Doctoral Thesis Themes 2026/2027
Study programme: **APPLIED INFORMATICS**

Supervisor: Prof. Petr Hájek, Ph.D. (petr.hajek@upce.cz)

1. Multimodal Financial Sentiment Analysis

The aim of this dissertation is to develop and validate a deep learning model for multimodal financial sentiment analysis. The student is expected to integrate textual, vocal, visual, and financial modalities, validate the approach on several labelled and sufficiently large datasets, and experiment with various types of fusion methods.

2. Aspect-Based Sentiment Analysis Using Large Language Models

The aim of this dissertation is to summarize existing deep learning neural network models for aspect-based sentiment analysis, acquire and label a sufficiently large dataset for text classification into aspect categories and sentiment categories, propose an appropriate deep learning neural network architecture, and perform text classification using this neural network.

3. Interval-valued Fuzzy Inference Systems

The aim of this dissertation is to define interval-valued fuzzy sets, to summarize the current capabilities of inference mechanisms for this class of systems, to propose algorithms for building the knowledge base of interval-valued fuzzy inference systems, to implement these systems, and to evaluate their prediction performance and interpretability on a set of benchmark datasets.

Supervisor: Assoc. Prof. Miloslav Hub, Ph.D. (miloslav.hub@upce.cz)

1. Evaluation of Usability of User Interfaces through Natural Language

The aim of this work is to design and verify a new way of evaluating the usability of user interfaces through natural language. The student is expected to search for existing methods of user interface usability evaluation, to design a model for user interface usability evaluation through natural language and to verify this model on experimental data.

2. The Use of Biometric Characteristics for Monitoring Crowd Behavior at Mass Events

The aim of the work is to propose and verify a new way of monitoring the behavior of the crowd at mass events through the biometric characteristics of their participants. The student is expected to research existing ways of monitoring crowd behavior at mass events, design a model for monitoring crowd behavior at mass events through the biometric characteristics of their participants, and verify this model on experimental data.

+ one theme upon agreement with an applicant

Supervisor: prof. RNDr. Michal Munk, PhD. (mmunk@ukf.sk)

1. The Use of ESG Information Disclosed by Commercial Banks under Pillar 3

The thesis focuses on the issue of information disclosure within ESG reporting under Pillar 3 - Market Discipline by commercial banks. The aim of the thesis is to verify the effectiveness of ESG reporting information disclosure, examining the extent to which this information is utilized by key stakeholders of the relevant commercial banks, as well as to design a methodology which allows to track stakeholders´ behaviour in relation to Pillar 3 information

in various regions, such as V4 and CEE countries. The research ambition is to design a methodology that utilizes publicly available data, making it less time-consuming in terms of data pre-processing and language independent (given the localization of Pillar 3 disclosure information). This methodology, based on publicly available data, will enable effective monitoring of the Pillar 3 disclosure information´s impact in various regions on a regular basis. In terms of data processing, the thesis deals with the knowledge discovery across all web domains, including search queries, web usage, and web content and structure.

Applicants can propose their own themes of dissertation theses. Such themes will be accepted upon agreement of a supervisor and advisory board of a particular study programme.