

INTELLIGENT SYSTEMS GROUP

Contact details

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Acronym	ISG	
Logo		
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Areas of expertise

Knowledge representation and reasoning

- Semantic Web; Ontology engineering; Text-based ontology learning; Ontology matching, Semantic annotation

Multi-agent systems

- Agreement technologies; Argumentation theory; Trust modeling; Argumentative agents for norm compliance

Business processes re-engineering.

- Semantic web services composition; Decision support systems; Expert systems; Norm Compliance

Norm compliance

- E-contracts; Model checking; Arguing conformance

Team

Prof. Dr. Eng. Ioan Alfred Letia; Assist. Prof. Dr. Eng. Emil Chifu, Prof. Dr. Eng. Adrian Groza, Assist. Prof. Eng. Radu Razvan Slavescu, Assist. Dr. Eng. Anca Marginean
Phd. Students: Eng. Anca Goron, Eng. Octavian Pop, Eng. Raluca Dudila

Representative projects

“Increasing understanding on climate change through public discourse analysis and stakeholders modelling”, Romania-Norway bilateral cooperation, 2016
ARGSAFE, “Using Argumentation for Justifying Safeness in Complex Technical Systems”, PNII-Capacitati, <http://cs-gw.utcluj.ro/~adrian/projects/argsafe/> (2013-2015)
ASDEC, “Structural Argumentation for Decision Support with Normative Constraints”, PNII-Capacitati, <http://cs-gw.utcluj.ro/~adrian/projects/asdec/> (2013-2014)
LELA, “Collaborative Recommendation System in the Tourism Domain Using Semantic Web Technologies and Text Analysis in Romanian Language”, PNII-INOVARE, <http://cs-gw.utcluj.ro/~adrian/projects/lela> (2013-2014)
GREEN-VANETS, “Improving Transportation Using Car-2-X Communication and Multi-Agent Systems”, Intern project -Technical University of Cluj-Napoca, <http://cs-gw.utcluj.ro/~adrian/projects/vanets>
ARGNET, “Structured Argumentation in a Web Context”, PNII-IDEI 170, <http://cs-gw.utcluj.ro/~adrian/argnet.html> (2009-2011)
 “Automating Online Dispute Resolution for B2B using multi-agent systems”, CNCSIS-534 <http://cs-gw.utcluj.ro/~adrian/odr.html> (2007-2008)
 “Web Service Composition Through Ontologies”, CNCSIS, (2007-2009)
 “Collaborative/Competitive Multi-Agent System Oriented on E-Business”, CNCSIS, (2005-2007)
 “Software Agents for Processing the Semantic Web”, CNCSIS, (2002-2004)
 “Testing and Validating Agents Behavior”, AT, (2002-2003)

Significant results

The most representative publications of the past 5 years:

1. A. Marginean, "Question answering over biomedical linked data with grammatical framework", in *Semantic Web: Interoperability, Usability, Applicability*, vol. 8, no. 4, pp. 565-580, 2017
2. R. Szabo and A. Groza, "Analysing debates on climate change with textual entailment and ontologies," in 2017 13th IEEE International Conference on Intelligent Computer Communication and Processing, R. Potolea and R. R. Slavescu, Eds. (IEEE International Conference on Intelligent Computer Communication and Processing ICCP, New York: IEEE, 2017, pp. 39-46.
3. D. Toniuc and A. Groza, "Climebot: an argumentative agent for climate change," in 2017 13th IEEE International Conference on Intelligent Computer Communication and Processing, R. Potolea and R. R. Slavescu, Eds. (IEEE International Conference on Intelligent Computer Communication and Processing ICCP, New York: IEEE, 2017, pp. 63-70.
4. Slavescu, R. R.; Oltean, M. N.; Torok, A. P.; et al., Automatic Learning of Medical Text Annotation Rules - a Case Study on Endoscopies 5th International Conference on Advancements of Medicine and Health Care through Technology (MEDITECH) Location: Cluj Napoca, ROMANIA Date: OCT 12-15, 2016, Book Series: IFMBE Proceedings Volume: 59 Pages: 248-251 Published: 2017
1. S. Contiu and A. Groza, "Improving remote sensing crop classification by argumentation-based conflict resolution in ensemble learning," *Expert Systems with Applications*, vol. 64, pp. 269-286, Dec 2016.
2. S. A. Gomez, A. Goron, A. Groza, I. A. Letia, "Assuring safety in air traffic control systems with argumentation and model checking", in *Expert Systems with Applications*, vol. 44, pp. 367–38, 2016.
3. I. A. Letia, A. Goron, "Model checking as support for inspecting compliance rules in flexible processes", in *Journal of Visual Languages and Computing*, vol. 28, 2015, pp. 100--121
4. A. Groza, I. A. Letia, A. Goron, S. Zaporozhan, "A formal approach for identifying assurance deficits in unmanned aerial vehicle software", in *Advances in Intelligent Systems and Computing Series*, vol. 1089, Springer, 2014, pp. 233–239
5. I. A. Letia, O. Pop, "Towards normative adaptive systems for communities of agents", in *Web Intelligence and Agent Systems*, vol. 11, no. 4, 2013, pp. 339—350
6. P. Donnell, M. Banaji, A. Marginean, C. Pantea, "CoNtRol: an open source framework for the analysis of chemical reaction networks", in *Bionformatics*, 2014

Significant solutions:

Checking compliance in business processes a version of description logic, enhanced with normative modalities, has been used with application to the Hazard Analysis at Critical Control Points standard. Contributions to fundamental research in argumentation and demonstrate innovative technologies validated in real-world scenarios such as safety standards, justifying audit decisions, and structured arguments for medical decision support.

Products and technologies:

1. Named Entity Recognition and ontology population through natural language processing of Romanian language
2. Compliance checking of business processes based on semantic technologies
3. Arguing conformance against ISO-like standards
4. E-Contracts monitoring

The offer addressed to the economic environment

Research & development	<p>Norm compliance: verifying business processes against norm compliance and quality standards like HACCP or ISO 22000.</p> <p>Support for dispute resolution for Small and Medium Enterprises in case of contract breach.</p> <p>Semantic-based business process re-engineering.</p> <p>Decision support systems based on domain-based, safety arguments.</p> <p>Logistic planning.</p> <p>Using argumentation for justifying safeness of complex technical systems.</p> <p>Agent oriented technology in support of e-business.</p> <p>Model checking of business processes against ISO-like quality standards.</p> <p>Representing and reason on business rules for e-commerce applications.</p> <p>Modelling and simulating trust on the Web.</p> <p>Semantic search of business products.</p> <p>Opinion mining for e-business.</p> <p>Natural language processing</p>
Consulting	<p>Consulting, design, research and prototyping towards development of semantic-based intelligent systems.</p> <p>Applied engineering services: engineering safety critical systems, business process re-engineering, model checking verification of computer systems, ontology engineering.</p>
Training	<p>Semantic Technologies: ontology engineering, reasoning on ontologies, linked data, OWL, RDF</p> <p>Model checking: Computation Tree Logic, Kropke models, hybrid logics.</p> <p>Agent-based programming: Semantic Web services, multi-agent technologies</p>