original Image


Grayscale Image


Segmented Image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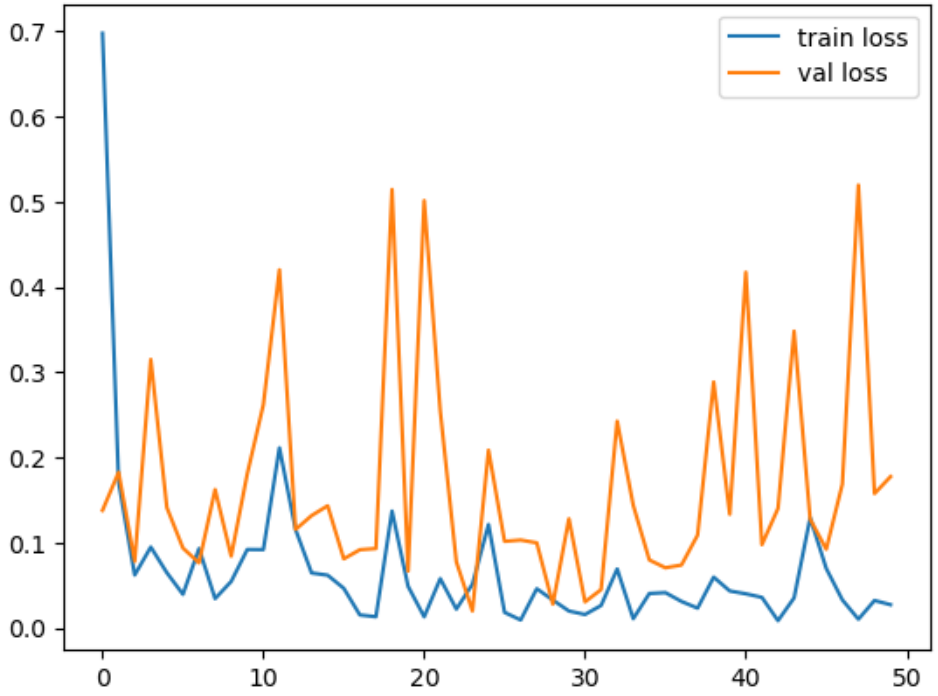
20
30
40
50
train acc
val acc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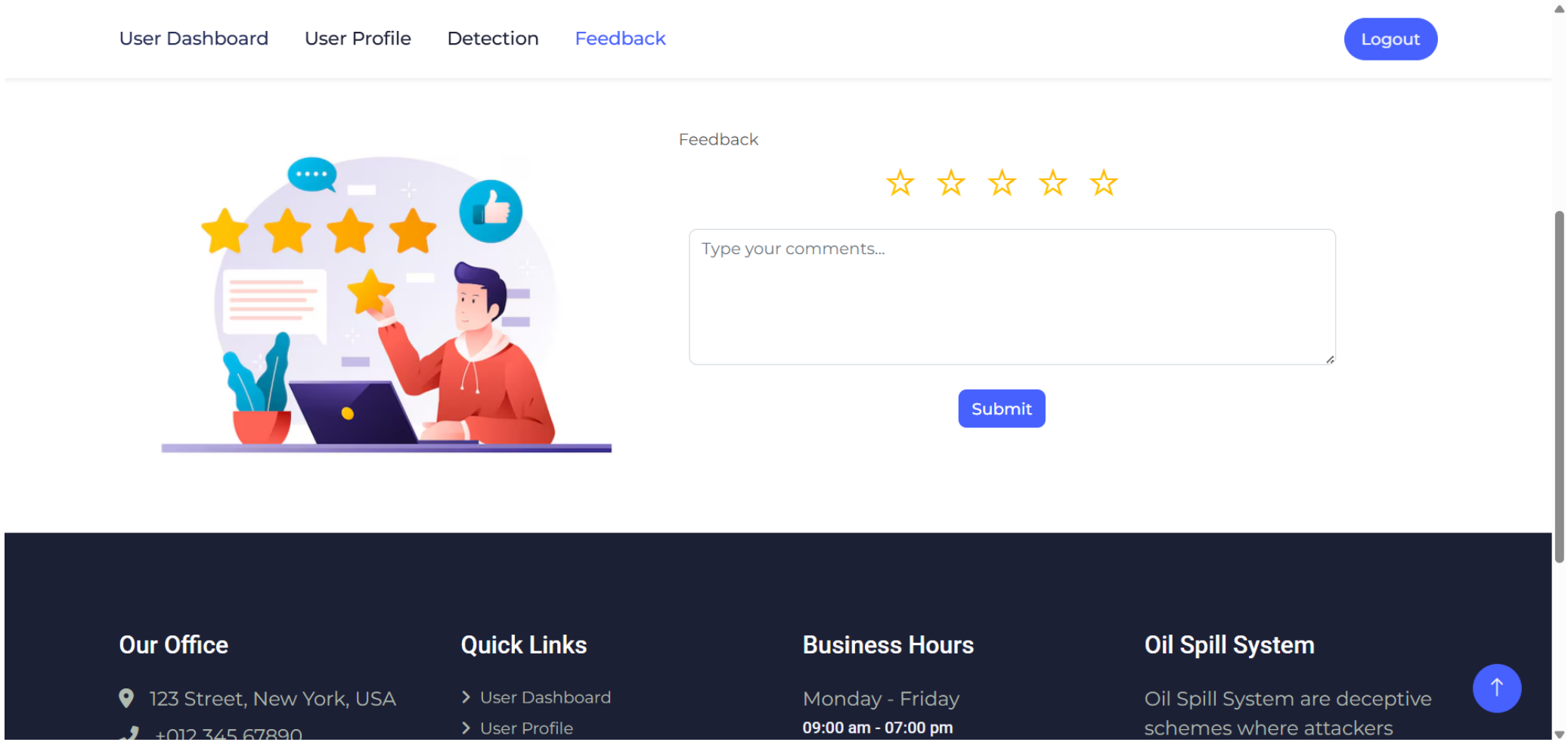
train loss
val loss

## Results


User Dashboard
User Profile
Detection
Feedback
Logout
Feedback
Type your comments...
Submit
Our Office
123 Street, New York, USA
Quick Links
User Dashboard
User Profile
Business Hours
Monday - Friday
09:00 am - 07:00 pm
Oil Spill System
Oil Spill System are deceptive schemes where attackers