Project "Personalized Menu"

Description

Many restaurants have their menus digitized. Guests can scan a QR code and have the menu presented on their smartphones. A disadvantage is that the screen is very small and it is difficult to get an overview, in particular, if the menu is large. However, some guests can not or do not want every meal, e.g. vegetarians or guests with an allergy. Instead of showing all the meals that are offered, it would be preferable to show only those meals the guest prefers.

The objective of the project is to represent the knowledge about meals and guest preferences and create a system that allows to select those meals that fit the guest preferences.

The knowledge base shall contain information about typical meals of an Italian restaurant, e.g. pizza, pasta, and main dishes. Meals consist of ingredients. There are different types of ingredients like meat, vegetables, fruits, or dairy. For each ingredient, there is information about the calories.

Guests can be carnivores, vegetarians, calorie-conscious, or suffer from allergies, e.g. lactose or gluten intolerance.

Task

1. Create different knowledge-based solutions for recommending food depending on the profile of a guest (carnivores, vegetarians, calorie-conscious, suffering from allergiesetc.) usind the following representation languages:

   - Decision tables (including DRD with sub-decisions and corresponding decision tables);

   - Prolog (including facts and rules);

   - Knowledge graph/Ontology (including rules in SWRL, queries in SPARQL and SHACL shapes)

2. Agile and ontology-based meta-modelling: adapt BPMN 2.0 to suggest the meals for a given customer. For this, you can re-use or extend the knowledge graph/ontology created in the previous task. One option that you have is to specify the class BPMN Task with a new class and add additional properties, similar to what we have done in class with the Business Process as a Service case. Think of a new graphical notation for the new modelling element, which could be easy to understand for the restaurant manager. Use the triple store interface (Jena Fuseki) to fire the query result.

Write a brief explanation of each solution and a conclusion chapter that explains the advantages and disadvantages of the knowledge-based solutions. For the development of the knowledge bases and the modeling language, you can work individually or as a pair. The conclusion chapter must be written individually.

You can request two coaching sessions with the lecturers. For the first coaching session we recommend that you show a proposal. The deadline for the submission is the 1st of July at midnight.