

Deniz Genco Atilla

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EDUCATION

Queen Mary University of London

MSc Artificial Intelligence

London, United Kingdom

Sep. 2025 – Sep. 2026 (Expected)

- **Relevant Modules:** Statistical Planning, Deep Learning, NLP, Reinforcement Learning.
- **Focus:** Specializing in Game AI algorithms (MCTS) and Large Language Model (LLM) optimization.
- **Thesis:** *Combining LLM Reasoning and MCTS as an Ensemble Game Playing Agent in the TAG Framework* – Supervised by Dr. James Goodman. Designing a phase-based ensemble agent that dynamically switches between LLM (Gemini via Vertex AI) and MCTS across Tabletop Games (TAG) to outperform either sub-agent in isolation.

Yeditepe University

Bachelor of Science in Computer Engineering (Honors Degree)

Istanbul, Turkey

Sep. 2020 – Jul. 2024

- Grade Point Average (GPA): 3.05 / 4.00

EXPERIENCE

Software Engineer

Cavamed A.S

July 2024 – November 2024

Kadikoy/Istanbul, Turkey

- Designed and implemented software solutions using C#, MySQL, MAUI, and Firebase technologies for the development of a hospital management platform (CRM and Inventory Management).
- Developed a helper program to facilitate communication between the platform and computers.
- Improved and managed software development processes in accordance with the SPICE framework together with the team.
- Designed, implemented, and validated functional and unit tests following the SPICE framework.
- Performed various enhancements and performance optimizations for the platform's mobile application.
- Developed a Firebase Notification application for the platform's mobile application.

Software Engineer Intern

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Aug. 2023 – Sep. 2023

Kadikoy/Istanbul, Turkey

- Developed a baseline label printing software that works with ZPL language.
- Studied on developing a REST API with C# to integrate new label printing script into software

PROJECTS

LLM-MCTS Ensemble Game Playing Agent

Java, TAG Framework, Gemini API, MCTS, LLM

Sep. 2025 – Present (MSc Thesis)

- Designing and implementing an ensemble game playing agent that dynamically switches between LLM (Gemini via Vertex AI) and MCTS at designated game phases within the Tabletop Games (TAG) framework.
- Implementing game-specific state summarization and prompt engineering to enable LLMs to play TAG games (Catan, Sushi Go, Poker, Connect4) competitively and identify their strategic strengths and weaknesses.
- Developing a phase-based switching mechanism with manually selected rules (e.g. LLM for early long-horizon reasoning in Catan, MCTS for combinatorial phases), with plans to extend to learned selectors via supervised classification and multi-armed bandit approaches.
- Evaluating ensemble variants against game-specific optimized MCTS opponents under fair time budgets, measuring win rates and mean ordinal rankings across games with varying strategic properties.

Temporal-Aware Hybrid Retrieval System

Python, SPLADE, Sentence-BERT, ChromaDB, RRF, MMR

Feb. 2026 – Apr. 2026

- Designed and implemented a five-stage hybrid retrieval pipeline for COVID-19 medical literature search over the TREC-COVID benchmark (171,332 papers), serving as Data Engineering & Pre-processing Lead.
- Combined neural sparse retrieval (SPLADE-inspired, neural TF-IDF) with dense semantic retrieval (Sentence-BERT + ChromaDB HNSW index), fused via Reciprocal Rank Fusion (RRF) and an alternative projection-based fusion strategy for empirical comparison.

- Integrated temporal filtering to prioritise documents within a ± 1 year window of the query date, and applied Maximal Marginal Relevance (MMR, $\lambda=0.7$) re-ranking to reduce result redundancy.
- Targeted nDCG@10 > 0.60 and sub-second query latency using entirely open-source tools (ChromaDB, Sentence-BERT, Streamlit); evaluated across six ablation configurations with paired t-tests.

Blackjack Strategy Analysis & Simulation Graduation Project

Python, PyTorch, Statistical Modeling

- Engineered a simulation environment for Blackjack to analyze win/loss probabilities across 7 distinct gameplay strategies.
- Implemented Supervised Learning models using PyTorch to predict optimal moves based on dealer up-cards and player hand capability.
- Utilized statistical optimization techniques to visualize distribution graphs, identifying the most effective long-term betting strategies.
- Modeled game logic and state management, bridging the gap between game mechanics and data analysis.

Sushi Go Game AI Agent (TAG Framework)

Sep. 2025 – Nov. 2025

Java, MCTS, Statistical Planning

- Designed and implemented an autonomous agent for the card game 'Sushi Go' using the Tabletop Games (TAG) framework.
- Engineered improvements to the Monte Carlo Tree Search (MCTS) algorithm to handle imperfect information scenarios.
- Developed domain-specific heuristics to guide the search process, significantly increasing the agent's win rate against baseline models.

RL-Based LLM Fine-Tuning for Abstractive Summarization

Oct. 2025 – Nov. 2025

Python, PyTorch, GRPO, LoRA, Qwen2.5, HuggingFace TRL, NLP

- Fine-tuned Qwen2.5-0.5B-Instruct on 3,000 CNN/DailyMail articles using Group Relative Policy Optimization (GRPO) with LoRA ($r=16$, $\alpha=32$), training only 4.8M parameters (0.96% of model).
- Engineered a multi-objective reward function through 5 iterative design cycles to combat reward hacking, combining capped ROUGE-L (0.6), cosine similarity via Sentence-BERT (0.9), piecewise word-length reward targeting 100–120 words, and a completeness signal (± 0.3).
- Achieved +22% total reward over the base model (1.46 vs. 1.20), reduced incomplete sentences from 12% to 4%, and improved length control from -0.001 to $+0.211$ without degrading semantic fidelity.
- Evaluated cross-domain generalization across News, Scientific, Business, Sports, and Technology domains; compared against BART-Large-CNN and T5-Small supervised baselines.

TECHNICAL SKILLS

Languages: Python (PyTorch, NumPy, Pandas), Java, C#, C++, SQL

AI & ML: Large Language Models (LLMs), Reinforcement Learning (RL), MCTS, Deep Learning, NLP

Game Dev: Godot Engine, Statistical Planning, Game Heuristics, Pathfinding Algorithms

Tools: Git, Docker, Linux, VS Code, IntelliJ

LANGUAGE SKILLS

Turkish: Native

English: IELTS Overall 7.0 (Writing: 6.5, Listening: 8.0, Speaking: 6.0, Reading: 6.5)

NETWORK AND MEMBERSHIPS

Yeditepe University Science Fiction Community : 2021 - 2024 Member