SOLUTION REQUIREMENTS

Project Name	Airlines Data Analytics for Aviation Industry
Team ID	PNT2022TMID49991

1.Increase in airline revenue

Data analytics helps the industry to understand customers' preferences and other maintenance issues. For instance, analysis of ticket booking helps the industry to target the customers with personalised offers while optimising the price in real-time using predictive analysis techniques. As a result, by gathering meaningful data, airlines can fetch more bookings in the given timeframe.

One should seriously consider revenue management based on the idea that customers perceive product value differently, so the price they are ready to pay for it depends on target groups they belong to and purchase time. Hence, revenue management specialists make good use of AI to define destinations and adjust prices for specific markets, find efficient distribution channels, and manage seats to keep the airline simultaneously competitive and customer-friendly.

2. Smart maintenance

Due to the use of smart data analytics, passengers will avoid many issues with baggage tracking. While radio-frequency identification prevents mishandling the baggage, predictive analysis assists in improving the predictability of fleet reliability. With the airport traffic increasing day by day, big data analytics will enable the airlines to keep on working on the optimization of the airspace use, especially when it comes to runway bandwidth, flight routes, types of aircraft, etc.

To illustrate, airlines bear high costs due to delays and cancellations that include expenses on maintenance and compensations to travellers stuck in airports. With nearly 30 % of the total delay time caused by unplanned maintenance, predictive analytics applied to fleet technical support is a reasonable solution.

Carriers deploy predictive maintenance solutions to better manage data from aircraft health monitoring sensors. Usually, these systems are compatible with both desktop and mobile devices, granting technicians access to real-time and historical data from any location. Knowing an aircraft's current technical condition through alerts, notifications, and reports, employees can spot issues pointing at possible malfunction and replace parts proactively.

3. Cost reduction

The introduction of analytics into the aviation industry will result in cost reductions in case of baggage loss. As a rule, the damages are repaid by the industry, but when using real-time baggage tracking, data helps avoid losing, damaging, or delaying bags. On the other hand, when the fuel real-time consumption data is collected and analyzed, one can achieve an improved level of fuel use efficiency. According to IATA's 2012, airlines spend 33% of their operating costs on fuel.

Airlines use AI systems with built-in machine learning algorithms to collect and analyze flight data regarding each route distance and altitudes, aircraft type and weight, weather, etc. Based on findings from data, systems estimate the optimal amount of fuel needed for a flight.

4. Customer satisfaction

With the help of predictive analysis, sentiment analysis, and travel journey analysis, the airline industry keeps its customers up-to-date in real-time, promoting special offers based on their needs, habits, and unique experiences. By collecting and crunching data about customers, airlines understand passengers' tastes and behaviour well enough to offer them transportation options they prefer and, more important, are ready to spend money on.

Likewise, when a flight delay or baggage loss occur, travellers get nervous. And if customers don't get a response or explanation of a problem from an airline representative in a timely manner, they likely won't choose this airline for their next trip. The speed of response to customer queries matters as much as actual steps that are taken to solve an issue.

So, travel experience is getting extremely customized and customer-oriented.

5. Digital transformation

With a purpose to deliver higher standard services to the passengers, big data and analytics considerably transform the commercial aviation industry. Some solutions have been launched to provide the perfect platform for the custom-made technology suppliers to showcase their products and services to airlines and airports in order to offer the passengers a more connected travel experience.

The emerging technologies are lifting the aviation industry into new heights by helping them in every possible way to meet the customer's needs, real-time performance dashboards, and predictive maintenance.

6. Performance measurements

Airlines usually operate in a globally competitive environment and therefore require prompt and accurate enterprise performance measurements. Even more, airlines are volume-driven and small variations (passengers enjoying the services, fuel spent, load carried) can multiply into major effects – therefore appropriate and timely action is critical. They also suffer substantial difficulties to produce daily/weekly reliable performance measurements.

This is where big data analytics can automate production of daily activity reports such as number of passenger flown per flight/sector, distance flown which can be used to provide estimated performance measurements such as daily or weekly revenues for specific routes or sectors.

7. Risk management

The truth is that global airline industry has been subjected to major catastrophes over the past years. For this reason, it's of utmost importance for the airlines to develop various risk management models and strategies to protect themselves from negative impact of these types of events. This is exactly where data analytics can be really of great assistance.

Some crew management solutions allow addressing fatigue risk that pilots are in danger of due to a constant change of time zones, long duty days, scheduling changes, etc. For example, developers of Crew Rostering solution from Jeppesen started integrating bio-mathematical models of fatigue into flight crew scheduling software. Their goal is to provide schedulers with the ability to rely on data about predicted fatigue to reduce risks in the planning phase.

8. Control and verification

Airline carriers require a number of control and verification models to be able to control costs arising from its various operational activities. To enable this, airlines have a pressing need for a complete and integrated repository of flight information data gathered from all its disparate business units. This will enable computation of various efficiency analytics, such as planed fuel usage compared with actual fuel usage per aircraft, and crew utilization. Apart from that, these problems could also be fully addressed by consolidating and analyzing relevant flight and aircraft data. Thus, creation of a 360 ° view of each flight/aircraft will allow the airlines to considerably improve their control and verification systems.

9. Load forecasting

Airlines require the development of an effective and holistic forecasting model to regularly assess the impact of options, such as increasing aircraft seats available, adjusting fares, introducing new routes, etc. Forecasts should also take account of actual statistical trends and results.