Alperen Tercan

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Education

Colorado State University — Fort Collins, CO
Master of Science in Computer Science - 4.00/4.00 — *Aug. 2019 – Sep. 2022*
- Co-Advisors: Prof. Vinayak Prabhu and Prof. Charles Anderson
- Thesis: Solving MDPs with Thresholded Lexicographic Ordering Using Reinforcement Learning

Bilkent University — Ankara, Turkey
Bachelor of Science in Electrical and Electronics Engineering - 3.84/4.00 — *Aug. 2015 – May 2019*

University of Oklahoma — Norman, OK
Exchange Student in Electrical and Computer Engineering - 4.00/4.00 — *Jan. 2018 – May 2018*

Research Roles

Research Intern — 06/2021 – Present
Max Planck Institute for Software Systems — *Saarbrucken, Germany*
- Research on task decomposition for block-based visual programming tasks and using large language models for programming
- Advisor: Dr. Adish Singla

Graduate Research Assistant — 08/2020 – 05/2021
Colorado State University — *Fort Collins, CO*
- Research on multi-objective RL and using formal languages for reward specifications.
- Advisor: Prof. Vinayak Prabhu

Teaching Roles

Graduate Teaching Assistant — 08/2019 – 05/2020 & 01/2022 – 05/2022
Colorado State University — *Fort Collins, CO*
- Taught recitations for sophomore level Discrete Mathematics course in Computer Science Department
- Graded exams and assignments

Publications

A. Tercan and C. W. Anderson, "Increased Reinforcement Learning Performance through Transfer of Representation Learned by State Prediction Model" 2021 International Joint Conference on Neural Networks (IJCNN), 2021, pp. 1-8

Under Review

A. Tercan and V. Prabhu. "Thresholded Lexicographic Ordered Multi-Objective Reinforcement Learning" | ICLR'23

A. Tercan, A. Ghosh, H. F. Eniser, M. Christakis, and A. Singla. "Synthesizing a Progression of Subtasks for Block-Based Visual Programming Tasks" | TMLR

Awards

- **Colorado State University Funding Guarantee (2019-2022):** Admission with guaranteed assistantship positions with full tuition waiver & stipend benefits during the MSc program)
- **Scholarship of the Turkish Prime Ministry (2015-2019):** Awarded monthly stipend during the BSc program (given to those who rank in first 100 among 1.8 million students in nationwide university entrance exam)
- **Bilkent University Comprehensive Scholarship (2015-2019):** Full tuition waiver & stipend during BSc
- **Nationwide University Entrance Exam (2015):** Ranked 25^{th} among 1.8 million students in Turkey

Engineering Roles

Engineering Intern 06/2018 – 09/2018
Fraunhofer IIS *Nuremberg, Germany*

- Implementation of Record and Replay functionalities of GOOSE receiver
- VHDL design of the components on FPGA
- Python programming on ARM processor for request processing
- C programming for FX3 USB3.0 interfacer

Summer Intern 06/2017 – 07/2017
Karel Electronics *Ankara, Turkey*

- Embedded C Programming on 8051 microcontrollers for the interface of a communication product. It takes input from the user through serial port and adjusts components. SPI and I2C protocols are used.
- Tested the product software above and revised it according to client feedback.

Projects

Distributed Generative Adversarial Networks | *PyTorch, Horovod* 2022
- Distributed training of a generative model that can create artificial paintings.

User Study Platform for Block Based Programming | *JavaScript, Django* 2021
- Created a website to be used in the user studies for our paper.

Stateful Next Generation Access Control for Fire Response Control | *Alloy* 2021
- Augmented NGAC framework with multi-level rule hierarchy and stateful policies.
- Showed how Alloy can be used to analyze an NGAC policy with an environment model.

Software Optimizations for Reinforcement Learning | *Tensorflow* 2020
- Investigated effects of weight clustering in RL

Reinforcement Learning for Combinatorial Optimization over Graphs 2020
- Surveyed several papers in this field with a focus on possible future research directions

Implementation of Ranking-Critical Training for Collaborative Filtering | *PyTorch* 2020
- A personal project to better understand the use of RL for recommender systems.

Policy Gradient Methods and Hierarchical RL for Robotic Control Tasks | *PyTorch* 2019
- Implemented DDPG, HER, Option-Critic, Modulated Policy Hierarchies
- Experimented on Mujoco Environments to test benefits of Hierarchical Reinforcement Learning.

Detection and Jamming of Wide Band FHSS Radio Signals | *MATLAB, C, Bash* 2019
- Works on a Zynq-7000 board and controlled via a computer GUI
- Quickly detects active bands in FHSS communication and generates the signal to jam it.

Image Reconstruction in cr-MREPT via Iterative Methods | *MATLAB* 2018
- Implemented genetic algorithms and gradient descent for matrix optimization in MREPT domain
- Investigated benefits of iterative methods in reconstructing Low Convection Field(LCF) regions

Playing Tetris using Evolutionary Algorithms and Reinforcement Learning | *Python* 2018
- Implemented Q-learning and a genetic algorithm agents that learn to play Tetris.

Race Bias in NY Mortgage Decision Data by Feature Importance Analysis | *Tensorflow* 2018
- Fitted several models to the mortgage decision data to model decision process.
- Used permutation feature importance to measure importance of various applicant data in Mortgage decisions and tested if race was a significant factor in the decisions.

Empirical Study on CAPM with Traditional and Machine Learning Methods | *MATLAB* 2018
- Tested performance of CAPM on stock prices with covariance-based, regression-based, and reported betas.

Maze Solving Robot using 8051 Microcontroller | *Assembly* 2017
- Robot uses proximity sensors to perform a tree search in a maze
- Keeps track of the movements via Hall sensors and draws the explored maze on a LCD screen

Tic-Tac-Toe Game with Rule Based Bot | *VHDL* 2016
- A Tic-Tac-Toe game with VGA that runs on BASYS3 board.
- Rule-based bots with three different difficult levels.