Can Polat
(Pronounced same as John)

Machine Learning Engineer | Data Scientist | Computer Engineering
Ph.D. Candidate at Texas A&M University

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Homepage
John Polat

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GitHub
CalciumNitrade

LinkedIn
Can Polat

Google Scholar
Can Polat

Turkish
Native

English
Highest TOEFL iBT - 100

German
B2

French
A2

Technicals

Daily
Python (with Pyroch, TensorFlow, SciPy, NumPy, Matplotlib, Pandas, PYQT5, PIL, OpenCV, and god knows how many else...)
SQL/NoSQL/PostGreSQL
PySpark
AWS
Docker
MLOps
ArgoCD
Flask
Grafana

Occasionally
C/C++
Node.js
Hadoop
Tableau
.Net
MongoDB
Fast
Java/C#
PHP - ASP - HTML

Work Experience (~Five Years)

Senior Machine Learning Engineer
Wavebreak Media Ltd. | Ireland | November 2022 - September 2024

- Use and research of state-of-the-art LLMs and Computer Vision models, focusing on a variety of applications such as image and video captioning, text suggestions, sentiment analysis, semantic search, text-to-image generation, object detection, deblurring, super-resolution. Additionally, .NET/Flask/Fast is used to develop scalable services/APIs for these models, while React is leveraged for interactive front-end applications. NoSQL databases (e.g., MongoDB, Redis) are employed for efficient data storage and retrieval. Recommendation systems, and fine-tuning of models.
- For DevOps, tools like Docker, Grafana, Git, and ArgoCD are utilized, along with Tableau and PowerBI for business intelligence.

Computational Imaging Engineer
Aselsan A.S. | Turkey | August 2021 - November 2022

- Leveraged computer graphics, computational imaging, and signal processing tools, including raytracing, Fourier optics, computer vision, and deep learning, to pioneer the design and development of cutting-edge Infrared/Optical range imaging systems tailored for both space exploration and defense applications.

Computational Imaging Engineer
Arcelik Global | Turkey | December 2019 - August 2021

- Designed and developed a consumer display system incorporating advanced techniques such as raytracing, computer vision, and deep learning.
- Devised a comprehensive backlight comparison model utilizing Python's SciPy and NumPy libraries to mathematically simulate backlight behavior. Implemented an intuitive user interface for the model with the PyQT5 library.

Academic History

Texas A&M University
Ph.D. Computer Engineering | January 2024 - December 2027
GPA: 3.50/4.00

- Current Focus Research Area - Generative AI in scientific applications, with a primary emphasis on materials science. This includes the integration of computer vision, natural language processing (NLP) with large language models (LLMs), and reinforcement learning techniques. Published 2 papers with CV techniques and 2 more in review for LLMs and multi-modal approaches.

Bogazici University
M.Sc. Physics | September 2019 - August 2022
GPA: 3.79/4.00 - High Honour Student

- Research Assistant - Fiber Laser Development and Applications Lab led by Assistant Professor Parviz Elahi (June 2021 - July 2022).
- M.Sc. Thesis: Noise Robust Real-Time Focus Detection with Deep Learning for Laser Micromachining. Advised by Assistant Professor Parviz Elahi.
- President, Bogazici Quidditch (October 2019 - November 2021).
- Member, Bogazici Sailing Society.

Hacettepe University
B.Sc. Physics Engineering | September 2014 - June 2019
GPA: 3.44/4.00 - Honour Student - Top-Ranked Graduate

- Ludwig-Maximilians-Universität München - Erasmus Student in Physics Department for a whole academic year (September 2015 - June 2016).
- Founder Member, Hacettepe Student-Exploration of Space.
- Founder Member, Hacettepe Quidditch Society.
- Founder Member, Hacettepe Physics Society.
- Member, Hacettepe Archery Society.

Honors

- High Honor Student in Physics M.Sc., Bogazici University.
- Top-Ranked B.Sc. Graduate in Physics Engineering, Hacettepe University with Honors.
- B.Sc. Project 1: Representations of Poincare Groups - 3rd place within the Department in the Engineering Faculty Graduation Project Competition.
- B.Sc. Project 2: Stress-Strain Measurement Device for Surgeon Threads - 3rd place in Physics Engineering Department Graduation Project Competition.

