

Success stories



Predicting the remaining useful life of Aircraft Engines based on sensor data

virtusa



BUSINESS SITUATION

- Normal maintenance cycles for aircrafts are often schedule based or based on the number of miles flown
- This can be inefficient as it does not take into account the condition of the aircraft between scheduled maintenance cycles
- With the high cost of labor and equipment involved, it is important to perform such maintenance operations at the right time when it would make the maximum impact



SOLUTION

- A structured process is followed to fully understand the business problem before moving on to creating and evaluating machine learning models
- **Exploratory Data Analysis** - Analyze the data and the relationships between the variables, Remove superfluous variables and split the dataset into training, test, and validation sets for model evaluation
- NASA dataset was used to demonstrate the feasibility and accuracy of this approach
- **Model Selection & Evaluation:** Clean the data and do feature engineering to frame the prediction problem
- Start with Generalized Linear Modeling to set a baseline ; Try ensemble methods and neural networks to improve the prediction accuracy and Evaluate the models on the test dataset and choose the highest performance model
- We have used 7 different machine learning algorithms for classification of the remaining useful life 0,1,2,3
- These models are used to assess whether an aircraft needs maintenance dynamically
- **Model Deployment:** Deploy the model on the cloud so that new, real-time data can be used to generate predictions
- **Model Visualization:** Different model summary along with the predicted values and model metrics are hosted on R shiny



BUSINESS BENEFITS

- Accurate prediction help with better scheduling of maintenance cycles
- Dynamically optimized maintenance schedules increase the life of an aircraft and increase the efficiency of the maintenance cycles
- RUL predictions help evaluate the condition of a fleet effectively and help manage resources better
- Similar techniques can be used to model the degradation patterns of major components in an aircraft and increase maintenance efficiency

Virtusa helps Medical Device and Care company to modernize/ enhance their therapy management for critical kidney care patients



CHALLENGE

- As home dialyzing becomes more popular, there is additional emphasis required on coordinated care by clinical staff, providers and physicians.
- Fresenius is enhancing peritoneal home-dialysis patient experience through the Connected Health Platform.

SOLUTION

- FMC engaged Virtusa to build Reciprocity and Unison components of the Connected Health platform.
- **Reciprocity** provides connectivity to the cyclor to manage its treatment programming and facilitates seamless collection of pre- and post-dialysis vital signs.
- **Unison** enables remote monitoring of treatment and clinical data by clinical staff and technical support teams.

BENEFITS

- Virtusa was engaged for end-to-end implementation of both these components leading them through requirements, development and support as governed by the FMC Quality process.

CLIENT PROFILE

Client Demographics

- Industry: Medical device(Dialysis)
- Team size: 25-30
- Geography: Boston and India

Timeline & Delivery Performance

Phases: Blueprinting, research, design development, verification, validation. On-time project completion and executive sign-off of deliverables

Capabilities & Skillsets

- IoT
- UX/UI

Technologies

- Thingworx. Azure Cloud
- .NET and ReactJS
- OSGI(Whiteboard) , C/C++, Lua



Improved operational efficiency by implementing one of the largest geospatial asset data store for a leading railway infrastructure management company



OVERVIEW

Solution provides the business with a trusted source of reliable asset data that is held in a single location, is easy to access, is spatially aligned and extensible with additional data sources for future demands

SOLUTION

- Integrated Track asset data in a centralized system that paves the way for advanced machine data analytics with machine learning at the heart of a large program
- Developed a Geospatial interface for user dashboards allowing an intuitive BI interface laying out the rail infrastructure on geographical maps providing the "Next-best-action" to be taken in a predictive and prescriptive manner

BENEFITS

- Increased real-time tracking for rides by 70%
- Allows better analysis on measures that support CRI, enabling safety benefits
- Reduced time spent collating data means more time for analysis in order to deliver greater insights

Preventive Maintenance solutions & partner led solutions



Elevator Monitoring System – Provides Live monitoring of operating conditions and Predictive Maintenance



Transformer Monitoring System(TMS) - Helps in reducing Power Outage, Decrease in operation cost, Extended Transformer life, safety, and helps progress towards unmanned sub stations



Advanced Metering System (AMS) - Reduce consumption by increasing transparency in power consumed and prevent power leakage



Wind Turbine Remote Maintenance assistance & Training through AR - developed a detailed Wind Turbine Onboarding Simulator in Virtual Reality



RTMS – Remote Tower Monitoring System (Telco) aids in monitoring Tower equipment health status, service monitoring and cost optimization



F2MS - Fleet Management System helps in Operational cost & Budget Forecasting, Fleet backup recommendations, Fleet Maintenance & Fleet downtime forecasting

Enhancing worker safety & productivity with a IoT & AI

OVERVIEW



modjoul

Wearable device enabled
Healthcare and Workers
safety solution with
remote monitoring and
management facility.

SAFETY & PERFORMANCE TRACKING

Tracks the safety and performance of an employee working and driving and provides insights into possible workplace safety issues



API GATEWAY

Connected API gateway to the larger IoT eco-system – Time & Labor, Machines, and Access



BLACK BOX™

Black Box™ for data capture events



CUSTOMIZABLE DASHBOARD

Customizable dashboard to represent the new insights, with views for employees, supervisors, risk managers, and leader of leaders

REAL-TIME DATA TRACKING

Real-time data flow with cellular or WiFi

PREDICTIVE DATA ANALYTICS

Proprietary predictive data analytics and modeling



DATA GATHERED

The modjoul belt becomes a part of the employee's uniform. Employee works as they normally do, and the sensor data is transmitted either through Wi-Fi or cellular to the cloud.



METRICS PRESENTED

The encrypted data is received and then used in proprietary formulas and models to present metrics in unique dashboards for the employee, supervisor and risk manager.



REPORTS ANALYZED

The dashboard reports are viewed online via mobile device or web browser, where the data can be analyzed and actioned.

CHALLENGES

- A disconnected work environment.
- Injuries in workplace are occurring without any clear or practical resolutions.
- Work is not being tracked, analyzed, or used in a meaningful manner.
- Collecting and analyzing work metrics is a time consuming, error-prone task

FEATURES

- Provides insights into actual work being performed, increasing workplace performance and safety.
- Customizable sensors track work, injury occurrence, and provide the data needed to prevent similar occurrences in the future.
- Easy to use and seamlessly integrated into normal working atmosphere and conditions.

BENEFITS

- Productivity savings of 5% to 10% from reduction of idle time and work-rate improvements
- Better/more accurate workplace data metrics
- Employee injuries and accidents are reduced