

PROBLEMS AND SOLUTION FIT FOR SMART RAILWAYS - SMART SOLUTIONS FOR RAILWAYS USING IOT

PROBLEMS/CHALLENGES

- ❖ Railways being the largest public sector undertaking has varied and complex problems. Its present railway network is overburdened and inadequate to meet the new challenges of a fast developing economy.
- ❖ Some regions are beyond the reach of railways due to unfavourable geographical conditions. These areas need to be opened to railways for removing regional inequalities in economic growth.
- ❖ The railways have to develop uneconomic projects due to political pressures and interferences.
- ❖ The State Electricity Boards and NTPC increase the tariffs arbitrarily and thus adds to the burden of railways.
- ❖ Railways are the largest consumer of diesel. Any increase in the rates of diesel, adversely affect the financial resources.
- ❖ Most of the equipment used by the railways are now obsolete and need immediate replacements.

SOLUTION FIT :

Railways to enhance the passenger experience, help improve safety, enable predictive maintenance, and, ultimately, create a successful future.

- ❖ IoT technologies help railways successfully manage passenger safety, operational efficiency, and the passenger experience.
- ❖ Smart sensors can be used to track important assets, manage passenger flow, and enable predictive maintenance.
- ❖ Innovative ways to safely get back to business post-COVID, meet the changing needs of their citizens, address urban population increases, and reduce their environmental impact. To meet these challenges and position themselves for future success, many forward-thinking governments and railway operators are looking for smart, intelligent IoT technologies to modernize their railways.
- ❖ There are many types of smart devices that enable IoT in railways, such as vibration and temperature sensors, vehicle and station cameras, digital signage, machine learning libraries, security systems, and more. When these intelligent devices work together in one end-to-end solution, railway operators can:
 - **Turn data into actionable insights.** With edge computing, railway operators can process and analyze data closer to where it is collected to allow for near-real-time decision-making and responsiveness. This low latency computing power helps enable solutions such as railway obstacle detection recognition, dynamic digital signage and interactive kiosk content, and passenger flow monitoring.
 - **Maximize the value of existing systems.** Bridging the IT/OT divide and achieving convergence, which is the integration of information technology (IT) with operational technology (OT), helps operators to leverage, aggregate, and analyze data across the whole

railway system. This new information can help streamline business processes, generate insights that can drive new innovative solutions and services, and reduce downtime.

- **Position themselves for future success.** Technology differentiators, such as deep learning and AI, can help operators prepare for the future and gain a competitive edge over other modes of transportation. AI can be used to predict rail delays to increase capacity without building new infrastructure, and deep learning can more accurately monitor passenger traffic flow for enhanced analytics in station planning and operational decision-making.
- ❖ By implementing sensor beacons, edge computing, AI, and cloud-based technologies, operators can eliminate queue lines at ticket machines. Using sensors on station platforms or trains, the system is designed to detect a specific smartphone app as passengers enter the station or train and automatically charge the correct fare. This not only streamlines the process for both passengers and operators but can also simplify back-end billing and revenue management and collect usage behavior for long-term planning.