**Techgium 2021**

***Challenge Title: Inventory Demand Forecasting for Serviceable Aircraft Parts***

*Nature of Challenge: Process Related*

*Domain / Discipline of Challenge: Artificial Intelligence*

***Concept title submitted: NSGA-II optimizer-based CNN-LSTM prediction model for Inventory Demand Forecasting***

**Team members:** 1. Karthik K

2.Nithin Soundar S J

3. Rithick Roshan R

**Mentor:** **RAJASEKAR T, Professor/ECE**

|  |
| --- |
|  |

**ABSTRACT:**

This model proposes a CNN-LSTM algorithm that combines the advantages of both Convolutional Neural Networks and Long-Short Term Memory cells to predict the expected replacement of serviceable parts of an aircraft within a stipulated time window to determine the optimal stock to be maintained at a station. Adding convolutional layers to capture local, temporal patterns on top of LSTM layers can be immensely helpful. An NSGA-II optimizer-based CNN-LSTM prediction model for Inventory Demand Forecasting is proposed. In the process of building the CNN-LSTM model, NSGA-II (Nondominated Sorting Genetic Algorithm), a multi-objective genetic algorithm, is used to optimize primary parameters such as RMSE and Accuracy i.e., NSGA-II reduces Root Mean Square Error and increases Accuracy. Usage of Synthetic data is proposed on the note that airlines have relatively lower data compared to prototypical models. The Algorithmic bias is overcome by augmenting training data sets. The accuracy of NSGA optimizer-based CNN-LSTM is greatly enhanced than the traditional LSTM model. The life of serviceable parts is predicted using parameters such as aircraft type, time of arrival, different airports, the weather temperature variations, runway quality at the station.