Development Document

Project: Using existing CCTV networks for crowd management,crime detection and prevention and work monitoring for Railway Stations.

Team: Meta Minds
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I. Technical Stack

Programming Languages:

- Python (primary language for backend development and model training)
- JavaScript (for frontend development and user interface interactions)
- Frameworks and Libraries:
  Libraries:
    - Matplotlib, seaborn, numpy pandas for graphical analysis
    - Imageio for reading and writing the images
    - Keras for building and training deep learning models

  Machine learning frameworks:
    - Tensorflow, scikit-learn
    - Yolo: Used for crowd management.

Backend:

- Node.js
- Express.js

Frontend:

- React (JavaScript framework for building user interfaces)

Cloud Platform:

- AWS (for website development)

II. AI Model Architecture

Chosen Model:

- Recurrent Neural Network (RNN) with Long Short-Term Memory (LSTM) architecture. Captures snapshots of images and processes the most impactful points in the image for identification of anomalies.
- Convolutional Neural Network (CNN)- We build the video classifier using CNN. It captures features of each frame of the video and passes these through multiple convolution layers for deep learning.

III. Key Functionalities

Crowd Detection and Management:

- Utilizes advanced algorithms to analyze crowd size and dynamics in real-time.
- Assigns individuals or groups to waiting rooms based on crowd density and distribution.
- Adapts resource allocation (staff, security, facilities) dynamically according to crowd fluctuations.
- Provides real-time alerts and recommendations for immediate action in critical scenarios.

Crime prevention:

- Employs machine learning algorithms to detect unusual or abnormal patterns in behavior, helping identify potential criminal activities.
- Classifies different activities such as accidental pushing, suicidal tendencies, and assault, using computer vision
- Sends instant notifications to employees and relevant personnel when suspicious activities are detected, enabling quick response.

Work monitoring:

- Monitors and assesses the flexibility of available services allocation in railway stations.
- Focuses on optimizing services for employee needs and efficient resource allocation.
- Incorporates predictive analytics to forecast service demand and employee requirement

User Interface:

Provide a user-friendly interface for:

- For viewing and getting real time insights of anomaly detection, work monitoring, crowd management
- Provides graphical representation of the data for better understanding.

Sample Links:

- **GIthub Repository Link:** https://github.com/Himanshu-Sangshetti/Nestria-Hackathon--Team-Meta-Minds
- **Github Project Link:** https://github.com/Himanshu-Sangshetti/Nestria-Hackathon--Team-Meta-Minds