**Functional Architecture**

This section is focused on presenting the architecture proposed for implementing the nutritional recommendation system based on preference and nutritional information. This architecture is sketched in Figure and is composed of four layers to process the information pipeline that begins in the user information layer and finishes in the final recommendation generation. These layers are:

1) The information gathering layer, which is focused on capturing all the nutrition-related relevant information associated to the user. This information includes physiological data such as user height and weight, heart rate, burned calories, daily physical activity level; as well as information directly provided by the user such as daily food intake Consequently, this layer has as an important information source that allow a continuous information gathering in order to effectively build the user profile.

2) The user profile dataset, which is focused on storage the information that will characterize users and will be used as input for the nutritional recommendation approach. Basically, this dataset will contain the data captured by the information gathering layer, allowing the recommendation generation based on nutritional aware criteria (supported by the physiological data),and preference-aware criteria (supported by the previous daily food intake).

3) The Third systems layer is focused on receiving as input the user profile information and returning as output the recommended meal plan. This layer also actively uses the nutritional knowledge which capture was conceived in the information gathering layer. Basically, the intelligent systems layer is composed of three main components: 1) the nutritional context determination, focused on initially filtering out some foods which are not appropriate for the current user recommendation; 2) the short-term models for generating daily meal plans, that is based on an optimization approach for maximizing the user preferences over the recommended foods while the fulfilment of the nutritional requirements are also verified; and 3) the long-term models for tuning the generated daily plan by considering weekly and monthly feeding schemes to follow.

4) A end user interface which is focused on presenting the recommended meal plans together with further nutritional information visualization. This interface is also focused on gathering the user feedback considering the provided recommendations. This feedback is returned to the information processing layer and is continuously used in the user profiling.

Graphical user interface, diagram

Description automatically generated