CS 455 - Artificial Intelligence

Project Proposal

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Problem Statement:

Create a predictive model to take in information from aircraft, such as maintenance records, flight times, flight conditions, previous information on the aircraft type and flight schedule, to determine the optimal time to go in for inspection/maintenance to prevent a long term out of service event, as to not interfere with the flight schedules. The information for the aircraft specifically could contain the maintenance task (such as wing, landing gear, engine, etc.) and each of those would have their own history for the fleet type that can be used to determine the average fault rate for the type and also take into account the aircrafts route/schedule to plan for an optimal time for it to head to the hangar to get checked on before the event occurs.

Proposed Approach:

The problem to be solved is looking for predictive outcomes, therefore a predictive Machine Learning model be used to take the set of information on the aircraft and determine trends and take into account all the variables to predict when the aircraft should be inspected or worked on.

Specifically the Machine Learning Predictive algorithm known as Prophet, will be used since it is typically used for predicting weather, which takes in multiple types of variables and "environment" aspects to make a decision and effectively predict the outcome of weather events.

This should work similar to the weather events because in dealing with controlling scheduling maintenance of aircraft around their individual schedule, time of season, past maintenance records, and fleet type history.

The model takes into account the data itself with trending, seasonal factors that could affect the trending, and taking into account holidays or high load factors that could affect timing of the aircraft maintenance or increase the probability of a failure/issue.

Team Structure:

Our team will have three members split into different roles. Dustin Cribbs will be in charge of developing and maintaining the database. Dustin has a background in coding and is learning databases currently from the files and database class. Cameron Stark will be the team leader and will be in charge of coding and development. Cameron has a strong background in coding and databases. Luis Olivier will be in charge of algorithm development and logic design. Luis has had some experience developing machine learning applications through an internship.

References:

Possible DataSet: Turban Degradation data

https://ti.arc.nasa.gov/tech/dash/groups/pcoe/prognostic-data-repository/

Prophet Algorithm Example:

https://towardsdatascience.com/forecasting-with-prophet-d50bbfe95f91

Machine Learning Predictive Models:

https://www.logianalytics.com/predictive-analytics/predictive-algorithms-and-models/