Baturay Saglam
Resume

Department of Electrical and Electronics Engineering
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GitHub: https://github.com/baturaysaglam

Research Interests

reinforcement learning theory, deep reinforcement learning, online learning, machine learning, deep learning, optimization, representation learning, interpretability in machine learning.
(See https://baturaysaglam.github.io./ for details.)

Education

Bilkent University, Ankara, Turkey

M.S. in Electrical and Electronics Engineering, September 2020 - Present

Expected Graduation Date: June 2022
Supervisor: Suleyman Serdar Kozat
GPA: 3.93/4.00

Bilkent University, Ankara, Turkey

B.S. in Electrical and Electronics Engineering, September 2016 - June 2020

GPA: 3.55/4.00

Awards and Honors

- **3 conference papers** in high impact IEEE Artificial Intelligence conferences.
- **2 journal papers** submitted to highly respected IEEE Transactions.
- **1 conference paper** submitted to a highly respected top 5 Machine Learning conference.
- Graduated with **High Honors** from Bilkent University.
- Ranked **1390$^{\text{th}}$ among 2M** high school graduates in National University Entrance Examinations.

Journal Papers

1. **Baturay Saglam**, Dogan C. Cicek, Furkan B. Mutlu and Suleyman S. Kozat, "Off-Policy Correction for Actor-Critic Methods", (Submitted to **IEEE Transactions on Neural Networks and Learning Systems**), (draft available with the permission of supervisor), October 2021.
2. **Baturay Saglam**, Enes Duran, Dogan C. Cicek, Furkan B. Mutlu and Suleyman S. Kozat, "Parameter-Free Deterministic Reduction of the Estimation Bias in Continuous Control", (Submitted to **IEEE Transactions on Neural Networks and Learning Systems**, https://arxiv.org/abs/2109.11788), September 2021.

Conference Papers

1. **Baturay Saglam**, Dogan C. Cicek, Enes Duran, Furkan B. Mutlu and Suleyman S. Kozat, N/A, (Submitted to AAAI Conference on Artificial Intelligence, under Phase 2 review), (name not available due to the double-blind review process), September 2021.
2. **Baturay Saglam**, Enes Duran, Dogan C. Cicek, Furkan B. Mutlu and Suleyman S. Kozat, "Estimation Error Correction in Deep Reinforcement Learning for Deterministic Actor-Critic Methods", (Accepted at **IEEE International Conference on Tools with Artificial Intelligence**), https://arxiv.org/abs/2109.10736, June 2021.
3. Dogan C. Cicek, Enes Duran, **Baturay Saglam**, Furkan B. Mutlu and Suleyman S. Kozat, "Adaptive WD3: Dynamic Reduction of the Estimation Bias", (Accepted at **IEEE International Conference on Tools with Artificial Intelligence**), (draft available with the permission of supervisor), June 2021.
4. Dogan C. Cicek, Enes Duran, **Baturay Saglam**, Furkan B. Mutlu and Suleyman S. Kozat, "Off-Policy Correction for Deep Deterministic Policy Gradient Algorithms via Batch Prioritized Experience Replay", (Accepted at **IEEE International Conference on Tools with Artificial Intelligence**), https://arxiv.org/abs/2111.01865, June 2021.

Industrial Experience

Data Scientist
Databoss Analytics, Ankara, Turkey December 2020 – June 2021
- Used Deep Reinforcement Learning and Statistical models to design automated sequential decision-making models. Taken an active role in the Universal Autonomy Project for HAVELSAN, one of the largest and leading technology firms of Turkey owned by and affiliated to the Turkish Armed Forces Foundation.
- Taken an active role in designing an autonomous driving model, which significantly improved the overall performance in unmanned driving.
- Developed software with state-of-the-art versioning and continuous integration tools.
Implemented mathematical models and state-of-the-art deep reinforcement learning algorithms using Python APIs such as PyTorch and TensorFlow.
- Participated in a research team to collaboratively share ideas and knowledge about various research topics and development tools.
- Developed purpose-built, distributable, and scalable services such as deep reinforcement learning systems and exploratory data analysis tools.
- Agile software development.

