IBM – NAALAIYA THIRAN

AIRLINES DATA ANALYTICS FOR AVAITION INDUSTRY

LITERATURE SURVEY

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1.Literature focusing on crew recovery

analytics Author : M. Selim Aktürk, Alper Atamtürk, Sinan Gürel

https://www.sciencedirect.com/science/article/pii/S0305054820302549#bb0020

The crew recovery problem (CRP) can be formulated as follows: given a flight schedule and a set of disruptions, re-assign to each (recovered) flight the necessary cabin and flight crew such that the disruption costs are minimized. For crew recovery, these disruption costs can include direct crew costs (e.g., remuneration or overtime compensation) and cost for deadheading crew. For studies that include flight cancellation as a recovery action, cancellation costs can be included in case a flight cannot be staffed. Alternatively, some authors opt to use minimizing the number of crew schedule changes as a proxy to the minimization of the crew recovery costs. The CRP is typically the second problem that is solved in the sequential solution approach. It is considered harder than the ARP since all regulations and restrictions dictated by government regulations, union agreements and airline-specific policies have to be taken into account.

2.Literature focusing on passenger recovery

Author : Bruno Aguiar, Jose Torres, António J M Castro

https://www.sciencedirect.com/science/article/pii/S0305054820302549#bb0010

Arguably, passenger recovery is the most relevant problem for airline disruption management since high passenger delay cost and continuous flight disruptions will lead to a potential loss of goodwill and long-term reputation damage. Passenger recovery can be formulated as follows: given a recovered flight and crew schedule and a set of disrupted passenger itineraries, re-assign to each disrupted itinerary the (recovered) flights necessary (given seat availability) to accommodate passengers from their current position to their destination while minimizing cost. These passenger recovery costs can include both hard and soft costs. Hard costs are directly incurred when a passenger cannot complete its scheduled itinerary (e.g., compensation for delay and cancellation as stipulated by government regulations). Soft costs are the potential losses of future revenue as a result of passenger inconvenience, possibly causing the passenger to switch to a different airline in the future. These costs are approximations made by the airline and can differ per passenger class or frequent flyer status. Alternatively, these passenger disruption costs are minimized by minimizing the total number of passenger delay minutes.

3.Literature focusing on integrated recovery

Industry Author : Khaled F. Abdelghany, Ahmed F. Abdelghany, Goutham Ekollu

https://www.sciencedirect.com/science/article/pii/S0305054820302549#bb0005

Both from a mathematical and computational perspective, the integration of all recovery stages (aircraft, crew, and passengers) is a difficult task. The purpose of this integration is to minimize the total disruption cost. This is achieved by weighing the disruption cost related to aircraft, crew, and passengers simultaneously to find the recovery solution that overall results in the lowest cost for the airline. To the best of the authors' knowledge, the first proposal of a truly integrated approach was the PhD Thesis of Lettovsky (1997), where the author formulated the 'Airline Integrated Recovery' problem which consists of aircraft routing, crew assignment, and passenger flow. The thesis presents a linear mixed-integer mathematical problem that captures the availability of the aforementioned resources. A decomposition scheme is presented where the 'Schedule Recovery Model' master problem controls the three sub-problems known as the 'Aircraft recovery model', 'Crew recovery model', and 'Passenger flow model'. The solution is derived by applying Benders' decomposition. A limitation is that the model only considers the cockpit crew and not cabin crew.