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GEIST Research Profile

AGH University of Science and Technology (AGH UST) in Krakow, Poland, founded in 1919, is ranked as one of top Polish universities involved in research and education in information technologies and computer science. The university consists of 16 Faculties from number of domains, including the Electrical Engineering and Business Management. It employs about 2000 faculty members serving over 30 000 students within undergraduate, postgraduate and continuing education programmes.

Group for Engineering of Intelligent Systems Technologies (GEIST) was created in 2009 by Grzegorz J. Nalepa and Antoni Ligęza and a group of dynamic young researches. The research interests of the Group is located in the area of computer science and artificial intelligence. It is focused on the methods, and tools for developing and applying intelligent technologies and systems.

Areas

GEIST is mainly focused on the following *areas of development and applications* of intelligent technologies and systems:

1. **knowledge engineering** including semantic information processing and explainability
2. **business intelligence** including business process management
3. **ambient intelligence** including context-aware systems
4. **affective computing** with focus on emotion detection and interpretation in mobile systems

Methods

We use and develop specific *methods and tools* such for:

- knowledge representation and reasoning
- knowledge engineering and management
- rule-based systems

The expertise of the Group includes:

- design and implementation, as well as formal verification and analysis of knowledge-based systems, mainly rule-based, see HQEd rule editor and HeaRT rule engine, as well as other results of

- business processes
- formal verification
- semantic annotations and ontologies
- visual design of knowledge bases
- semantic wikis for knowledge engineering
- machine learning techniques
- context-aware applications
- software engineering

the HeKatE project
- modelling and evaluation of business rules and processes, see the Bimloq project
- distributed and collaborative knowledge management with semantic wikis, see the Loki semantic wiki system
- Semantic Knowledge Engineering methodology, including the eXtended Tabular Trees rule modeling formalism

Projects

GEIST has practical experience in multiple *research and development projects*. Largest project include:

- **Prosecco** which is a 32 months long NCBR PBS project started in 2012-12. The goal of the project is to address the needs and constraints of small and medium enterprises (SME) by designing methods that will significantly improve their Business Process Management systems.
- **BIMLOQ**, which was 32 month long NCN project on *business models and processes optimization for quality*.
- **INDECT**, which is a large EU collaboration project coordinated by Department of Telecommunications of AGH. The aim of the project is the development of an intelligent information system supporting observation, searching and detection for security of citizens in urban environment.
- **Parnas:**, which was a 18 month long NCN project on *tools for inference control and quality analysis in modularized rulebases*.
- **HeKatE**, which was a 30 month long NCN project on *hybrid knowledge engineering methodology for knowledge-based systems*.

The complete list of projects can be *found here*.

Contacts

Finally the group is active in the area *international collaboration* for both research and teaching:

- scientific collaboration with Universities of Wuerzburg, Kassel, Siegen, and Almeria, Murcia
- teaching collaboration in the scope of the Erasmus LPP
- participation of group members in the Organizing Committees international conferences and workshops, including KESE, RuleApps, and number of Program Committees see here for more details.

We are looking for partners, and projects – contact us!

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