

Tomislav DURICIC

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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, Frontiers) 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 (FER) | 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 (KIT), 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 (FER) | 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 — **Software & ML 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 & AI Fundamentals	Core Models: RecSys, GNNs, LLMs (RAG), Transformers, Deep Learning. Domains & Concepts: Representation Learning, NLP, Personalization, User Modeling, Beyond-Accuracy (Fairness, Diversity, XAI), Search/Retrieval, Network Analysis, Knowledge Graphs, Multimodal AI, Time-Series, Anomaly Detection.
Python ML Stack	Python (Adv.), PyTorch, PyG, NetworkX, LangChain, RecBole, Scikit-learn, Pandas, NumPy, Matplotlib, MLflow; Data @ Scale (Spark/PySpark), CUDA.
Software Engineering	Java (Adv.), Spring Boot, Microservices, REST APIs (Swagger/OpenAPI), RabbitMQ, OOD, Concurrency, Maven, API Security (OAuth); AR/VR Dev (Unity/C#); Databases (SQL, NoSQL, Vector, Graph); Unit/Integration Testing.
DevOps, MLOps & Cloud	Git, Docker, CI/CD, MLOps Practices, Linux/Bash, Cloud Platforms (AWS/GCP).
Research & Leadership	Publications (RecSys, ECAI, etc.), Grants (€750k+), Academic Service (Peer Review, Chairing); Experiment Design & Analysis, Project Leadership, Mentoring, Teaching (Graduate Level), Interdisciplinary & Industry 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*.