Success Story

Empowering an Energy/ Utilities Business with Advanced Analytics Solutions

Business:
Advanced Analytics

Domain:
Energy, Utilities

Tools:
R, Python, Graffana, Neural Networks

Key Highlights

Key Success:
» Reduced surplus and inventory costs by 5% for DISCOMS.
» Preventive maintainence of turbines resulted in the reduction downtime losses by 5-6%.

Database:
Open TSdb, PostgreSQL

Client
The client develops, sells and services energy analytics software to renewable energy producers, OEMs, transmission and distribution utilities, and other energy companies.

Overview
The client's product is used by some of the world largest wind farms where a weekly energy generation fluctuation of just 1% owing to erratic weather would translate into millions of dollars of made or lost revenue. Wind energy companies therefore want to be able to predict power generation to the highest possible degree of accuracy, a task for Advanced Predictive Analytics and Neural Networks. In addition to forecasting power generation, Indium Software was also tasked with formulating models which would identify at-risk turbines for predictive maintainence.

1 Status Quo

The client develops, sells and services energy analytics software to renewable energy producers, OEMs, transmission and distribution utilities, and other energy companies. The platform primarily handles Weather forecast data, historical energy consumption data, and data from IoT sensors.

The client required an advanced analytics solution to make use of the data to generate insights that:

» Help their business forecast demand for Distribution Companies.
» Detect outliers for ill-performing wind turbine.

2 Indium Software's Approach

Indium Software's approach focused on two use cases:

» Demand Forecasting
» Survival Analysis

Demand Forecasting Problem

Business Requirements

» The data flux from the Weather reports, Energy Consumption and IoT Sensor data is of high frequencies and volumes.
» Using the data, create a model of High Accuracy and Less Variance forecasting values.

Solution

» Indium Software implemented Generalized Additive Modelling to achieve high accuracy and less variance results.
» The high volume, high frequency data is handled using OpenTSdb.
» Used Non-parametric regression for more generalization, piecewise splines.
» Saved the Model in a PMML Object and use it for inflowing data to generate demand forecasting results.

Business Impact

The client was able to use the model to realize real-time business benefits.

» Reduced surplus and inventory costs by 5% for DISCOMS.
» With better inputs for financial, operational planning and budgeting, revenue management process became proactive and efficient.

Survival Analysis Problem

Business Requirements

» Use of data sources from Weather forecast reports, Wind Turbine sensor data from a large number of wind turbines.
» Predict failures in advance to leave enough device repair and maintenance time.

Solution

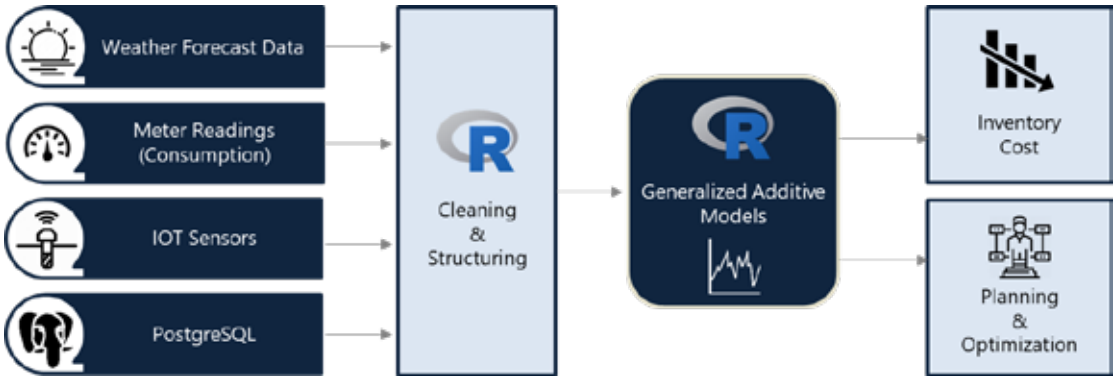
» Indium Software leveraged OpenTSdb to handle unbalanced data.
» Used Survival Analysis which gives probability of failure in a given window of time.
» Used Isolation Forest and Advanced Outlier Detection methods.

Business Impact

The client was able to use the model to realize real time business benefits.

» Energy grids get alerted and repair the turbines before they go out of the order. This projected a significant 5-6% cost savings in repair and maintenance.

» Enhanced Predictive Maintenance aided the client business to maximize revenue recovery, reducing sunk costs by 2-3%.



Data Flow Diagram

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