Understanding Health and Nutrition through Data Science

In the last decades, a lot of work is done in predictive modelling in healthcare. All this work is supported by existence of a number of available biomedical vocabularies and standards, which play a crucial role for understanding the health information. Even more, there are available systems such as the Unified Medical Language System that brings and links together all these biomedical vocabularies to enable interoperability between computer systems. As a result of the availability of these resources, the medical data can be used to find a patient's representation by projecting the data into a continuous vector space. In this way, medical embeddings are learned that also capture the non-linear relationships that exist between the medical concepts. These representations are further used with some advanced machine learning methods or deep learning to perform predictive studies in healthcare. The first part of the talk will be focused on state-of-the-art medical embedding methods.

However, in 2019, the Lancer Planetary Health published that the 2019 will be the year of nutrition, where the focus will be on the links between food systems, human health, and the environment. Contrary to the large number of available resources for the biomedical domain, in the food domain there is a limited number of resources that can be used. There is still no annotated corpus with food concepts, and there are few rule-based food named-entity recognition systems that can be used for food concepts extraction. There are also a number of food ontologies that exist, each developed for a specific application scenario, but there is no links between them. The second part of the talk will be focused on natural language processing and machine learning methods available for food and nutrition science.

The talk will also address several gaps that are important to be addressed in the near future in order to make a bridge between human health and food systems.

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Tome Eftimov is a postdoctoral researcher at Stanford University in USA. Previously, he was a researcher at Computer Systems Department, Jožef Stefan Institute, in Ljubljana, Slovenia.
In 2018, he received his PhD degree in Information and Communication Technologies at the Jožef Stefan International Postgraduate School, Ljubljana, Slovenia.
His areas of research include statistical data analysis, stochastic optimization algorithms, natural language processing, machine learning, and information theory. His recently published work on Deep Statistical Comparison in top-tier journal is selected as Hot Off the Press talk (i.e. one of the best papers related to stochastic optimization published in 2017 in the world), which will be presented at the Genetic and Evolutionary Computation Conference (i.e. GECCO 2018) in Kyoto, Japan.