Taylan Kutbay

B.Sc. Computer Science – RWTH Aachen University

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Education

Bachelor of Science in Computer Science

RWTH Aachen University, Germany   *Expected Graduation: 2026*

Relevant Coursework (RWTH): Machine Learning, Process Intelligence, IT Security, Software Engineering, Mathematical Logic

Study Abroad Semester – German University of Technology (GUtech), Oman

Focus: Artificial Intelligence and Cybersecurity

Selected Coursework (GUtech): Advanced Machine Learning, Multi-Agent Systems, Ethical Hacking

Practical Experience

Systems Programming Internship – Embedded Operating System in C

RWTH Aachen University

- **Achieved** a minimal embedded operating system running on an ATmega microcontroller
- **By** implementing low-level I/O, direct register access, interrupts, timers, and a cooperative scheduler
- **Using** pure C, memory-mapped peripherals, and hardware-near abstractions under real-time constraints

AI Text Adventure – Multi-Agent System Internship

RWTH Aachen University

- **Achieved** an interactive AI-driven text adventure with coordinated agent behavior
- **By** designing multiple communicating agents with distinct roles and responsibilities
- **Using** Python, OpenAI APIs, multi-agent communication patterns, and prompt orchestration

Selected Projects

Temporal Fusion Transformer for Financial Time Series Prediction

- **Achieved** robust multi-horizon classification of market regimes
- **By** designing an end-to-end ML pipeline for time series modeling
- **Using** Temporal Fusion Transformer (TFT), engineered temporal and technical features, and walk-forward validation

Axion Discord Bot (Community Management & Operations)

- **Achieved** scalable operation and management of a crypto trading community
- **By** implementing subscription and payment handling, moderation workflows (ticket systems), and analyst performance tracking
- **Using** Python, Discord APIs, NoSQL databases, and a modular system architecture

Event Logging & Process Mining Pipeline for Discord-Based Community Operations

- **Achieved** end-to-end visibility into community operations for a large Discord-based platform ($\approx$90k users)
- **By** tracking and structuring fine-grained events (subscriptions, ticket lifecycles, moderation, analyst activity)
- **Using** Python, NoSQL databases, event-based schemas, and exporting logs to Celonis for process mining

Bio-inspired SNN for Bird vs. Drone Classification

- **Achieved** energy-efficient event-based classification
- **By** combining Spiking Neural Networks with Ant Colony Optimization for feature selection
- **Using** bio-inspired optimization techniques and neuromorphic learning principles

Signal Classificator (Discord-based Trading Signal Extraction)

- **Achieved** automated extraction and structuring of trading signals from unstructured analyst messages
- **By** parsing free-text messages to identify symbols, directions, entries, targets, and updates
- **Using** OpenAI API, rule-based NLP techniques, and structured data schemas

Multi-Agent Sokoban Simulation

- **Achieved** cooperative problem-solving in a constrained environment
- **By** designing autonomous agents with distributed decision-making
- **Using** a multi-agent framework with inter-agent coordination and goal-driven behavior

Technical Skills

- **Programming:** Python (advanced), Java, C/C++
- **Machine Learning:** supervised learning, time series analysis, feature engineering, loss functions, backpropagation, model evaluation, multi-horizon classification
- **Data Engineering:** time series data processing, labeling pipelines, data quality validation
- **Distributed Systems:** basic networking, client–server models, communication protocols
- **Tools & Frameworks:** PyTorch, NumPy, Pandas, Git, Linux, Jupyter Notebook
- **Databases:** SQL, NoSQL
- **Process Mining:** event log generation, Celonis integration

Research Interests

Time Series Analysis and Forecasting; Data-Driven Systems and Data Engineering; Machine Learning for Time-Dependent Data; Robustness and Security of AI Systems; Distributed and Multi-Agent Systems

Languages

German (Native), English (Fluent, C1)