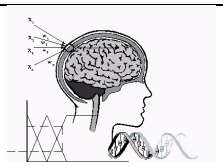
International

Innovation in Knowledge Based and Intelligent Engineering Systems



INVITED SESSION SUMMARY

Title of Session: **Knowledge Engineering and Data Mining - theory and practice**

Name of Chair:

Assoc Prof. Agnieszka Nowak-Brzezińska
Dr. Agnieszka Konys

Details of Session:

Extracting knowledge from data is a fundamental process in creating intelligent information retrieval systems, decision support, and knowledge management. Among the welcome topics of work, we seek research on data mining methods, multidimensional data analysis, supervised and unsupervised learning methods, methods of knowledge base management, language ontologies, ontology learning, and others. We encourage you to present new algorithms and work on practical solutions, i.e., applications/systems presenting the actually created applications of the proposed research achievements.

Knowledge engineering is a field that involves the development and application of methods to acquire, represent, and use knowledge in computer systems. It plays a crucial role in artificial intelligence (AI) and the design of intelligent systems. Here are some key topics related to knowledge engineering:

- Knowledge Representation:

Ontologies: Building and using ontologies to represent knowledge in a structured and formal way, often involving hierarchical relationships and semantic meaning.

Frames: Representing knowledge using frames, which are data structures that capture information about objects and their properties.

- Knowledge Acquisition:

Knowledge Elicitation: Techniques for extracting knowledge from experts in a particular domain.

Automated Knowledge Acquisition: Developing methods and tools to automatically acquire knowledge from various sources, including data mining.

- Inference Engines:

Rule-Based Systems: Designing systems that use rules to make inferences and decisions based on available knowledge.

Semantic Reasoning: Applying logic and reasoning to draw conclusions from the knowledge represented in a system.

- Knowledge Verification and Validation:

Quality Assurance: Ensuring the accuracy, reliability, and completeness of the knowledge captured and used by a system.

Validation Techniques: Methods for testing and validating the correctness of knowledge representation and inference processes, including validation against data mining results.

- Expert Systems:

Building Expert Systems: Developing computer systems that emulate the decision-making abilities of a human expert in a particular domain.

Knowledge-Based Systems: Systems that utilize knowledge engineering principles to solve complex problems, often integrating insights from data mining.

- Knowledge Discovery and Data Mining:

Association Rule Mining: Discovering relationships and associations between variables in datasets.

Classification and Regression: Using algorithms to predict and categorize data based on known attributes.

Clustering: Grouping similar data points together based on inherent patterns.

Text mining: Extracting valuable information and knowledge from unstructured text data.

Knowledge Synthesis: Integrating information from various sources, including data mining results, to generate new insights.

- Natural Language Processing (NLP):

Semantic Analysis: Extracting meaning from natural language texts to represent knowledge.

Knowledge Extraction from Text: Techniques for automatically extracting structured information from unstructured text, complementing data mining for comprehensive knowledge extraction.

- Knowledge-Based Learning:

Machine Learning with Knowledge: Integrating domain knowledge into machine learning algorithms for improved performance and interpretability.

Transfer Learning: Leveraging knowledge from one domain, including insights from data mining, to improve learning in a related domain.

The invited session covers the entire knowledge engineering pipeline: from data acquisition and data mining to knowledge extraction and exploitation. Our purpose is to gather the many researchers operating in the field to contribute to a collective effort in understanding the trends and future questions in the field of knowledge engineering and data mining. Topics include, but are not limited to:

- knowledge acquisition and engineering;
- data mining methods;
- big knowledge analytics;
- data mining, knowledge discovery, and machine learning;
- knowledge modeling and processing;
- knowledge acquisition and engineering;
- query and natural language processing;
- data and information modeling;
- data and information semantics;
- data intensive applications;
- knowledge representation and reasoning;
- decision support systems;
- rules mining;
- outliers mining;
- semantic web data and linked data;
- ontologies and controlled vocabularies;
- data acquisition;
- multidimensional data analysis;
- supervised and unsupervised learning methods
- practical applications of knowledge engineering and data mining systems

IMPORTANT DATES:

Conference date: KES-2026: 9-11th September

Submission of papers: **30th March 2026**
Notification of acceptance: **4th May 2026**

Final paper publication files to be received by: **1st June 2026**

Publication:
The conference proceedings will be published in Elsevier's **Procedia Computer Science** open access journal, available in **ScienceDirect** and submitted to be indexed/abstracted in **CPCi (ISI conferences and part of Web of Science)**, **Engineering Index**, and **Scopus.**

KES Conference is indexed in CORE (cat. B) and MNiE List in Poland (item 841, 70 points).

30th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems

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Website URL (if any):

http://kes2026.kesinternational.org/

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