**Model for Preventive Maintenance based on Predictive Analytics**

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# Which Domain?

As demand for dependability grows across an expanding spectrum of tools, failure analysis is quickly becoming a complex, costly, and time-consuming must-do operation. The cost of constructing a modern semiconductor manufacturing facility can easily exceed a billion dollars, integrated circuit manufacturers have a strong incentive to quickly diagnose and resolve any problems that arise during the manufacturing process to keep their investment producing products that can be sold.

Downtime for heavy machinery costs a lot of money in the manufacturing industry, both in terms of idle time wasted due to maintenance work and in terms of repair costs. It would be a significant boost to the bottom line if firms could be proactive and undertake routine maintenance activities proactively, as well as predict concerns ahead of time using previous data.

1. <https://gallery.azure.ai/Experiment/Predictive-Maintenance-Implementation-Guide-Data-Sets-1>
2. <https://limblecmms.com/blog/predictive-maintenance/>

# Which Data?

For the creation of this Predictive Maintenance Model, the following data sources were used.

**Telemetry**

Time series data containing a variety of metrics from various equipment, such as voltage, rotation, pressure, and vibration.

**Machines**

Machine-related information.

**Failures**

A list of components that have failed.

**Maintenance**

Machine component replacement records resulting from routine maintenance or breakdowns.

**Errors**

Errors made by machines throughout history.

# Research Questions? Benefits? Why analyze these data?

The research question is the same as the title of this proposal. Is it possible to predict tool data with machine learning? With the help of the dataset’s attributes and machine learning techniques used to predict the failure of Roberts in the tool. The focus of this project is developing a model that can be used to make early prediction of tool failure.

# What Method?

This supervised learning work can be performed using the CRISP – DM Methodology.

The below modules in python to accomplish this supervised classification task.

* pandas
* numpy
* sklearn
* matplotlib
* seaborn
* joblib
* os

Random forests, nave bayes, decision trees, and logistic regression are among the classification techniques I intend to use. Using many tactics will provide an in-depth picture of which one works and the differences in the outcomes.

# Potential Issues?

One apparent issue that comes to mind is how to cope with drastically disparate findings when several methodologies are used, each of which may have its own set of restrictions. I'll need to devise a strategy for dealing with unexpected events that might divert my attention away from the project's main goal.

# Concluding Remarks

The ultimate goal is to develop a proactive maintenance plan that attempts to predict future component failures in heavy machinery. It benefits businesses by lowering operational costs, long-term maintenance costs, and increasing output hours, as previously stated. The model would have undergone a series of tests and experiments with various algorithms that can anticipate tool data.