Project Initialization and Planning Phase

Date	25 Sep 2024
Team ID	739704
Project Title	Railway Sentry: Detecting Workers on Railway Tracks using YOLO V9
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) template

Railway maintenance and construction often involve workers on or near tracks, putting them at risk of accidental collisions with oncoming trains. Traditional monitoring systems rely on either manual observation or simpler forms of detection, which are prone to errors and delays. The aim of this project, Railway Sentry, is to develop a highly accurate and real-time detection system that identifies and tracks the presence of railway workers using the YOLO V9 (You Only Look Once, Version 9) algorithm.

Project Overview	
Objective	**Detect Workers:** Use the YOLO V9 model to identify workers on railway tracks. **Track Movement:** Continuously track worker positions and movement along the railway line. **Alert System:** Trigger automatic alerts for railway personnel when workers are detected in dangerous proximity to oncoming trains. **Scalability:** Design a model that can adapt to different environments, weather conditions, and lighting.
Scope	Railway Sentry will employ state-of-the-art computer vision techniques and deep learning models, with an emphasis on real-time performance and accuracy. YOLO V9 has been chosen for its exceptional speed and precision, making it ideal for this application. The system will be tested in a variety of real-world railway scenarios to ensure robustness and reliability.

Problem Statement	
Description	Railway maintenance and construction workers often perform tasks on or near active railway tracks, exposing them to the risk of oncoming trains and potential accidents. Ensuring worker safety is paramount but challenging with traditional monitoring systems that rely heavily on human surveillance, which can be prone to errors and delays.
Impact	Railway Sentry enhances worker safety on railway tracks by providing real-time detection of personnel near active tracks, reducing accident risks and improving response times. By automating alerts for oncoming trains, this YOLO V9-powered system minimizes human error in surveillance, advancing operational efficiency and safety in railway maintenance and operations.
Proposed Solution	
Approach	Railway Sentry employs YOLO V9 for precise, real-time worker detection on tracks, using annotated datasets to train the model on various conditions. It integrates tracking and alert systems to notify railway operators of worker proximity to active tracks.
Key Features	Railway Sentry leverages YOLO V9 for real-time, high-accuracy worker detection on railway tracks, adaptable to varied conditions. It provides automated alerts, continuous tracking, and scalability, enhancing safety protocols and reducing accident risks in railway operations.

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	GPU specifications, vs code	NVIDIA V100 GPUs
Memory	RAM specifications	8 GB
Storage	Disk space for data, models, and logs	1 TB SSD
Software		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	Ultralytics , Yolov9s,
Data		
Data	Roboflow, 2GB, Directories	Roboflow dataset 1000 images