MACHINE LEARNING - BASED PREDICTIVE ANALYTICS FOR AIRCRAFT ENGINE

PROBLEM STATEMENT

Why do we need Machine Learning - Based Predictive Analytics For Aircraft Engine?

Aviation is a capital-intensive business that is also governed by strict environmental and safety laws. With a focus on experiences and lessons learned, technological advancements of aircraft engines are typically undertaken slowly to reduce risk. Over the years, engine makers have produced and gathered a lot of data. These huge data, which come from a variety of sources including the database of currently manufactured engines, ongoing development projects, completed development projects, and unproduced designs, are important sources of intelligence that can enable the creation of new engines. Data can be mined to provide important insights that could bring high levels of efficiency to engine conceptual design with the use of machine learning and rising computer capability.

OUR PLAN:

Engine failure is highly risky and needs a lot of time for repair. Unexpected failure leads to loss of money and time. Predicting the failure prior will save time, effort, money and sometimes even lives. The failure can be detected by installing the sensors and keeping a track of the values. The failure detection and predictive maintenance can be for any device, out of which we will be dealing with the engine failure for a threshold number of days.

The project aims to predict the failure of an engine by using Machine Learning to save loss of time & money thus improving productivity.

ABSTRACT

The nature of international business is changing as a result of big data and AI/ML. Today, data is the most important asset for businesses across all sectors. Businesses are utilizing data-driven insights to gain a competitive edge. As a result, machine learning-based data analytics are quickly gaining traction in a variety of industries, creating autonomous systems that assist in human decision-making. In this study, machine learning was applied to the conceptual design of aero plane engines. Regression and classification techniques for supervised machine learning were used to analyze trends in an open-source database of production and research turbofan engines, producing predictive analytics that can be used to forecast the performance of new turbofan designs.

In particular, the author created machine learning-based analytics to forecast high-efficiency engine cruise thrust specific fuel consumption (TSFC) and core sizes using the engine design parameters as the input, turbofan engines. The underlying engine for the predictive analytics was Google's Tensor Flow, an open source toolkit for numerical computing, which was trained and used in conjunction with Keras, an open-source neural networks application program interface (API) built in Python. The predictive analytics' encouraging outcomes demonstrate that machine learning methods deserve additional investigation for use in conceptual aviation engine design.