ADITI
CONSULTING

CASE STUDY

Application Modernization, Data + Analytics

A DATA DRIVEN APPROACH TO OPTIMIZING LOCOMOTIVE PERFORMANCE

THE CHALLENGE

A major logistics company specializing in rail transport identified a need in the industry for an intelligent cruise control system for locomotives to optimize fuel consumption, reduce operational costs, and enhance overall safety. To address this efficiency challenge, they wanted to develop an advanced algorithm to enable more precise control over train speed, braking, and acceleration that would lead to smoother operations and less wear on equipment.

Such a system could improve scheduling and routing, thereby minimizing delays and increasing deliveries on time. Additionally, efficient, data-driven locomotive control could also help rail transport companies to meet their sustainability goals by lowering their emissions and overall carbon footprint.

Rail transport operates in a highly complex environment, and, for effective analysis, the algorithm would need to incorporate data from IoT sensors on the train and data describing the terrain, weather, traffic, and so on. Recent advances in data acquisition and analytical computer power have made such a complex real-time analytical solution feasible, but the logistics company did not have internal resources available to push the project forward; they needed outside help to make this intriguing concept a reality.

OUR SOLUTION

To push this project forward, the company turned to their long-standing relationship with Aditi, a relationship that the two companies had developed over the years through the completion of a variety of successful projects.

Aditi provided a software development team with the following capabilities to find a solution:

- DATABASE ADMINISTRATORS (DBAS)
- FRONT-END DEVELOPERS
- BACK-END DEVELOPERS
- DATA SCIENTISTS
- IOT EXPERTS
- A PROJECT MANAGER
- A SYSTEM ARCHITECT

The core objectives were analyzing of locomotive speeds (especially during transitions in and out of urban zones), determining the ideal throttle adjustments to minimize sudden speed changes, and designing an application to offer real-time suggestions to conductors.

After all necessary data and parameters were captured and analyzed, the team created a proof-of-concept dashboard to visualize and interpret train IoT and other data, including terrain details, the train composition, any speed restrictions, and other operating conditions to determine optimum speed profile for any given section of track.

The team also created an application to advise conductors on throttle adjustments to ensure seamless transitions and optimized fuel consumption. The technology used for this solution includes Postgres for database management and Python for backend development and data processing. JavaScript was employed for front-end development and interactive visualizations.

THE BUSINESS OUTCOME

Aditi's software development team created a system that gives conductors real-time, data-driven throttle advice. This solution minimizes unnecessary speed changes and thus reduces fuel consumption by an EPA-certified 10%. This software has been used for over one billion collective miles by locomotives worldwide to save over 700 million gallons of fuel and dramatically reduce the carbon footprint of rail transportation.

Through the synergistic blend of diverse technologies, ranging from Postgres to Python, coupled with a robust team structure, Aditi was able to craft an efficient solution for this company, which underscores our prowess at using advanced technology to deliver measurable business results.

ADITI EMPOWERS DATA AND ANALYTICS

Aditi partners with you through the entire life cycle of application development and modernization so that you can expedite time-to-deployment. Aditi builds teams quickly to perform business analysis, project management, UI/UX design, software development, QA/testing, and ongoing support.

Contact us today to discover how we can help you leverage the power of application development.

CONTACT US

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Aditi is a leading digital engineering services company. We partner with established and emerging enterprises by leveraging borderless talent across three continents to achieve transformative outcomes that will reshape their trajectory. We lead and support our clients' efforts to design, build, and operate the products, systems, and processes required to deliver impact by leveraging deep insights, practical knowledge, and human spirit.

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