SHIRATECH
KNOWTION

Flight Passenger Prediction

Algorithms for predicting the utilization of means of transport

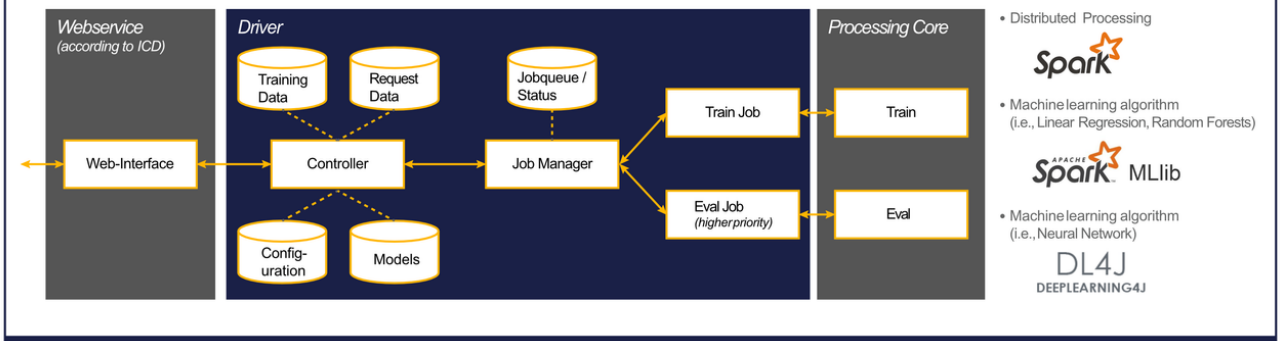
Project Goal

Increasing airport traffic presents challenges in passenger handling during various stages such as check-in, luggage handling, security checks, and passport control. Dissatisfaction among passengers commonly stems from issues related to these processes, including delays, seat allocation problems, luggage loss, and slow delivery. Insufficient information flow and inadequate support during unforeseen events like missed flights, strikes, and weather disruptions further contribute to passenger dissatisfaction.

To reduce consumer dissatisfaction during check-in and security screening, airports should proactively plan the required security personnel. The goal is to have sufficient employees available to ensure efficient passenger handling without long queues, while maximizing employee utilization. Therefore, an intelligent passenger forecast system is necessary to automatically provide airport staff with crucial information.

The key information for personnel planning is the expected number of passengers for each time period, which can span several weeks or even months. This requires a comprehensive demand forecast that covers the entire airport, including all routes and airlines.

As part of this project, we have developed a state-of-the-art algorithm pipeline that leverages all available airport information and historical data to predict the expected number of passengers for each flight in the coming months. This prediction model takes into account factors such as bank holidays, extended weekends, and school holidays, based on past similar situations. The resulting information enables the calculation of the anticipated number of passengers at the airport for future time intervals.



Software Architecture for Distributed Processing

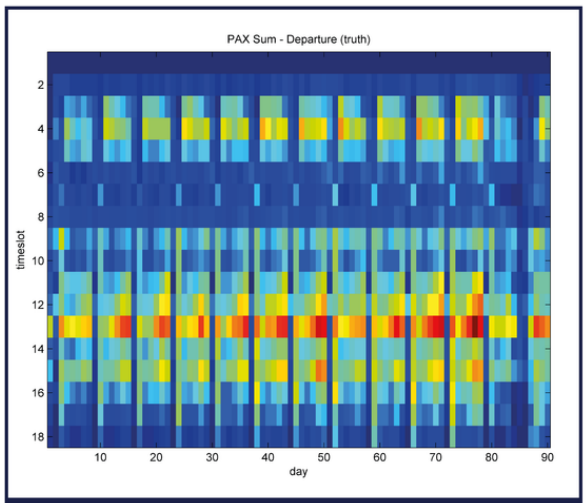
Procedure & Solution

From a data processing standpoint, there are numerous challenges that must be addressed to establish a system capable of accurately and efficiently predicting the number of passengers for each individual flight at a given date and time. The algorithm pipeline must effectively handle a variety of uncertainties and special events, including strikes, weather conditions, holidays, and unexpected changes in routes and schedules.

Considering all these factors and their interdependencies results in a substantial feature vector for each flight. The algorithm pipeline must autonomously identify the relevant factors that are crucial for accurate predictions. In our approach, we employ various contemporary data-driven models and machine learning algorithms, such as random forests and neural networks. The combination of the extensive feature vector for each flight and the considerable number of flights to be considered gives rise to a substantial dataset that requires efficient processing.

To efficiently handle such vast amounts of data, we employed modern big data technologies. For instance, the algorithm pipeline was implemented on a distributed processing framework like Spark, enabling parallel processing of all flights across multiple distributed cluster nodes.

This approach significantly enhanced our ability to process the extensive dataset effectively, resulting in efficient processing of passenger forecasts for all flights and providing accurate predictions for the expected number of travelers at the airport for each day and time.



Estimation of the daily course of passengers at the airport for the next 3 months

Results & Benefits

Automated prediction of passenger load on flights

Utilization of advanced data-driven models

Enhanced airport staff scheduling

Reduced check-in times, delays & baggage loss

Increased passenger satisfaction & handling

Long-term forecasting capability

SHIRATECH KNOWTION

www.shiratech-knowtion.com

GERMANY
Knowtion GmbH
Amalienbadstr. 41 Bau 52
76227 Karlsruhe

team@knowtion.de

ISRAEL
Shiratech Solutions Ltd.
58 Amal St, Kiryat Arie POB
32722, Petach Tikva 4951358

info@shiratech.ai