INTELLIGENT SYSTEMS GROUP

Contact details

Name: Intelligent Systems Group
Acronym: ISG

Logo: [Image]

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Areas of expertise

Machine Learning and Explainable AI - Deep Learning for medical data and autonomous driving.
Knowledge representation and reasoning - Semantic Web; Ontology engineering; Expert systems.
Natural Language Processing - Machine comprehension, Chatbots, Commonsense reasoning.
Multi-agent systems - Logic-based agents; Agreement technologies; Trust modelling; Ethics for AI, Dialogue protocols
Business processes re-engineering. - Decision support systems; Norm Compliance, E-contracts, Bayesian networks, Model checking.

Team

Prof. Dr. Eng. Ioan Alfred Letia; Assoc. Prof. eng. Emil Chifu, Assoc. Prof. eng. Adrian Groza, Assoc. Prof. eng. Radu Razvan Slavescu, Assoc. Prof. eng. Anca Marginean

Representative projects

“Extensive Capitalization of Experience in Spatial and Security Activities (VESS), project PN-III-P1-1.2-PCCDI-2017-0371 (2018-2020) - member
SmartCoDrive – Cooperative Advanced Driving Assistance System Based on Smart Mobile Platforms and Road Side Units”, national research project (2012-2016) - member

Significant results

The most representative publications of the past 5 years:
2. A. Groza, Interleaved Argumentation and Explanation in Dialog in Logic, Cognition, Games, College Pub., 2020

Significant solutions:
Automatic Diagnosis of retina conditions using deep learning; Analysing arguments on social media; Machine comprehension and natural language processing for chatbots; Recurrent networks for pedestrian identification with pose estimation; Crop classification from satellite images using ensemble learning; Checking compliance of business processes with description logic; Checking compliance against safety standards (e.g. Hazard Analysis at Critical Control Points); 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. Controlled Natural Languages with Grammatical Framework.

Products and technologies:
1. Train and visualize deep neural network for OCT B-scans ([https://github.com/ancamarginean/retina_amd](https://github.com/ancamarginean/retina_amd))
3. GFMEd ([http://cs-gw.utcluj.ro/~anca/tools.html](http://cs-gw.utcluj.ro/~anca/tools.html)) - translating questions about drugs and diseases from English to SPARQL.

The offer addressed to the economic environment

Research & development
Medical data and financial data analysis with machine learning. Natural language processing
Support for dispute resolution for Small and Medium Enterprises in cases of contract breach.
Semantic-based business process re-engineering.
Decision support systems based on domain-based safety arguments. Logistic planning.
Agent oriented technology in support of e-business.
Representing and reasoning on business rules for e-commerce applications.
Modelling and simulating trust on the Web.

Consulting
Machine learning: design, train and evaluate models
Consulting, design, research and prototyping on development of semantic-based intelligent systems. Applied engineering services: engineering safety critical systems, business process re-engineering, model checking verification, ontology engineering.

Training
Machine learning: deep learning, classical machine learning, XAI
Semantic Technologies: ontology engineering, reasoning on ontologies, linked data, OWL, RDF
Model checking: Computation Tree Logic, Kripke models, hybrid logics.
Agent-based programming: Semantic Web services, multi-agent technologies