Tomislav Duricic

tduricic90@gmail.com | tduricic.me | tduricic | tduricic | 8010 Graz, Austria

Professional Summary

Senior Machine Learning Researcher & Engineer (10+ years) specializing in **Recommender Systems**, **Graph Neural Networks**, & **Large Language Models**. Proven track record developing algorithms across job matchmaking, automotive diagnostics, & immersive AI assistants. Published in top venues (RecSys, ECAI) on **beyond-accuracy optimization** & GNN applications. Experienced in full ML lifecycle from research to production using PyTorch, Java & Python for large-scale data. Led cross-disciplinary projects **(€750k+ funding)**, combining research expertise with engineering solutions. Passionate about AI systems that enhance user experiences through **personalization, diversity, fairness, & explainability**.

Education

PhD — ***Computer Science*** Oct 2018 - Dec 2025 (Expected)
Institute of Interactive Systems and Data Science | Graz University of Technology (TU Graz), Austria
Advisors: Assoc.-Prof.Dr. Elisabeth Lex, Priv.-Doz.Dr. Dominik Kowald

MSc — ***Computing | Profile: Software Engineering and Information Systems*** Sep 2013 - Jul 2015
Faculty of Electrical Engineering and Computing | University of Zagreb, Croatia
Advisors: Prof.Dr.Sc. Vedran Podobnik, Prof.Dr.Sc. Gordan Gledec, Assoc.-Prof.Dr. Elisabeth Lex

ERASMUS+ — ***Exchange Programme*** Aug 2012 - Aug 2013
Department of Informatics | Karlsruhe Institute of Technology, Germany
Advisors: Dr. Verónica Rivera-Pelayo, Prof.Dr. Rudi Studer

BSc — ***Computing | Profile: Software Engineering and Information Systems*** Sep 2009 - Aug 2013
Faculty of Electrical Engineering and Computing | University of Zagreb, Croatia
Advisor: Prof.Dr.Sc. Slaven Zakošek

Work Experience

Know Center, Graz, Austria — ***Senior Machine Learning Researcher*** Jan 2024 - Present
- Leading research within the **Fair AI Research Area** on **graph algorithms** for enhancing recommendation **diversity**, **serendipity**, and **fairness**, establishing a framework for **beyond-accuracy optimization** in GNN-based recommender systems [1].
- Designing and implementing **immersive AI assistants** in **AR/VR** for machine operation support, integrating **LLMs** with **multimodal interaction** (speech, gesture, vision) to enhance user performance in complex environments (DDIA COMET Module) [2].
- Rigorously **benchmarking LLMs** for technical document understanding, evaluating impacts of prompting strategies, **RAG architectures**, and **context length** on structured output, Q&A accuracy, and task guidance reliability [Work in progress].
- Co-authored successful **€60k grant** (TILDE/OpenWebSearch.eu) applying LLMs/RAG/KGs for **trustworthy web knowledge access**, directly applying **Fair AI** principles; actively contributing expertise while helping draft new Horizon Europe/FFG proposals.

TU Graz & Know Center, Graz, Austria — ***PhD Researcher & Project Lead*** Oct 2018 - Dec 2023
- Conducted PhD research (partially funded by DDAI COMET Module) on GNNs and RecSys using graph-based approaches, analyzing **music preference homophily** related to user mainstreaminess, novelty, and diversity on the **large-scale LFM-1B dataset** [3]. Studied GNN performance vs. graph structure (communities, homophily) for **semi-supervised classification** [4]; co-developed structure-based GNN attacks **revealing vulnerabilities** [5]; proposed novel trust/embedding RecSys for **cold-start users** [6, 7].
- Led development & deployment of real-time recommender systems for industry partners: e.g., Studo/Talto job matchmaking (text embeddings, ScaR framework [8]), achieving **20% user engagement uplift** & securing **€150k FFG grant** for **fair/transparent matching**; applied sequential RecSys/embeddings to AVL automotive diagnostics, achieving **>50% node prediction accuracy**.
- Core contributor to the Java-based ScaR real-time RecSys framework; applied it across diverse projects (e.g., job matching, resource recommendation) and **managed ML projects** (e.g., COGSTEPS, Studo/Talto), **leading teams** of up to 5 researchers/engineers.
- **Co-advised** Bachelor's/Master's theses and **taught** graduate courses including Data Science in Business 2 and Complexity Science.

Know Center, Graz, Austria — ***Machine Learning Engineer & Data Scientist*** Mar 2016 - Sep 2018
- Developed real-time data pipelines using microservices architecture (Java, Spring Boot, RabbitMQ, Apache Solr) integrating Python ML models for retail analytics (Detego Fashion), enabling **outlier detection** to optimize product placement and boost sales.
- Developed **time-series forecasting models** (Python, R, SARIMA, LSTM) & interactive dashboard (Plotly) for Porsche Holding car demand prediction, improving accuracy; **earned internal Excellence Silver Award & featured in Trend magazine** [9].
- Developed an **end-to-end ML pipeline analyzing image metadata** (using Java Microservices, PySpark/Hadoop, Weka) to automate photo-to-month classification for personalized calendars, **significantly improving accuracy** over baselines.
- Contributed to the **early development** of the ScaR recommender framework (Java), applying ML techniques to bridge research concepts and **production-ready systems** for industry partners.

