Ai Labs

MinskyCube

Data Acquisition & Predictive Maintenance for Remote Assets Using IoT Sensors and Minsky™

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

Problem Statement

The Client was a large Power Utility company that required real time data acquisition from remote assets (Such as Transformers, Power equipment, etc) for conditional monitoring and predictive maintenance. In addition the solution also required the establishment of a Digital Twin for data security and data redundancy.

Solution Overview:

Our MinskyCube solution consisted of data acquisition from remote equipment using IoT sensors and storage in a Data warehouse/Cloud Server. Data is then migrated to data base using ETL and published to Tableau, Power-Bi or any other dashboards for data visualization/condition monitoring.

In addition to above, our solution integrated the Real Time IoT data with the historical equipment data for Modelling using our proprietary Ai engine Minsky to perform Predictive Maintenance.

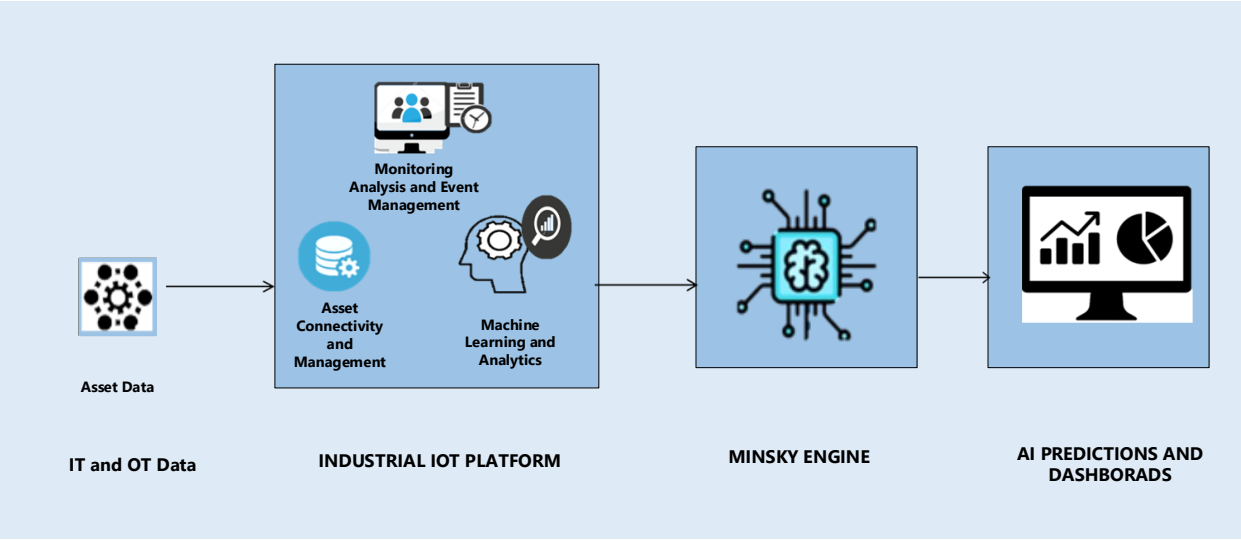
Typical Data Flow:



The following are some specific feature of our current use case:

- Data acquisition from IoT sensors and stored in a Data warehouse. Simultaneously, digital twin is also created for data security and to maintain data redundancy.
- SSIS package was created for real-time data movement into a SQL Server DB so that all the dashboards can show live data.
- Interactive Dashboards were created using Power-BI while showing the data on a Grid map from SQL DB based on postal codes.
- Additional IoT data from pole transformers such as Temperature, Oil level, Power loads, etc was displayed from dashboards for condition monitoring.
- Interactive ALERT Dashboards were created using Power-BI (heat map) for live Temperature values based on Pre-defined alert conditions. Fox ex, we are displaying all Transformers location with T > 40 deg C
- Interactive ALERT Dashboards were created using Power-BI (heat map) for live Oil Levels values based on Pre-defined alert conditions. Fox ex, we are displaying all Transformers location with Oil Levels < 70
- The real time data was analyzed by Minsky using the Ai Models developed from the historical data to perform Predictive Maintenance.
- MinskyCube was also integrated with ServiceNow, Maximo and other 3rd party ERP systems for work order creation for Service Maintenance Technician dispatch.

Our Typical Ai data flow:



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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 business
- 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

Project Results/Benefits

- Ability to view Real-Time condition monitoring data from interactive dashboards.
- 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
- 24/7 monitoring the equipment and alerts to alert support staff to fix critical issues
- Our solution can be integrated with any 3rd party ERP systems, Data visualization tools etc.

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