Certificates

Interests

Cats
Literally any Felidae

Formula 1
#LH44

MotoGP
An H-D rider, though

Sailing
Amateur Sailor

Photography
Cat pictures mostly

Archery
Certificated by Hacettepe University, Olympic

Cinematography
Nuri Bilge Ceylan

Publications

Journal

- **Polat C.** Kurban M. & Kurban H., (2024), Multimodal Neural Network-Based Predictive Modeling of Nanoparticle Properties from Pure Compounds. Machine Learning: Science and Technology (**Under Review**).
- **Polat C.** Kurban H. & Kurban M., (2024), Enabling Ease of Access to Quantum Chemistry with Transformer-Based Text Encoding and Physics-Informed Multilayer Perceptron. Machine Learning: Science and Technology. (**Under Review**).
- **Polat C.**, Kurban H. & Kurban M., (2024), QuantumShellNet: Ground-State Eigenvalue Prediction of Materials Using Electronic Shell Structures and Fermionic Properties via Convolutions. Computational Materials Science. (Link).
- Kurban, M., **Polat, C.**, Serpedin, E., & Kurban, H. (2024). Enhancing the electronic properties of TiO_2 nanoparticles through carbon doping: An integrated DFTB and computer vision approach. Computational Materials Science, 244, 113248. (Link).
- **Polat C.**, Yapici G. N., Elahi S., & Elahi P. (2023). High-precision laser focus positioning of rough surfaces by deep learning. Optics and Lasers in Engineering, 168, 107646. (Link).

Conference Proceeding

- **Polat C.**, Gungor A., Yorulmaz M., Kizilelma B., A Transformer-based Real-Time Focus Detection Technique for Wide-Field Interferometric Microscopy. SIU 2023 (2023, July 5-8)
- **Polat C.**, Yapici G.N., Elahi S., Elahi P.. Noise Robust High Precision and Real-Time Focus Detection for Laser Micromanaging. CLEO 2022, (2022, May 15-20).
- **Polat C.**, Yapici G.N., Elahi S., Elahi P.. Machine Learning-Based High Precision and Real-Time Focus Detection for Laser Material Processing Systems. SPIE. Photonics Europe 2022, (2022, April 3-8).
- Elahi S., **Polat C.**, Safarzadeh O., Elahi P.. Noise Robust Focal Distance Detection in Laser Material Processing Using CNNs and Gaussian Processes. SPIE. Photonics Europe 2022, (2022, April 3-8).

Professional Projects Worth Highlighting

- **Recommendation System for Assets:** Within this project, I utilize companies user data to recommend users possible assets they might like depending on their country and business segments. Furthermore, I utilize OpenSearch and Redis in order to query for assets and fast processing of data. Additionally, I am using Docker, ArgoCD, Flask, and Grafana for DevOps. The webpage is DesignWizard-App and DesignWizard.
- **Intelligent Template Maker:** In this project, we are using object detection and segmentation models to determine a place on an image for a given text. For example, writing "Merry Christmas!" to a Christmas photo. This problem includes both place finding, text font, and text sizing. Furthermore, we try to mimic design process of a user using RLHF.
- **High Precision Telescope Mirror Alignment with Deep Learning:** Cassegrain's primary and secondary mirrors align in this project. The project uses CNNs to find the best step size from the interference data is gathered by an interferometer. Then the mirror holding stages are moved accordingly. The ultimate goal of this project is to find the required alignment precision from just one measurement. Currently, it is being done on one axis.
- **Backlight Quality Comparison Application:** To compare backlight performances, the intensity change from the middle to the corner of a TV backlight was measured with a CCD camera and turned into a 3D array. These points are visualized with Matplotlib, then mathematically modeled with SciPy and NumPy. A comparison model between the different backlights is created using the coefficients of the mathematical model. A GUI is designed for the practical use of the comparison model as an application. The application is being used for classifying the quality of the TV backlights in Arcelik Global.
- **Lens Classifier Application:** A classifier was designed with the TensorFlow framework to classify two different types of lenses used in TV backlights. The model consisted of CNNs with five hidden layers in total. The training process took about 3 hours with an accuracy of %89.