System Dietadhoc® - A Fusion of Human-Centred Design and Agile Development for the Explainability of AI Techniques Based on Nutritional and Clinical Data

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Abstract : In recent years, the scientific community's interest in the exploratory analysis of biomedical data has increased exponentially. Considering the field of research of nutritional biologists, the curative process, based on the analysis of clinical data, is a very delicate operation due to the fact that there are multiple solutions for the management of pathologies in the food sector (for example can recall intolerances and allergies, management of cholesterol metabolism, diabetic pathologies, arterial hypertension, up to obesity and breathing and sleep problems). In this regard, in this research work a system was created capable of evaluating various dietary regimes for specific patient pathologies. The system is founded on a mathematical-numerical model and has been created tailored for the real working needs of an expert in human nutrition using the human-centered design (ISO 9241-210), therefore it is in step with continuous scientific progress in the field and evolves through the experience of managed clinical cases (machine learning process). DietAdhoc® is a decision support system nutrition specialists for patients of both sexes (from 18 years of age) developed with an agile methodology. Its task consists in drawing up the biomedical and clinical profile of the specific patient by applying two algorithmic optimization approaches on nutritional data and a symbolic solution, obtained by transforming the relational database underlying the system into a deductive database. For all three solution approaches, particular emphasis has been given to the explainability of the suggested clinical decisions through flexible and customizable user interfaces. Furthermore, the system has multiple software modules based on time series and visual analytics techniques that allow to evaluate the complete picture of the situation and the evolution of the diet assigned for specific pathologies.

Keywords : medical decision support, physiological data extraction, data driven diagnosis, human centered AI, symbiotic AI paradigm

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