Project Presentation

Good afternoon Sir/Maam.

We are Team **"Red Dev Redemption"**, my name is **Abdurrahman Qureshi** from third year IT and the problem statement we aim to solve is:

"Maximizing Section Throughput Using AI-Powered Precise Train Traffic Control"

The Indian railways consists of more than **25 million passengers** that travel daily between and throughout the country. It is one of the most prominent and most effective mode of transport that is used across the states.

However, with such a big scale comes a big puzzle of managing thousands of trains every day and every minute. Freight, express, passenger trains all compete with each other leading to bottlenecks and limited prioritization. The puzzle to solve keeps changing rules every minute due to the weather, delays, accidents or maintenance.

The result is a **paradox of decision** where a small mistake can lead to a huge butterfly effect and cause major hurdles down the railway tracks and the states.

Problems in the Current System

- Controllers manually track and monitor train positions.
- **Reactive and not Proactive**:
  - The system only manages delays when they occur and not prevent or predict in advance.
- Despite high investment, the tracks are not utilized to their full potential.
- **Lack of Priority**:
  - A freight train carrying perishable food can be delayed behind a late passenger train, with no system to re-prioritize in real time, risking food shortages and economic loss.

The outcomes can vary from harmless effects like delays to the worst – in case of:

- The Odisha accident in **June 2023** from collision and derailment due to signaling error.

- The **August 1999** West Bengal accident caused by the same reason.

Our Project

We plan to solve this paradox by **Project RailVeer**.

Proposed Solution

- Provide real-time monitoring and tracking of trains.
- Predict when and where delays and congestions may occur using AI models.
- Calculate and predict optimized train movements to avoid delays and accidents.
- Provide an intuitive dashboard to traffic controllers for actionable suggestions.

Innovation and Uniqueness (Why Use This Project)

- **Scheduling Algorithms + AI Models**: About solving for the best outcome.
- **Dynamic Prioritization**:
  - Allows the system to adjust trains based on priorities to maximize economic, time, and passenger value.
- **Digital Twin Simulation**:
  - If a controller is not confident about making a decision, he/she can simulate it in a digital simulation to see the aftermath leading them to make a better decision.
- **Digital Simulation**:
  - To simulate stress and spike testing on new stations or busy stations in metropolitan and rural areas.

Overall increases the throughput to ensure maximum effort and value is utilized.

[Show project simulation]

Next Step

Next-up my friend **Yamin** will be going over the **technologies that we will be using**.