Flight Delay Prediction for Aviation Industry using Machine Learning

Define Problem/Problem Understanding

SPECIFY THE BUSINESS PROBLEM

Flight delays can be a significant problem for businesses particularly those that rely on air travel to conduct their operations. Here are some ways flight delays can impact businesses: Lost productivity: Flight delays can result in lost productivity as employees may miss important meetings, conferences, or other work-related events. This can result in missed opportunities and lost revenue. Increased costs: Flight delays can also lead to increased costs for businesses as they may need to pay for additional travel expenses, such as hotel accommodations and transportation Customer dissatisfaction: If businesses rely on air travel to transport goods or provide services, flight delays can lead to customer dissatisfaction and loss of business. Damaged reputation: Frequent flight delays can damage a business's reputation, making it less attractive to customers and potential employees. To mitigate these issues, businesses can take several steps. For example, they can choose airlines that have a good track record for on-time arrivals and departures, allow employees to build extra time into their travel plans, or arrange for backup transportation options in case of flight cancellations or delays. Businesses can also invest in video conferencing and other remote collaboration tools to reduce the need for business travel. In 2014 the OAG Flight Status database reported that over 4.6 million flights arrived more than 15 minutes late at their destination; a conservative average of 80 passengers per flight equates to about 368 million passengers being inconvenienced. If we then apply an average

actual delay of 30 minutes, you've got around 7.6 million days of 'lost' time in 2014. Recent research from mass flight, a US-based specialist operational research company, suggested that the cost of a wide-bodied cancelled flight could be as much as $40,000 per cancellation. Place that in the context of the recent heavy weather disruption in the North East United States and that's a lot of costs, lost revenue and logistical inconvenience for the airlines as well as the traveler. Flight delays can't be helped. They are a by-product of global trade and tourism. The more we all travel the greater the demand and pressures on infrastructure and, ultimately, the risk of human error. Equally, passive acceptance of delays is nothing more than an act of denial when knowledge of disruptions are not only immediate but also available for use by all parts of the aviation supply chain. Every one of those 4.6 million delays represents a challenge or an inconvenience and reaches beyond the hassled passenger. But delays also offer a significant opportunity for effective, personal customer communication, service recovery and relationship development. In some cases delays can generate additional revenue and improve yield. All of which might explain why increased data sharing and use of flight status across the broader aviation industry has been a growing trend in the last few years. Accurate, timely delivery of flight status data cuts across both B2B and B2C users in a way that few other aviation data sets do. Decision making – personal and professional The B2B environment, flight status data is used for all sorts of analysis and service support. Data helps stakeholders plan and respond to a change in scheduled arrival times, from the limousine company with their driver parked up off site, to the car hire company managing inventory at the airport, never mind the concession operators, hoteliers, tour

representatives and immigration control authorities. With operating costs always under review in most businesses and resource planning central to an effective operation, the earlier the warning of flight delays, the better for businesses. For the passenger, advanced notice of a flight delay - and subsequent contingency planning - is becoming increasingly important. Alternate options and flights can be explored, changes to business plans made and, if really necessary alternate accommodation sourced before the final room in the city is taken. Not surprisingly there are more than 300 flight status travel apps on the market, developed by global data suppliers, individual airlines, airports and online travel agents. Picking the definitive one and ensuring you have the best single source of such data can be a challenge in its own right. Going forward, the successful apps are going to be those that reflect and personalize the user experience, geo locate the user in real-time and provide alternate personalized travel offerings and services that meet the passenger's needs rather than the advertisers' desires. In the past two years OAG's flight status database has grown exponentially. We now capture more than 95% of all scheduled flight data every day and have a database that stretches back for years. Directly and indirectly we power over 60% of those travel apps and products, providing the raw data on which the app developers then overlay valuable localized data. We now provide after-the-fact analysis, helping airports and airlines to track their on-time performance, understand how their competitors reacted and most importantly learn from previous experiences.