Intern Engineer
Fraunhofer IIS, Nuremberg, Germany *(Supervisor: Maximilian Kasparek)* June 2019 - September 2019
- Taken a role in the department of Localization and Analytics (LA) for the 5G-Bavaria project of Fraunhofer IIS.
- VHDL modules for the Primary and Secondary Synchronization Sequences (PSS and SSS) of the user equipment (UE) with the Location Measurement Units (LMUs) and the base station were designed to achieve wireless communication through 5G.
- VHDL module to find the peak in the results of the PSS and SSS was designed to determine the location of the UE.
- Wireless communication and synchronization in the Mobile Radio Deployment Structure for the Uplink TDOA were achieved with these VHDL modules. The satellite requirement in the localization problem was eliminated using 5G Technology.

Intern Engineer
FIGES A.S., Ankara, Turkey *(Supervisor: Fatih Genc)* June 2018 - July 2018
- HDL code of an FIR Filter was generated on MATLAB/Simulink and optimized to test on the NEXYS4 DDR FPGA board using the WorkFlow Advisor.
- Arbitrary input signals generated by the computer were processed through the FIR Filter embedded in the FPGA, and outputs were measured and displayed by the computer.
- Such a HIL design eliminated the necessity for developing real hardware for test issues.

Academic Experience

Research Assistant
Bilkent University, Ankara, Turkey September 2020 - Present
- Reinforcement learning theory
- Deep reinforcement learning algorithms
- Deep reinforcement learning applications
- Distributional and multi-agent reinforcement learning
- Efficient experience replay sampling algorithms
- Batch-constrained deep reinforcement learning
- Online learning
- Telecommunications applications of deep reinforcement learning

Teaching Assistant
Bilkent University, Ankara, Turkey September 2020 - Present
- EEE 211 (Analog Electronics) in Fall 2021-2022
- EEE 212 (Microprocessors) in Spring 2020-2021
- EEE 211 (Analog Electronics) in Fall 2020-2021

Projects

SmartBody: A body system to provide emergency detection and monitoring of the subject by processing and interpreting the data collected by the various wearable sensors placed on the body was designed and developed for HAVELSAN as a part of the academic, industrial design project.

Maze Solver Robot: A robot that can solve and find the exit of any maze without loops was designed and implemented. The right-hand-rule algorithm to solve mazes was implemented and optimized at the embedded-systems level. Motors of the robot were optimized to save more battery life for optimum speed and maneuverability by using Motor classes- written in C++, operating on FRDM-KL25Z board.

Clap Switch: A clap triggered system that can turn on or off any electronic device connected to it was designed and implemented. The algorithm for detecting claps in terms of frequency, duration, and amplitude was developed and optimized - written in VHDL, operating on BASYS3 FPGA Board. **YouTube video:** https://youtu.be/ILgCQ2XesAM.

Hotel Classifier: Implementation of three machine learning models to classify the type of hotel based on the hotel booking demands. The learning algorithms of Naive Bayes Classifier, Logistic Regression, and Multi-Layer Perceptron were analyzed and implemented from scratch in detail.

Car Price Regressor: A car price predictor model was designed and tested on over 400,000 car samples using three different algorithms: Random Forest, Neural Networks, and Logistic Regression.

TRC-10: An uncertified radio transmitter and receiver working within 10 meters was designed, implemented, and tested.

Don't Starve!: An Android application that offers recipes according to the ingredients in the user's kitchen. Designed with Java, it operates on any Android device.

Skills

Programming:

- **Python** Professional work experience in a large-scale ML framework,
- **MATLAB** Professional experience with various statistical libraries, signal processing tools and neural systems toolboxes,
- **Verilog HDL, FPGA** Professional experience with various signal processing tools,
- **Java, C, C++, ARM Assembly, Android Programming** Learned during undergraduate years as a part of the core Computer Science field courses

Tools:

- **PyTorch** Main tool used in the industrial and academic experience,
- **TensorFlow** Experience with deep learning applications,
- **Docker, Git** Experience in the industrial experience

Languages

Turkish (Native), English (Fluent)