INTELLIGENT SYSTEMS GROUP

Contact details

Name	**Intelligent Systems Group**
Acronym	**ISG**
Logo	
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Faculty Department	**Faculty of Automation and Computer Science** **Computer Science Department**
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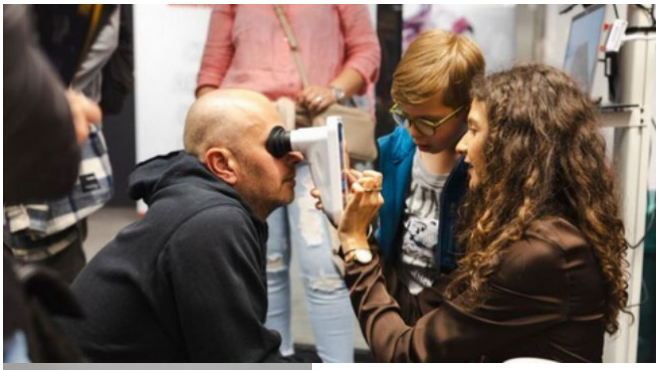

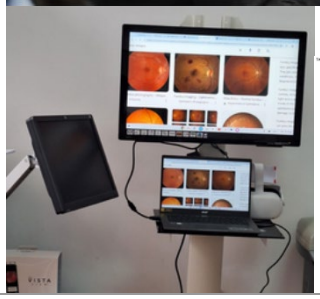

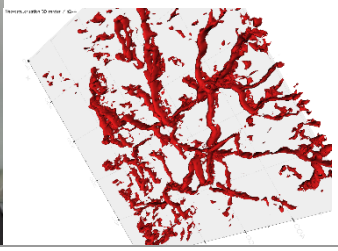

Areas of expertise

Machine learning: We know how to torture data to make a full confession. We master various torture instruments: CNN, RNN, GNN, SVM, PCA, GradientBoosting Trees.
Knowledge graphs: We know how to interleave deep learning with knowledge graphs. We know how to build domain ontologies.
Natural Language Understanding – We know how to analyse text to support precise reasoning and question answering. We know how to adapt and fine tune language models to specific problems.
Agentic AI - We know how: to use encoded images for sequences or volumes of images; to combine text with images; to learn from labelled or unlabelled images with contrastive learning, ViT, or Diffusion Models; to put ML to a diet: with ablation studies, knowledge distillation, few-shot learning,
Explainable Artificial Intelligence – We like white box machine learning, transparency and AI ethics.

Team

Prof. Eng. Adrian Groza, Prof. Eng. Radu Razvan Slavescu, Assoc. Prof. Eng. Anca Marginean, Assoc. Prof. eng. Emil Chifu, Lecturer Cristina Feier, Lecturer Roxana Szomiu, Lecturer Istvan Attila Csaszar, Phd. students: Cheres Ioana, Alexandru Lecu, Adrian Pop, Andrei Dumitras, Iacob Liviu, George Bara, Emil Stetco, Virgil Puiac, Prof. Dr. Eng. Ioan Alfred Letia;

Recent projects

"SOL-2024-2: Distributed Ledger Technologies Implementation in Internal Organizational Workflows and Support Applications for Cooperation among National Security Institutions, PN-IV-P6-6.3-SOL, nr. 20341/2024, 2024-2026
"New Optical Coherence Tomography Biomarkers Identified with Deep Learning for Risk Stratification of Patients with Age-related Macular Degeneration, PED616, 2022-2024, https://users.utcluj.ro/~agroza/projects/delarmad/

Significant results

1. **"Where artificial intelligence stands in the development of electrochemical sensors for healthcare applications-A review"**, A. Cernat, A. Groza, Mi. Tertis, B. Feier, O Hosu-Stancioiu,C. Cristea, ***TrAC Trends in Analytical Chemistry*** DOI: https://doi.org/10.1016/j.trac.2024.117999, **2024**
2. **"A Qualitative Evaluation of ChatGPT4 and PaLMs Response to Patients Questions Regarding Age-Related Macular Degeneration"**, Muntean, G., Marginean, A., Groza, A., Damian, I.et al., ***Diagnostics*** Vol. 14, Iss. 14, DOI: 10.3390/diagnostics14141468, **2024**.
3. **"The Predictive Capabilities of Artificial Intelligence-Based OCT Analysis for Age-Related Macular Degeneration Progression "**, Muntean, G.A.; Marginean, A.; Groza, A.; Damia, et al. ***Diagnostics*** Vol. 13, Iss. 14, DOI: 10.3390/diagnostics13142464, **2023**.
4. **"Artificial Intelligence for Personalised Ophthalmology Residency Training"**, Muntean, G., Groza, A, Marginean, et all., ***Journal of Clinical Medicine*** Vol. 12, Iss. 5, DOI: 10.3390/jcm12051825, **2023**.

