

Kadir Goksel Gunduz

Computer & Artificial Intelligence Engineer

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ITU MSc Energy Science and Technology | NEU BSc Computer & Artificial Intelligence Engineer

PROFESSIONAL EXPERIENCE

AI Engineer & Team Leader @ Seduss Robotics - Istanbul

03/2024 - Present

- Leading the technical direction of a specialized **large language model (LLM)** development project in the educational technology sector. Managing the design of **data collection** strategies, **optimization** of data processing workflows, and development of custom database architecture. Coordinating **LLM training**, smart API distribution in **AWS** infrastructure (**serverless**, **EC2**), and performance optimization processes.
- Developed a recursive system for **extracting** structured **data** from websites, creating a comprehensive multimedia **database** from open-source platforms. Implemented a high-performance vector-based **semantic search** engine using **PostgreSQL** for efficient utilization of the comprehensive **database**.
- Transformed complex data by using a **custom-trained TROCR (Transformer OCR)** model to convert **table** and **graph data** into structured formats. **Optimized** existing Turkish datasets in **ORPO** and **DPO** formats, developing a **pipeline** with automatic dataset creation capability, significantly **improving** the model's Turkish language **performance**.
- Developed a scalable **SaaS** solution on **AWS** infrastructure (**EC2**, **Lambda**) with **Gemini API** integration and customized database to provide students with **real-time** intelligent **Q&A** capabilities. **Automated** AI model training using **serverless** architecture.

Machine Learning Engineer @ Gürış Holding - Ankara

12/2023 - 03/2024

- Conducted comprehensive data analysis projects to **improve** the **operational efficiency** of the **wind turbine** fleet. Developed energy production **forecasting models** to **optimize** performance. Designed an interactive **dashboard** using PowerBI for real-time monitoring and analysis of turbine data.
- 3D **power surface modeling** approach for **wind turbine optimization**, co-authoring a published methodology subsequently adopted by the company.
- Finetuned** a LLM for institutional knowledge that streamlined onboarding processes, enabling new interns or employees to efficiently access **company-specific informations**.

Autonomous Agricultural Vehicles Startup Leader @ UMAI | TÜBİTAK

08/2023 - Present

- Implementing **SLAM** and **ROS** integration in my **autonomous agricultural vehicles startup** under the TÜBİTAK BIGG program.
- Working with and developing **swarm intelligence algorithms** alongside AI integrations for the vehicles, and executing patent procedures for the prototypes under my development.

AI & R&D Engineer

July - September 2022

@ Arvis Technology - Istanbul - Intern

- As project **team leader** during my **internship**, developed a deep learning classification model for age and **gender classification** from audio data by **spectrograms**. Created a high-accuracy model using **time series** analysis, **anomaly detection**, and **signal processing** techniques through **spectral features**. Expanded the project by developing a synthetic **voice generation** and voice **cloning** model using **TFGAN** (Time and Frequency Domain Based GAN) architecture.
- Developed a comprehensive solution for **real-time audio classification** at the company's special request after the internship. The system was designed as an end-to-end pipeline including **raw audio isolation**, **Speech-to-Text** conversion, and a user-friendly QT interface.

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Computer & Artificial Intelligence Engineer

PROFESSIONAL SKILLS & PROJECTS

Computer Vision

- Developed a **pipeline** capable of creating **dataset-specific architectures**. When creating specialized architectures, **feature selection**, neural network components (backbone & head), and loss functions were considered. The model achieved finalist standing at the prestigious TEKNOFEST 2022-2023 **Healthcare AI Competition**.
 - Engineered **high-throughput DICOM processing** infrastructure using **NVIDIA DALI** that reduced batch processing time by through parallel GPU operations and quantization techniques utilized for medical imaging applications.
 - Optimized** lightweight YOLO **object detection** model achieving 30 FPS on Raspberry Pi 3 deployments accelerating **real-time inference** processes using **TensorRT** and **ONNX**.
 - Currently developing an advanced **computer vision pipeline** with **YOLO-inspired** architecture for global deployment. The system integrates a novel **CNN-Transformer hybrid** approach that balances computational efficiency with detection accuracy—using CNNs for rapid feature extraction and **Vision Transformers (ViT)**
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Natural Language Processing & Large Language Models (LLMs)

- Developed and **finetuned** a large language model focused on generating Turkish **paragraph questions** within the Turkish education system. The finetuned model can create paragraph questions of appropriate quality and qualification in line with the current examination system format of Turkish.
 - Created an extensive dataset with materials obtained from various publishers across different disciplines to achieve **high accuracy** in **reasoning** and QA (question answering) tasks. Also trained Llama3.1 using **Unsloth** framework and **LoRA** method with datasets created in **ORPO** and **DPO** formats from the **recursive scraper pipeline** I've created, processing **over 5 million Turkish QA samples**.
 - Developed a **MOE (Mixture of Experts)** framework for language model hybridization that routes specialized tasks to domain-specific model components. This approach achieved significantly higher scores on **Turkish reasoning benchmarks (%62 MMLU)**
 - Conducting **architectural optimization** centered on **Reward & Penalty loss** functions using **evolutionary computation** and **genetic algorithms** to obtain the **optimal transformer architecture**. Currently authoring a journal publication on language-specific architecture evolution techniques that demonstrably improve performance metrics
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Reinforcement Learning

- Implemented **Forward-Forward network** optimization to the **PPO method** to **minimize** computational **cost** during the **backpropagation** phase.
 - Trained an **industrial robot** arm in a **Unity** environment to assemble parts onto a conveyor belt using the **A2C** method.
 - Currently developing a custom-built **drone project** that **trains** in a **computer simulation** to navigate obstacles and process language commands for autonomous execution.
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Cloud Computing & DevOps

- Designed **microservice** architectures using **AWS** services (**EC2**, **Lambda**, **Sagemaker**), implemented load balancing and **auto-scaling** structures, and **intelligent API distribution**.
 - Architected cost-effective, scalable AI **request-response systems** utilizing **AWS serverless infrastructure** to optimize resource allocation and enable **dynamic workload** management.
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GAN Networks

- Worked with **ESRGAN networks** in my **bachelor's thesis** to enhance **low-resolution** images to **ultra-high resolution**. The model was **optimized architecturally** using **genetic algorithms** to make it versatile and suitable for various use cases.