Erkan Karabulut

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🌐 https://erkankarabulut.github.io/

Employment History

2025 Nov - 2026 Jan	**Visiting Researcher** Translational AI Lab - Amsterdam University Medical Center
2023 Feb – 2027 Feb	**PhD Researcher** University of Amsterdam, The Netherlands.
2020 Oct– 2022 Sep	**Research Assistant** Research Institute of the Free State of Bavaria for software-intensive systems, Germany.
2019 Nov – 2020 Oct	**Working Student - Software Infrastructure** Planerio GmbH, Germany.
2018 Feb – 2019 Sep	**Software Developer - Part Time** IPera Solutions, Turkey.
2017 Sep – 2018 Jul	**Student Research Assistant** Yildiz Technical University, Turkey.

Education

2023 – ····	**Ph.D. Computer Science,** University of Amsterdam, The Netherlands. Thesis title: *Neurosymbolic Knowledge Discovery and Interpretable Inference*
2019 – 2022	**M.Sc. Computer Science,** Technical University of Munich, Germany. Thesis title: *Machine Learning-based Data Classification and Data Aggregation on the Edge.*
2014 – 2019	**B.Sc. Computer Engineering,** Yildiz Technical University, Turkey. Thesis title: *Adaptive Learning-based Tracing Tool for Weather Research and Forecasting Software.*

Academic Service

PC Member	Amsterdam AI Thesis Award 2023 ICSOC 2025 (Artifact Evaluation) EurIPS AI for Tabular Data Workshop 2025
Subreviewer	ECAI 2024 CIKM 2023, 2024, 2025
Journal Reviews	JMLR

Teaching and Supervision

Teaching

2025	▌ **Teaching Assistant** Semantic Web, University of Amsterdam.
2024	▌ **Teaching Assistant** Information Organization, University of Amsterdam.
	▌ **Teaching Assistant** Knowledge and Data (Semantic Web), University of Amsterdam.
2023	▌ **Teaching Assistant** Knowledge and Data (Semantic Web), University of Amsterdam.

Supervision

BSc Theses ▌ 2024 | Alessio Silvério - Heuristic-based Numerical Association Rule Mining

MSc Theses ▌ 2024 | Rhea Huang - Large Language Model for Ontology Learning in Drinking Water Distribution Network Domain

2025 | Yonathan Adye - Noise Detection in Sensor Data Analysis with Semantics: A Clustering-Based Approach

2025 | Jose Pérez Hernández - Sensor Data Analysis: A Research on Missing Value Imputation with Semantics

2025 | Louise Buijs - Semantically enriched association rule mining as a tool for finding better interpretable rules in gene expression data

2025 | Yujie Cao - Rule Learning for Water Distribution Leak Detection

Research Publications

Journal Articles

1. E. Karabulut, P. Groth, and V. Degeler, "Learning semantic association rules from internet of things data," *Neurosymbolic Artificial Intelligence*, vol. 1, p. 29 498 732 251 377 518, 2025.

2. E. Karabulut, P. Groth, and V. Degeler, "Pyaerial: Scalable association rule mining from tabular data," *SoftwareX*, vol. 31, p. 102 341, 2025, ISSN: 2352-7110. 🔗 DOI: https://doi.org/10.1016/j.softx.2025.102341.

3. E. Karabulut, S. F. Pileggi, P. Groth, and V. Degeler, "Ontologies in digital twins: A systematic literature review," *Future Generation Computer Systems*, 2023.

4. E. Karabulut and R. C. Sofia, "An analysis of machine learning-based semantic matchmaking," *IEEE Access*, vol. 11, pp. 27 829–27 842, 2023.

Conference Proceedings

1. E. Karabulut, P. T. Groth, and V. O. Degeler, "Neurosymbolic association rule mining from tabular data," in *Proceedings of the 19th International Conference on Neurosymbolic Learning and Reasoning (NeSy)*, Accepted/In Press, 2025. arXiv: 2504.19354.

2. E. Karabulut, D. Daza, P. Groth, and V. Degeler, "Discovering association rules in high-dimensional small tabular data," in *1st International Workshop on Advanced Neuro-Symbolic Applications (ANSyA), at ECAI 2025*, Preprint available at arXiv:2509.20113, 2025. 🔗 URL: https://arxiv.org/abs/2509.20113.

3. V. Degeler, M. Hadadian, E. Karabulut, *et al.*, "Ditec: Digital twin for evolutionary changes in water distribution networks," in *International Symposium on Leveraging Applications of Formal Methods*, Springer, 2024, pp. 62–82.

4. E. Karabulut, P. Groth, and V. Degeler, "3k: Knowledge-enriched digital twin framework," in *Proceedings of the 14th International Conference on the Internet of Things*, 2024, pp. 188–193.

[5] E. Karabulut, V. Degeler, and P. Groth, "Semantic association rule learning from time series data and knowledge graphs," in *Proceedings of the Second International Workshop on Semantic Industrial Information Modelling (SemIIM)*, 2023.

[6] N. Bnouhanna, E. Karabulut, R. C. Sofia, E. E. Seder, G. Scivoletto, and G. Insolvibile, "An evaluation of a semantic thing to service matching approach in industrial iot environments," in *2022 IEEE International Conference on Pervasive Computing and Communications Workshops and other Affiliated Events (PerCom Workshops)*, IEEE, 2022, pp. 433–438.

[7] E. Karabulut, N. Bnouhanna, and R. C. Sofia, "Ml-based data classification and data aggregation on the edge," in *Proceedings of the CoNEXT Student Workshop*, 2021, pp. 21–22.

[8] I. M. Yazici, E. Karabulut, and M. S. Aktas, "A data provenance visualization approach," in *2018 14th International Conference on Semantics, Knowledge and Grids (SKG)*, IEEE, 2018, pp. 84–91.