5. V. Mercea, A.Paraschiv, D. A. Lacatus, A. Marginean, D. Besliu-Ionescu: A Machine Learning Enhanced Approach for Automated Sunquake Detection in Acoustic Emission Maps. Solar Physics 298, 4, 2023
6. **"Predicting Visual Acuity in Patients Treated for AMD"**, Marginean, B., Groza, A., Muntean, G., Nicoara, S. D., ***Diagnostics*** MDPI, Vol. 12, Iss. 6, pp. 1504, **2022**
7. **"The profile: unleashing your deepfake self"**, Cheres, Ioana and Groza, Adrian, ***Multimedia Tools and Applications*** Springer Nature, pp. InPress, DOI: https://doi.org/10.1007/s11042-023-14568-x,
8. **"Agents that argue and explain classifications of retinal conditions"**, Groza, Adrian and Toderean, Liana and Muntean, George Adrian and Nicoara, Simona Delia, ***Journal of Medical and Biological Engineering*** Springer, Vol. 41, Iss. 5, pp. 730--741, DOI: 10.1007/s40846-021-00647-7, **2021**
9. **"Interleaving Automatic Segmentation and Expert Opinion for Retinal Conditions"**, Bilc, S., Groza, A., Muntean, G., Nicoara, S.D, ***Diagnostics*** MDPI, Vol. 12, Iss.1,DOI: 10.3390/diagnostics12010022, **2021**
10. **"Agents that argue and explain classifications of retinal conditions"**, Groza, Adrian and Toderean, Liana and Muntean, George Adrian and Nicoara, Simona Delia, ***Journal of Medical and Biological Engineering*** Springer, Vol. 41, Iss. 5, pp. 730--741, DOI: 10.1007/s40846-021-00647-7, **2021**.
11. **"Reliable Learning with PDE-Based CNNs and DenseNets for Detecting COVID-19, Pneumonia, and Tuberculosis from Chest X-Ray Images"**, Marginean A., Muntean, D., Muntean, G et al. Camelia-M., ***Mathematics*** Vol. 9, Iss. 4, DOI: 10.3390/math9040434, **2021**.
12. **"FastRCA-Seq: An efficient approach for extracting hierarchies of multilevel closed partially- ordered patterns"**, C. Nica, V. Almăşan, A. Groza, ***Knowledge-Based Systems*** Vol. 210, pp. 106533, DOI: https://doi.org/10.1016/j.knosys.2020.106533,
13. **"Climate change opinions in online debate sites"**, Groza, A, Ozturk, P. et al. ***Computer Science and Information Systems*** Iss. 1, pp. 93--116, DOI: 10.2298/CSIS180601015, **2020**.

Significant solutions: Automatic diagnosis of retina conditions using deep learning; Detecting fake news by reasoning on ontologies Analysing arguments on social media; Crop classification from satellite images using ensemble learning; Checking compliance against safety standards (e.g. HACCP)

Products and technologies:
1.Residents training https://users.utcluj.ro/~chiorana/resident.html
2. Identifying biomarkers in retina from OCT B-scans (https://github.com/ancamarginean/retina_amd)
3. FACE - Fack checker with explanations
2. Chemical Reaction Network analysis tool (http://cs-gw.utcluj.ro/~anca/tools.html) CoNtRol
3. GFMEd (http://cs-gw.utcluj.ro/~anca/tools.html)- questions about drugs and diseases from English to SPARQL
4. PEARLS (http://cs-gw.utcluj.ro/~srazvan/prj/perlas/) - Personal Expectations Aware Recommender of Landmarks and Sites

The offer addressed to the economic environment

Research & development	Artificial Intelligence – more than 20 years of experience
Consulting	Artificial Intelligence, AI ethics, AI Act
Training	Artificial Intelligence, Inteligent Systems, Agentic AI, Knowledge representation and reasoning, Semantic Technologies

Last update on January 2025