Know Center, Graz, Austria — ***Research Intern (ERASMUS+)*** Mar 2015 - Aug 2015
- Conducted Master's thesis research on "Real-time Recommendations Based on Social Trust", tackling data sparsity using novel trust metrics calculated via Apache Solr within the **ScaR framework** demonstrating **improved accuracy** and **real-time performance.**

Skills

ML Research & Modeling	Expertise in modern ML/AI for content representation, description, categorization, retrieval (GNNs, Deep Learning, LLMs, Embeddings, Transformers). Recommender Systems design, evaluation (beyond-accuracy: diversity, fairness, novelty), and cold-start solutions. User behavior modeling, network science.
Programming & Frameworks	Python (Proficient), PyTorch (Proficient), PyG, Scikit-learn, Pandas, NumPy, Scikit-surprise, RecBole. Java (Proficient), Spring Boot. Familiarity with Scala.
Data & Scalability	Large-scale data processing and analytics (Spark/PySpark familiarity), SQL (PostgreSQL), NoSQL (MongoDB, Apache Solr), Data Pipelines, Big Data.
Software Engineering & Other	Object-Oriented Design, Microservices Architecture, RESTful APIs, Containerization (Docker), Cloud Platforms (AWS/GCP exposure), Git, CI/CD concepts, AR/VR Development (Unity), Agile methodologies.
Research & Problem-Solving	Research design, experimental methodology, statistical analysis, grant writing (€750k+ contributed), scientific publication (RecSys, ECAI, ASONAM, etc.), presentation skills, interdisciplinary and international collaboration.

Selected Publications

[1] **Duricic, Tomislav**, Dominik Kowald, Emanuel Lacic, and Elisabeth Lex. Beyond-accuracy: a review on diversity, serendipity, and fairness in recommender systems based on graph neural networks. *Frontiers in big data*, 2023.

[2] **Duricic, Tomislav**, Peter Müllner, Nicole Weidinger, Neven ElSayed, Dominik Kowald, and Eduardo Veas. Ai-powered immersive assistance for interactive task execution in industrial environments. In *ECAI 2024*. 2024.

[3] **Duricic, Tomislav**, Dominik Kowald, Markus Schedl, and Elisabeth Lex. My friends also prefer diverse music: homophily and link prediction with user preferences for mainstream, novelty, and diversity in music. In *Proceedings of the 2021 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*, 2021.

[4] Hussain Hussain, **Duricic, Tomislav**, Elisabeth Lex, Denis Helic, and Roman Kern. The interplay between communities and homophily in semi-supervised classification using graph neural networks. *Applied Network Science*, 2021.

[5] Hussain Hussain, **Duricic, Tomislav**, Elisabeth Lex, Denis Helic, Markus Strohmaier, and Roman Kern. Structack: Structure-based adversarial attacks on graph neural networks. In *Proceedings of the 32nd ACM Conference on Hypertext and Social Media*, 2021.

[6] **Duricic, Tomislav**, Emanuel Lacic, Dominik Kowald, and Elisabeth Lex. Trust-based cf: Tackling the cold start problem using regular equivalence. In *Proceedings of the 12th ACM conference on recommender systems*, 2018.

[7] **Duricic, Tomislav**, Hussain Hussain, Emanuel Lacic, Dominik Kowald, Denis Helic, and Elisabeth Lex. Empirical comparison of graph embeddings for trust-based collaborative filtering. In *Foundations of Intelligent Systems: 25th International Symposium, ISMIS 2020, Graz, Austria, September 23–25, 2020, Proceedings*, 2020.

[8] Emanuel Lacic, Markus Reiter-Haas, **Duricic, Tomislav**, Valentin Slawicek, and Elisabeth Lex. Should we embed? a study on the online performance of utilizing embeddings for real-time job recommendations. In *Proceedings of the 13th ACM conference on recommender systems*, 2019.

[9] Emanuel Lacic, Matthias Traub, **Duricic, Tomislav**, Eva Haslauer, and Elisabeth Lex. Gone in 30 days! predictions for car import planning. *it-Information Technology*, 2018.

Academic Services

- **Program Committee Member / Reviewer:** Active reviewer for numerous premier AI/ML, Web, & Information Retrieval conferences (e.g., ACM RecSys ('18, '21-'23), SIGIR ('22-'25), WebConf ('22-'23), WSDM ('22), IUI ('22-'25), ECIR ('23), UMAP ('21-'22)) and relevant journals (e.g., Frontiers in Big Data - RecSys, SNAM, Information Sciences).
- **Community Leadership & Mentoring:** Session Chair (ACM RecSys '21); Workshop Organizer (COGSTEPS Entrepreneurship Series '22-'23); Deep Tech Mentor (HEICE, EDIT+).

Theses Supervision

- Co-advised Master's and Bachelor's theses in Machine Learning and Data Science, including topics such as *RecSys Accuracy-Diversity Trade-off* and *Cross-Platform User Behavior Analysis*.

Awards

- **Best Presentation Award** (PhD Retreat '22), Know Center & Graz University of Technology. Awarded for presentation on *Beyond-Accuracy Optimization in Social-Based Recommender Systems*.