

University of Zilina
Faculty of Management Science and Informatics
Department of Mathematical Methods
and Operations Research

Univerzitná 8215/1, 010 26 Žilina, Slovakia

PhD project

Thematic area ²⁾

Analysis of large datasets in service systems

Advisor: Assoc. Prof. Ľuboš Buzna

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Problem description:

The project focuses on the application and development of methods to analyse large datasets to improve efficiency of service systems. Considered example of a service system is operation of restaurants and more broadly food industry. In this case, the dataset contains detailed records of transactions (purchases, orders, expenses and supply deliveries) for the long enough time period.

Based on the provided data, it is required to assess how the data could be used to improve the operation of a service system. The goal of the research is to develop methodology that will enable to address problems such as:

- short term estimation (e.g. one day ahead) of the number of customers, estimate of the needed personnel (What are the future trends?, What algorithms are suitable to estimate the occupancy/utilisation of the system?),
- short term estimation of the stock development (How to effectively organize the storage supply?, How to improve efficiency of the system?)

Co-supervisor: Ing. Michal Lekýr, PhD.

Expected scientific contributions:

- new methodologies/algorithms to support decision making in the area of service systems.

Recommended methods:

- thorough analyses of the state-of-the-art,
- formulation of hypothesis and of models for data processing,
- application of computational methods to analyse large datasets,
- validation and evaluation of results.

Compulsory PhD Courses:

Mathematical foundations of informatics,
Theory and methodology of applied informatics,
Course selected according to the specialisation.

Type of research:

Applied research

Related research projects:

VEGA 1/0463/16 Economically efficient charging infrastructure deployment for electric vehicles in smart cities and communities

VEGA 1/0342/18 Optimal dimensioning of service systems

Previous publications of the department where the training will take place:

1. M. Cebecauer, Ľ. Buzna: A versatile adaptive aggregation framework for spatially large discrete location-allocation problems, *Computers & Industrial Engineering* , Vol. 111, p. 364-380, 2017
2. M. Cebecauer, K. Rosina, Ľ. Buzna: Effects of demand estimates on the evaluation and optimality of service centre locations, *International Journal of Geographical Information Science*, Vol. 30, Issue 4, 2016.
3. K. Rosina, P. Hurbánek, M. Cebecauer, "Using OpenStreetMap to improve population grids in Europe," *Cartography and Geographic Information Science*, s. 1-13, 2016.

We are looking for a PhD candidate having strong background in at least one of the following areas: computer science, software engineering, geoinformatics or operations research.

The expected start: September 1, 2018

For more information please email to Lubos.Buzna@fri.uniza.sk