

Abstract

Tailored Food Recommendations in Facilitating Dietary Change: A Rule-Based Personalized Eating Solution [†]

Jenni Lappi ^{*} , Adil Umer, Jaakko Lähteenmäki and Nesli Sözer

VTT Technical Research Centre of Finland, 02100 Espoo, Finland; adil.umer@vtt.fi (A.U.); jaakko.lahteenmaki@vtt.fi (J.L.); nesli.sozer@vtt.fi (N.S.)

^{*} Correspondence: jenni.lappi@vtt.fi

[†] Presented at the 14th European Nutrition Conference FENS 2023, Belgrade, Serbia, 14–17 November 2023.

Abstract: Background and objectives: A concept of personalized eating originates from personalized nutrition, where dietary advice is tailored to an individual. In personalized nutrition solutions, dietary advice is more and more based on clinical biomarkers, genetics, and the gut microbiome. However, there is evidence that tailored dietary advice based only on personal dietary data is effective in facilitating changes in dietary intakes. Thus, the aim is to create a personalized eating solution: a prototype of data platform recommends foods by linking individual's dietary data with product information via specified rules. Methods: The data platform is integrated with an external global food product database and a user interface (UI), and the system structure is: (1) a personal profile, (2) a rules engine with functionality for setting tags and filtering rules, and (3) a knowledge database (food product database). The food product database is integrated via an open API (application programming interface) with the platform, and is utilized to retrieve product information for the filtering rules. When using the platform for the first time, a user must enter demographic data and information about specific dietary criteria and personal preferences. With the permission from the user, the data platform may also retrieve data for the personal profile from other integrated services, including wearable devices. Food recommendations are generated by filtering the product information based on the personal profile and food groups selected by the user. The user can access the food recommendations via a web-based UI. The platform also includes an API, which allows the recommendations to be integrated to existing wellness applications and devices. Results and Discussion: The personalized eating solution suitability for use by consumers and ecommerce services will be tested in 2023. A strength is that the solution considers personal preferences to motivate users, such as values related to the consumption of ethic and sustainable products. However, the food recommendation rules rely on formal information about products in the external food database. In the future, the solution could be used for research, commercial, and healthcare purposes in facilitating dietary changes to promote health and wellbeing.

Keywords: personalized eating; food recommendation; platform prototype



Citation: Lappi, J.; Umer, A.; Lähteenmäki, J.; Sözer, N. Tailored Food Recommendations in Facilitating Dietary Change: A Rule-Based Personalized Eating Solution. *Proceedings* **2023**, *91*, 28. <https://doi.org/10.3390/proceedings2023091028>

Academic Editors: Sladjana Sobajic and Philip Calder

Published: 14 November 2023



Copyright: © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Author Contributions: Conceptualization, J.L. (Jenni Lappi) and J.L. (Jaakko Lähteenmäki); methodology, J.L. (Jenni Lappi), A.U. and J.L. (Jaakko Lähteenmäki); software, A.U.; validation, J.L. (Jenni Lappi), A.U., J.L. (Jaakko Lähteenmäki) and N.S.; formal analysis, J.L. (Jenni Lappi), A.U., J.L. (Jaakko Lähteenmäki) and N.S.; investigation J.L. (Jenni Lappi) and A.U.; resources, N.S.; data curation, J.L. (Jenni Lappi) and A.U.; writing—original draft preparation, J.L. (Jenni Lappi); writing—review and editing, A.U., J.L. (Jaakko Lähteenmäki), and N.S.; visualization, J.L. (Jenni Lappi); supervision, N.S.; project administration, J.L. (Jenni Lappi) and N.S.; funding acquisition, N.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Business Finland 6666/31/2021.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data sharing not applicable. No new data were created or analyzed in this study.

Conflicts of Interest: The authors declare no conflict of interest.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.