

Erkan Karabulut

[✉ e.karabulut@uva.nl](mailto:e.karabulut@uva.nl)

[🎓 erkan-karabulut](https://erkan-karabulut.github.io/)

[LinkedIn erkan-karabulut](https://erkan-karabulut.github.io/)

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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**

Talks

- 2025 - Dec ■ **Scalable Neurosymbolic Knowledge Discovery from Tabular Data**
VU Machine Learning Seminar
- 2025 - Nov ■ **Semantic Rule Learning for Knowledge Discovery and Interpretable Inference**
Amsterdam Data Science Center Seminar
- 2025 - Sep ■ **Knowledge Discovery via Neurosymbolic Rule Learning**
Unlimidata
- 2025 - Jul ■ **Semantic Rule Learning for Knowledge Discovery and Interpretable Inference**
SICK AG
- 2025 - May ■ **Semantic Rule Learning for Knowledge Discovery and Interpretable Inference**
Amsterdam UMC Translational AI Lab

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.