

Avia Expert System

Description

This is a project which aims to create a simple expert system. Its purpose is to advice its user steps to reach the certain goal: take a flight to a different country's capital.

Usage

The program is a JavaFX application written on Kotlin language, which will provide user with several choices to determine the user's situation and give him a correct course of action for a successful flight to his destination.

Knowledge base

The expert system's knowledge base is predeclared as a text file in .json format. The knowledge representation model is a production model, stored as a list of entries, which contain following information:

1. The entry's id, which will be used to formalize logical rules and get the results.
2. The object name, with which the entry is associated.
3. The entry's property, which itself is an object, containing string of lexical description and a scoring mark for formalizing the entry's importance.

The logical rules are stored as a Kotlin Object, which holds functionality for generating a result, which will be presented to the user. It will be presented as a text, containing instructions and advice, based on user's input.

Knowledge representation model

The following table shows the knowledge base's knowledge representation model, which formalizes the different properties of 10 objects influencing the trip.

Table 1. KRM

Object #	Object	ID	Property
1	Visa	A1	no visa
		A2	visa obtained
2	Ticket	A3	no ticket
		A4	ticket obtained
3	Free luggage	A5	no luggage required
		A6	luggage is required

Object #	Object	ID	Property
4	Climate at destination location	A7	is similar to departure location
		A8	is different from departure location
5	Airport's usual fullness with people	A9	very busy
		A10	is average
		A11	is low
6	Road traffic at departure location	A12	traffic jams
		A13	is average
		A14	is low
7	One's knowledge of local language of destination location	A15	no language knowledge
		A16	base to intermediate knowledge of language
		A17	advanced knowledge of language
8	Health condition	A18	ill
		A19	malaise
		A20	good
9	Financial condition	A21	tight budget
		A22	just enough for trip
		A23	more than enough
10	Declaratory belongings	A24	don't have declaratory belongings
		A25	have declaratory belongings

Logical rules

The following table shows the logical rules, which are used to generate the result for the user. If the user's situation matches the rule's condition, the rule's advice will be added to the expert system's return.

Table 2. LR

Condition	Advice
A1	Obtain a tourist visa of your destination country.
A2	Check whether your visa is valid and hasn't expired yet.

Condition	Advice
A3	Buy a plane ticket holding in mind your plans, so you won't miss your flight and possible delays won't interrupt your plans.
A4	Precisely check your ticket's information, so you won't miss your flight.
A5	Check whether your ticket provides free of charge luggage and whether you can have refund for ommitment of luggage.
A6	Check whether your ticket provides free of charge luggage and if not learn the price you have to pay for your luggage.
A7	Take only the clothes you need for your comfort in trip.
A8	Take in mind that you shall check the weather conditions at your destination and have with you clothes fitting the weather at your destination.
A9	Try to register on-line for your flight and make sure to arrive at the airport at least 2.5 hours before your flight.
A10	Register on-line for your flight and make sure to arrive at the airport at least 2 hours before your flight. If you want to register at the airport, make sure to arrive at least 2.5 — 3 hours before your flight.
A11	Register on-line for your flight and make sure to arrive at the airport at least 1.5 — 2 hours before your flight. If you want to register at the airport, make sure to arrive at least 2 — 2.5 hours before your flight.
A12	Try to leave your home with enough time to spend in traffic jams. Bear in mind that traffic jams are possible at any time of the day and can be unpredictable.
A13	Try to leave your home with enough time on road. Bear in mind that traffic jams and difficult traffic are possible at any time of the day and can be unpredictable.
A14	Leave your home so that you arrive at the airport at least 15 minutes before your intended arrival at the airport so unpredictable difficult traffic won't affect your flight.

Condition	Advice
A15	Try to learn basic phrases in local language of your destination country. Also make a list of phrases you might need in your trip both in local and your language, so you can show the required phrase to the person you are talking to. Also make sure to have translator app on your phone and the local language packet is downloaded, so you don't need to rely on the internet connection.
A16	Think about situations you can face in your trip and fill lexical and grammar gaps you might have in those situations.
A17	Find a way to practice and master your language skill in real life or on-line, so that in stressful situation while you can be nervous, you won't experience difficulties in communication.
A18	Consider delaying the flight because flight's overloading can worsen your health condition.
A19	Consult your doctor about your health condition and whether you can take a flight. If flight is permitted by doctor, make sure to protect your health during and after flight, because you will encounter a lot of people and some of them can be ill.
A20	Make sure to protect your health during and after flight, because you will encounter a lot of people and some of them can be ill.
A21	Plan your trip so that you won't spend more money than you have. Also, learn whether you can have discounts in your trip. Consider delaying your trip if you can't afford it.
A22	Plan your trip so that you won't spend more money than you have. Also, learn whether you can have discounts in your trip. However, don't be too greedy, because you can miss a lot of interesting things.
A23	Monitor your spends, so you don't spend more money than you intend to. It is easy to spend more than you could have, but also don't be too greedy, because you can miss a lot of interesting things.

Condition	Advice
A24	Research the restrictions and goods which should be declared when crossing the border of your destination country. If you don't have any declaratory belongings, you should learn what to do with declaration sheets on the arrival.
A25	Research the restrictions and goods which should be declared when crossing the border of your destination country. If you have declaratory belongings, you should learn what to do with declaration sheets on the arrival.