**Functional diagram**

This diagram captures the modules in the application as per their functionality and the interaction between them.

The different functional entities in the application are explained below:

1. User interface module

This module is responsible for receiving the user input and presenting the prediction data back to the user. It also takes care of rendering the view as per the mobile device used and display preferences of the user.

1. Parser

This module acts as a translator between the user interface module and the travel investigator. User can input either the flight number or the detailed itinerary. This module parses the different types of user inputs and provides the itinerary fields as required by the travel investigator module. It also translates the prediction result data of the travel investigator to the format understood by the user interface module.

1. Data Collector

This module collects the required data through the cloud from external data sources like ‘air time delay data source’ and ‘past weather data source’ and stores it in the SAP HANA database used by the application.

1. Data filter

This module filters the large volume of data and updates the HANA database to store the relevant data as required by the application. This module provides the historical data to the machine learning module.

1. Travel investigator

This module acts as the main coordinator module that communicates with other modules like the parser, weather forecaster, machine-learning module and alternatives-recommender to provide the information needed by the user.

1. Weather forecaster

This module fetches the weather forecast for the itinerary of the user.

1. Machine learning module

This module acts as a wrapper to the SAP mathematical module. It receives the itinerary and weather forecast from the travel-investigator module and historical data from the Data filter module and feeds this information to the SAP mathematical module. It then provides the prediction results as analyzed by the SAP mathematical module back to the travel-investigator.

1. SAP mathematical model

This is the standard mathematical model from SAP that does the data analysis.

1. AlternativesRecommender

This module takes in the itinerary and suggests alternative travel arrangements, by referring to external sources like flight schedules, car rentals and hotels.

Constraints:

In order to minimize the cost of the project, the alternative travel suggestions are not analyzed using the machine-learning module. If the customer requires the suggested alternatives to be accurate and better than the current itinerary, then the cost and duration of the project are going to increase.