

Recommender System Based on Food and Exercise Ontologies to Find the Suitable Fitness Exercise Plan with the aid of Python

P.B.M.C.S. Basnayake^{*}, H.C.S. Peiris, S.D.H.S. Wickramaratne and D.P. Jayathunga

*Department of Computer Science and Informatics, Faculty of Applied Sciences,
Uva Wellassa University, Badulla, Sri Lanka*

**Corresponding Author E-mail: basnayakechamali@gmail.com, TP: +94713857140*

In the modern world, professionals of diverse industrial sectors have severely become victims of overweight and obese conditions which can be minimized by having proper dietary plans, physical activities, and minimizing alcohol-based relaxation. However, most of the exercise plans provided by fitness applications currently available for usage are not personalized and general exercises are given for every individual. In this research context, individuals are guided by recommending suitable exercises with exercise frequency, exercise environment, and unique time period to perform according to body parameters. According to domain experts, fitness plans highly depend on individual characteristics. Therefore height, weight, age, sex, diet details, medical history and user preferences for exercises taken from the front end which is a Tkinter Graphical User Interface. In this system, food ontology uses these details to calculate the daily calorie intake and extra calorie intake of the particular individual. Disease extraction using natural language processing techniques, computed with Python and integrated with the output of Food Ontology which is to be mapped with the exercise ontological knowledge base along with the predefined rules to match respective exercises suitable for the particular individual that is compatible with his preferences. Two ontologies for foods and exercises developed using Protégé 4.3 and data retrieved by running Simple Protocol and Resource Description Framework Query Language (SPARQL) queries inside the Python code using the RDFLib module and output is taken and directed to the front end. The entire system developed with Python 3, where two ontological files of Foods and Exercises are loaded and tested for consistency using the HermiT reasoner with the aid of Owlready2. The task-based ontology evaluation approach is performed by addressing the competency questions through the execution of SPARQL queries. In conclusion, this study provides an approach to integrate two ontologies and a disease extraction model using Python programming language. Correctness and qualitative evaluations of the system are verified by the domain experts, and recommendations from the ontological system are beneficial for physical trainers to improve and validate their manual exercise recommendations.

Keywords: Exercises; Ontology; Food; Tkinter; Python