LITERATURE SURVEY

AIRLINES DATA ANALYTICS FOR AVIATION INDUSTRY

TITLE: Data Analytics for Air Travel Data: A Survey and New Perspectives

AUTHORS: Haiman Tian, Maria Presa-Reyes, Yudong Tao

From the start, the airline industry has remarkably connected countries all over the world through rapid long-distance transportation, helping people overcome geographic barriers. Consequently, this has ushered in substantial economic growth, both nationally and internationally. The airline industry produces vast amounts of data, capturing a diverse set of information about their operations, including data related to passengers, freight, flights, and much more. Analyzing air travel data can advance the understanding of airline market dynamics, allowing companies to provide customized, efficient, and safe transportation services. Due to big data challenges in such a complex environment, the benefits of drawing insights from the air travel data in the airline industry have not yet been fully explored. This article aims to survey various components and corresponding proposed data analysis methodologies that have been identified as essential to the inner workings of the airline industry. We introduce existing data sources commonly used in the papers surveyed and summarize their availability. Finally, we discuss several potential research directions to better harness airline data in the future. We anticipate this study to be used as a comprehensive reference for both members of the airline industry and academic scholars with an interest in airline research.

TITLE: BIG DATA ANALYTICS IN AIRLINES

AUTHORS: Hamida Abdulsamie, Mahmoud Ramadan AIAzab

This study illustrates how airlines successfully adopt big data technology. The paper also explores the opportunities and challenges of big data in the airline industry. Based upon the qualitative approach,27 semi-structured interviews with employees and experts at airlines in Egypt were conducted. The findings reveal that big data has a great importance in providing broad opportunities for airspace management, enhancing flexibility in dealing with each passenger, boosting problem solving, supporting decision, providing safe flights, boosting predictive maintenance, and improving performance. The findings illustrate a range of challenges that airlines may face when dealing with big data, such as shortage of qualified human resources, absence of data-driven culture, dealing with and processing huge amounts of data, as well as data privacy and security issues. Finally, implications for practice as well as future researches are discussed.

TITLE: Anomaly Detection in General-Aviation Operations Using Energy Metrics and Flight-Data Records

AUTHORS: Tejas G. Puranik, Dimitri N. Mavris

Among the operations in the general-aviation community, one of the most important objectives is to improve safety across all flight regimes. Flight-data-monitoring or flight-operations quality-assurance programs have percolated in the general-aviation sector with the aim of improving safety by analyzing and evaluating flight data. Energy-based metrics provide measurable indications of the energy state of the aircraft, and can be viewed as an objective currency to evaluate various safety-critical conditions. The use of data-mining techniques for safety analysis, incident examination, and fault detection is gaining traction in the aviation community. In this paper, a generic methodology is presented for identifying anomalous flight-data records from general aviation operations in the approach-and-landing phase. Energy-based metrics, identified in previous work, are used to generate feature vectors for each flight-data record. Density-based clustering and one-class classification are then used together for anomaly detection using energy based metrics. A demonstration of this methodology on a set of actual flight-data records from routine operations, as well as simulated flight data, is presented, highlighting its potential for retrospective safety analysis. Anomaly detection using energy metrics, specifically, is a novel application presented here.