**Project Title: Predictive Maintenance Using Big Data and Machine Learning**

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**Objective:**

The objective of this project is to develop a predictive maintenance system for manufacturing plants using big data and machine learning. The system will use data from various sources such as sensors, machines, and operators to predict when a machine is likely to fail, allowing maintenance to be scheduled proactively.

**Data Resource:**

The data resource for this project will include historical data from sensors, machines, and operators in the manufacturing plant. This data will be collected and stored in a big data platform, such as Hadoop or Spark, to be processed and analyzed.

Literature Review:

Predictive maintenance is a growing field in the manufacturing industry and has received significant attention in recent years. Research has shown that predictive maintenance can significantly reduce maintenance costs, increase machine uptime, and improve overall plant efficiency. Machine learning algorithms, such as Random Forest, Support Vector Machines, and Gradient Boosting, have been proven to be effective in predictive maintenance tasks.

**Methods:**

The project will use machine learning algorithms to analyze the big data collected from the manufacturing plant. The algorithms will be trained on historical data to predict when a machine is likely to fail. The system will also take into account other relevant factors, such as machine usage patterns, weather conditions, and operator behavior. The system will be tested on real data from the manufacturing plant to evaluate its accuracy and effectiveness.

**Significance:**

The significance of this project lies in its ability to improve the efficiency of manufacturing plants by reducing maintenance costs, increasing machine uptime, and improving overall plant efficiency. The system will also provide valuable insights into the functioning of the machines and the manufacturing process, allowing manufacturers to make informed decisions about maintenance and improvements.

**Reference:**

J. Biswas and K. S. Moon, “Predictive maintenance: a review,” Journal of Manufacturing Systems, vol. 39, pp. 1–13, 2015.

J. A. Field, “Predictive maintenance of manufacturing systems using machine learning,” Journal of Intelligent Manufacturing, vol. 29, pp. 2105–2114, 2018.

K. Kim and J. Lee, “A predictive maintenance approach based on machine learning algorithms,” Expert Systems with Applications, vol. 42, pp. 1296–1303, 2015.