Assignment - Real Time Analytics Case Study

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Solving business problems and specific issues the aircraft manufacturing industry can seem problematic when implementing batch Analytics. Batch Analytics requirements to Oracle data take more time to transform and load to yield possible business information and solutions. In this case, we are trying to resolve problems based on aircraft fuel leaks facilitating the flight data via CSV files and running batch analytics.

An optimal solution would require using real-time analytics. Something as detrimental as an airplane fuel leak would need to be caught during the instance it happens and needs an appropriate response with corrective action in constraints.

The best available method will be to implement the historical CVS data with real-time analysis using feature methods of predictive analytics. The ultimate solution would require real-time predictions based on current trends and behaviors from all sources of data available.

Predictive Analytics is a branch of advanced analytics that is used to make predictions about unknown future events. Such as an airplane fuel tank or sensory data. Predictive Analytics uses many techniques that incorporate big data solutions such as statistical analysis and modeling, data mining, machine learning, and artificial intelligence to analyze a collaboration of historical and current data to make predictions about future events.

I would recommend implementing a subset of machine learning known as deep learning with pattern recognition and sensory data with IoT sensory devices that will alert pilots and flight Crews of potential aircraft fuel leaks. Also, this data can be retained for forest Oracle maintenance purposes. This implementation would target solutions, fuel flow rate, alerts, maintenance tasks, systems, and efficiency protocols.

Implementations of machine learning can be used effectively with statistical analysis to analyze a sample and observational data of the aircraft fuselage, fuel strainer, fuel selector, and other equipment parts. This data could be used to recognize patterns of wear, usage, limitations, and many other vital data points.

The company can ultimately depend on machine learning algorithms such as fault diagnosis for high-end predictions that guide real-time decisions. These decisions will improve safety enhance reliability and reduce mean it cost of complex aviation systems.

Furthermore, I would recommend the use of predictive analytics to table, extract, load, and transform the gathered data moving forward. I would recommend several use cases, predictive analytics models, to consolidate and analyze the company's data.

**Predictive models and architecture:**

* ETL Data allocation: would comprise collecting data cleaning, selecting, and transforming the data which will be processed into informational data Machin learning can use to make decisions.
* Statistical Modeling: There are several statistical techniques that I would like to recommend for a specific purpose. I can be used to derive statistical inference and insights into the data that is being collected.
* Outliers Model
* The outliers model is oriented around anomalous data entries within a dataset. It can identify anomalous figures either by themselves or in conjunction with other numbers and categories.
* Parametric Model: Handling assumptions, assumptions are the crucial part of any data model, it not only makes the model easy also improves predictions, so the algorithms that consider assumptions and make the function simple are known as parametric ML algorithms, and a learning model that compiles data with different parameters of a predetermined size, independent to the number of training variables, is termed as a parametric model.

Non-parametric Model: Machine learning algorithms that enable to make strong assumptions in terms of the mapping function are called non-parametric Machine learning algorithms and without worth assumptions, ML algorithms are available to pick up any functional form training data. Non-parametric models are a good fit for the huge amount of data with no previous knowledge.

Using state-of-the-art off-brand technology predictive analysis through machine learning will allow less human interaction and dependency.

While providing a platform that will reduce risk, improve data integrity, lower cost, and uncover insights. The combination of different models and deep learning will help identify key problems effectively resolve issues based on Trends and its analysis of the situation based on real-time data.

**I recommend that the company invest in the following data infrastructure**

* Azure infrastructure and cloud storage
* data processing framework(apache Spark)
* Implementation of training scripts
* Azure ML GPU cluster
* container registry(for machine learning Technologies)

**Architecture diagram**: