LITERATURE SURVEY

PROBLEM STATEMENT:

Airline Data Analytics for Aviation Industry

DOMAIN:
Data Analytics

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S.NO	TITLE	AUTHOR	ABSTRACT
1.	Applications of Big Data in Airline Industry (Publication: JAAUTH, Vol. 21 No 4, pp.73-108, 2021)	Dou Lee Nikolopoulos and Petropoulos Izzo Larsen Sternberg	With the advent of big data era, modern aviation industry can find solutions for their major challenges of safety and performance improvement because big data can provide multidimensional, adequate, and real-time information and improve the predictive and preventive capabilities of aviation flight risks. Big data will effectively improve the technical performance and operating conditions of aircraft, avoid various adverse external environmental conditions, and reduce manual errors, to enhance aviation safety. By adopting big data technology, fuel consumption, crew deployment, and flight operations could be optimized; maintenance could anticipate when parts need replacing; air congestion could be reduced; flight routes could be altered well in advance of takeoff to avoid storms and passengers could be kept informed about schedules from the minute they leave their home for the airport. The airline industry makes use of primary data sets that come from many different parameters such as flight tracking data, airport operations data, weather conditions, airline information, market information, passenger information, aircraft data and air safety reports.
2.	A Machine Learning Approach to Predict Aircraft Landing Times using Mediated Predictions from Existing Systems (Publications: AIAA AVIATION FORUM, 2024, 2021)	Daniel Wesely Andrew Churchill John Slough William J Coupe	Developed a novel approach for predicting the landing time of airborne flights in realtime operations. The first step predicts a landing time by using mediation rules to select from among physics-based predictions (relying on the expected flight trajectory) already available in real time in the Federal Aviation Administration System Wide Information Management system data feeds. The second step uses a machine learning model built upon the mediated predictions. The model is trained to predict the error in the mediated

			prediction, using features describing the current state of an airborne flight. These features are calculated in real time from a relatively small number of data elements that are readily available for airborne flights. Initial results based on five months of data at six large airports demonstrate that incorporating a machine learning model on top of the mediated physics-based prediction can lead to substantial additional improvements in prediction quality.
3.	Predictive analytics with aviation Big Data (Publicatins: Intergrated Communicatins, Navigation and Surveillance Conference, 2013)	Samet Ayhan Johnathan Pesce Paul H Comitz Gary Gerberick	In this paper, we describe a novel analytics system that enables query processing and predictive analytics over streams of big aviation data. As part of an Internal Research and Development project, Boeing Research and Technology (BR&T) Advanced Air Traffic Management (AATM) built a system that makes predictions based upon descriptive patterns of massive aviation data. Boeing AATM has been receiving live Aircraft Situation Display to Industry (ASDI) data and archiving it for over two years. At the present time, there is not an easy mechanism to perform analytics on the data. The incoming ASDI data is large, compressed, and requires correlation with other flight data before it can be analyzed. The service exposes this data once it has been uncompressed, correlated, and stored in a data warehouse for further analysis using a variety of descriptive, predictive, and possibly prescriptive analytics tools. The service is being built partially in response to requests from Boeing Commercial Aviation (BCA) for analysis of capacity and flow in the US National Airspace System (NAS). The service utilizes a custom tool developed by Embry Riddle Aeronautical University (ERAU) that correlates the raw ASDI feed, IBM Warehouse with DB2 for data management, WebSphere Message Broker for real-time message brokering, SPSS Modeler for statistical analysis, and Cognos BI for front-end business

			intelligence (BI) visualization tools. This paper describes a scalable service architecture, implementation and value it adds to the aviation domain
4.	Prediction of runway configurations and airport acceptance rates for multi-airport system using gridded weather forecast (Publication: Transportation Research Part C-Emerging Technologies 125, 103049, 2021)	Yuan Wang Yu Zhang	Accurate prediction of real-time airport capacity, a.k.a. airport acceptance rates (AARs), is key to enabling efficient air traffic flow management. AARs are dependent on selected runway configurations and both are affected by weather conditions. Although there have been studies tackling on the prediction of AARs or runway configurations or both, the prediction accuracy is relatively low and only single airport is considered. This study presents a data-driven deep-learning framework for predicting both runway configurations and AARs to support efficient air traffic management for complex multi-airport systems. The two major contributions from this work are 1) the proposed model uses assembled gridded weather forecast for the terminal airspace instead of an isolated station-based terminal weather forecast, and 2) the model captures the operational interdependency aspects inherent in the parameter learning process so that proposed modeling framework can predict both runway configuration and AARs simultaneously with higher accuracy. The proposed method is demonstrated with a numerical experiment taking three major airports in New York Metroplex as the case study. The prediction accuracy of the proposed method is compared with methods in current literature and the analysis results show that the proposed method outperforms all existing methods.