RailGuard

Team: Meta Minds

The Problem Statement

Lost in Translation: Security and efficiency at railway stations

- Anomalies and overcrowding getting undetected and neglected on a daily basis leading to dangerous consequences.
- Misinterpretations, missed opportunities, and entire functional damage.
- Need for a bridge between events occuring and the on-ground railway staff for a prompt and swift action.

Tech Stack

Programming Languages:

- Python (primary language for backend development and model training)
- JavaScript (for frontend development and user interface interactions)
- Frameworks and Libraries:TensorFlow, scikit-learn, YOLO, matplotlib, seaborn, numpy, pandas, cv, imageio, keras

Backend:

- Node.js (to create server side web applications)
- Express.js (web application framework for building RESTful APIs with Node.js)

Frontend:

- React (JavaScript framework for building user interfaces)

Cloud Platform:

- AWS (potential use for cloud storage, compute resources, and website deployment)

Stage 1: Data Collection

- Gathering huge datasets of crowd and anomalous behaviour exhibited by individuals on railway platforms.
- Instantaneous alerts will be integrated into our system in real-time.

Stage 2: Training AI Models

- Trained a YOLO v7 model for crowd detection.
- Leveraged RNN, CNN and LSTM networks for anomaly detection.
- Hyperparameter tuning for optimal performance:

    -Acquired an accuracy of 85% for the crowd detection model.

    -Acquired an accuracy of 68% for the anomaly detection model.

Stage 3: Intuitive Frontend Development

- From Data to Action: Interactive Navbar to navigate through various pages.
- Dynamic Hero Section: User can view the analysis of various segments like crowd monitoring, work management etc by clicking on these.
- Feedback section: The user can contact us about any difficulties etc by sending a message.

–Add relevant screenshots from your application

Results

Improved Crowd Understanding:
Businesses can now accurately identify over crowd and manage it effectively through alerts, enabling targeted responses.

Enhanced safety and security of people: Proactive anomaly analysis and detection that allows businesses to compel the railway staff and authorities to take action and prevent the consequences.

Better Work Monitoring:
Graphical display and analysis of crowd,anomaly trends over time.Also keeping an eye on increasing the efficiency of the physical level authorities for prompt actions.

Team Contribution:

1. Kaushik Aduri (Data Scientist):
   - Engineered real-time crowd spotting at stations using YOLOv7 model and python scripting , enhancing security by identifying crowded areas in real time with an accuracy of about 80%.

2. Shreya Kumar (Data Scientist):
   - Implemented LSTM models for spotting unusual incidents and unforeseen anomalies at railway platforms using CNN algorithms, achieving about 70% accuracy rate.

3. Reva Sartape (Backend and UI Developer):
   - Contributed to the backend web development and designed the UI framework for our website.

4. Meghna Jha (Frontend Developer):
   - Developing the user interface of our website using React JS. Focused on simplicity and user-friendliness.

5. Himanshu Sangshetti (Hosting and Deployment):
   - Managed the hosting and deployment of our ML models, ensuring availability and efficiency on the AWS platform.
   - Integration of models and the website.

We’ll proceed to the live demo now