

Machine Learning

Assignment – 1

-> Prediction of Wear and Tear in Industrial Equipment (Supervised Learning)

Future Prediction of Wear and tear of major industrial equipment which are used extensively and generates major revenue for company. Company can't afford to lose that machine because it may result in major loss of revenue. Now, if we predicted that after 5 days there may be breakdown in machine, then company can call for machine service beforehand which saves the valuable time for company.

Input Data Set will be past few years breakdown finding for the machine and reason which led to breakdown.

Algorithm which can be used here is SVM (Support Vector Machine).

-> Work-Force Requirement in Industry (Supervised Learning)

Number of employees required for efficient working of industry can be predicted based on many factors like time of year, requirement of product being manufactures, need of product, supply of product in market, etc. All the above factors will be the Input Data set from previous years. This prediction will help industry maximize the profits and no labour is getting wasted.

Algorithm which can be used here is MAPA (Multiple Aggregation Prediction Algorithm).

-> Dimensionality Reduction (Unsupervised Learning)

Machine learning is predicated on large amounts of data. That said, there are large amounts and overwhelmingly large amounts. A data set that can be winnowed down to 10, or even a few dozen features is one thing. The data set with thousands of features – and they most definitely exist – can be overwhelming. Accordingly, one of the first steps of machine learning can be dimensionality reduction to reduce the data to the most meaningful features.

A common algorithm for dimensionality reduction, pattern recognition, and data exploration is principal components analysis (PCA). A detailed discussion of this algorithm is beyond the scope of this article. Suffice it to say that it can help identify subsets of data that are orthogonal to one another – i.e., they can be removed from the data set without affecting the main analysis. PCA has several interesting use cases:

- Data pre-processing: When it comes to machine learning, the oft stated philosophy is more is better. That said, sometimes more is just more, particularly in the case of extraneous/redundant data. In these cases, unsupervised ML can be used to remove unnecessary features (data dimensions), speeding processing time and improving results. In the case of vision systems, unsupervised ML can be used for noise reduction.
- Image compression: PCA is very good at reducing the dimensionality of data sets while retaining meaningful information. This makes the algorithm very good at image compression.
- Pattern recognition: The same capabilities discussed above make PCA useful for tasks like facial recognition and other cases of complex image recognition.