Predictive Maintenance using Artificial Intelligence & Internet of Things (IoT)

Overview:

The Client was a large Water Utility that needed to predict failure for their water pumps. AI Modes were generated for the equipment using historical data parameters for the pumps along with the past equipment down-time instances. Then, real-time equipment data was gathered from the remote equipment using IoT sensors and uploaded to our secure cloud. This data was used along with the historical AI models to make equipment failure predictions. This early identification of issues helped the client deploy limited maintenance resources more cost-effectively, maximize equipment uptime ultimately improving financial positioning, & customer satisfaction.

Key Benefits (Minsky):

➤ User-Friendly, cloud based AI platform
➤ No coding skills are required for results or predictions.
➤ Provides you a list of dependency features that can be used to optimize your AI Models
➤ Ability to fine tune or optimize the models by trying different algorithms / prediction attributes
➤ Easy integration with other third party solutions such as TABLEAU for data visualization.

Results:

➤ Reduction in Maintenance costs
➤ Better Management of spare parts inventory
➤ Avoiding catastrophic equipment failures
➤ Systematically schedule the optimal maintenance / inspection routine
➤ Improved productivity in operations
➤ Improved equipment lifespan
➤ Avoid unnecessary scheduled maintenance

Typical Predictive Maintenance Challenges:

➤ Unable to provide continuous equipment up times resulting in poor customer satisfaction.
➤ Decrease in production operational efficiency.
➤ Poor management of spare parts inventory(overstock/Under-stock)
➤ Increased Maintenance costs
➤ Catastrophic equipment failures
➤ Unnecessary maintenance resulting in reduced asset lifespan.

Solution:

Our goal was to explore how artificial intelligence can lead to improved metrics across all assets that require routine maintenance and have a positive impact on our customers, employees, and bottom-line. After thoroughly evaluating the client's challenges we used Minsky to accurately model historical data of equipment down-time instances along with past data parameters for the pumps. This process included collection of the pump data using IoT sensors from remote locations. Once the AI models were generated by Minsky for the selected algorithms and historical data parameters for the pumps along with past actual pump downtimes, predictions for future maintenance were made using real time equipment data which is gathered from IoT sensors and uploaded to our secure cloud. Prediction data from Minsky was also integrated with 3rd party data visualization application like Tableau.
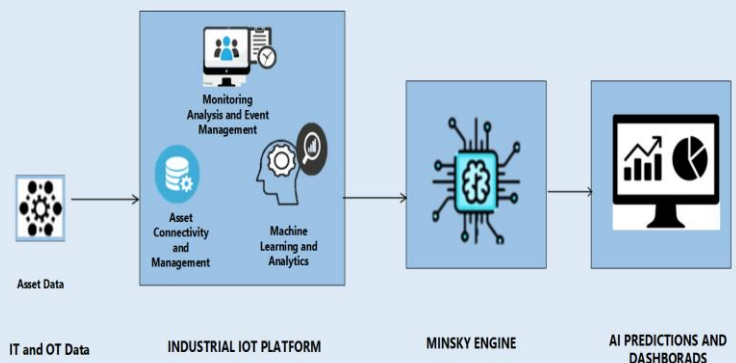
This process was done in 3 steps:
Step1: Data collections from remote pump sensors using IoT
Step2: AI Modeling using Minsky
Step3: Use analytics to predict the future maintenance requirements.