Angelos Mavrogiannis

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Education

University of Maryland, College Park (UMD) Aug 2020 – May 2025 (exp.)
Doctor of Philosophy (Ph.D.), Computer Science
Current Research: Deep Reinforcement Learning for Behavior-Rich Navigation in Autonomous Driving
Advisor: Prof. Dinesh Manocha
Selected Coursework: Decision-Making for Robotics, Foundations of Deep Learning, Computer Vision

Carnegie Mellon University (CMU) Aug 2018 – May 2020
Master of Science (M.S.), Mechanical Engineering
Thesis: "Human Driver Behavior Classification from Partial Trajectory Observation"
Advisor: Prof. Changliu Liu
Selected Coursework: Advanced Control & Reinforcement Learning, Deep Learning, Mechanics of Manipulation, Machine Learning, Robot Design & Experimentation, Linear Control Systems, Engineering Computation
GPA: 3.92/4.00

University of Patras (UoP) July 2017
Diploma, Mechanical Engineering and Aeronautics
Concentration: Mechanical Design & Control
Thesis: "Environment Development for Implementing Design Optimization Using Parsers and Genetic Algorithms"
Advisor: Prof. Argyris Dentsoras
GPA: 8.03/10.00 (top 10%)

Honors & Awards

Fulbright Scholarship 2018-2020
Fulbright Foundation
Carnegie Mellon Mechanical Engineering MS Research Symposium Award 2020
Department of Mechanical Engineering, Carnegie Mellon University

Duke Mech. Eng. & Materials Science Graduate Scholarship (declined) 2018
Duke University
Andreas Mentzelopoulos Scholarship 2018-2020
University of Patras
Harry D. Triantafillu Scholarship 2018
Harry D. Triantafillu Scholarship Fund - Institute of International Education
Participant, 3rd ACM Summer School in Data Science 2019
Association for Computing Machinery

Research Experience

Graduate Research Assistant Sept 2020 – Present
Department of Computer Science, University of Maryland
Gamma Group (PI: Prof. Dinesh Manocha)

- Introduced a behavior-based Reinforcement Learning policy-training scheme that uses a Graph Convolutional Network (GCN) to model the interaction between traffic agents.
- Proposed a novel algorithm for behavior-guided action prediction and local navigation for autonomous vehicles. (publication submitted to ICRA 2021: https://arxiv.org/abs/2011.03748)

Graduate Research Assistant Jan 2019 – Present
The Robotics Institute, Carnegie Mellon University
Intelligent Control Lab (PI: Prof. Changliu Liu)

- Developed a machine learning framework (PyTorch, Scikit-Learn) for classifying human driver behaviors based on partial trajectory observations and applied it to vehicle trajectory prediction.
- Designed and created a simulator on Python for visualizing vehicle trajectories.
- Master thesis available at: https://www.researchgate.net/publication/345780499_Human_Driver_Behavior_Classification_from_Partial_Trajectory_Observation

Graduate Research Assistant Sept 2018 – Jan 2019
Department of Mechanical Engineering, Carnegie Mellon University
Computational Engineering and Robotics Lab (PI: Prof. Kenji Shimada)

- Research on the design and control of an underwater, hull-cleaning robot (code in C++, communications through ROS, project funded by Tsuneishi Shipbuilding Co. Ltd and supervised by Prof. Kenji Shimada).

Undergraduate Research Assistant Nov 2016 - July 2017
Mechanical Engineering and Aeronautics Department, University of Patras
Machine Design Laboratory (PI: Prof. Argyris Dentsoras)

- Developed a software tool (Visual Basic) for automatic parsing of optimization problems from mathematical expressions into numerical code and solving them using Genetic Algorithms (Diploma Thesis project).
- Demonstrated the efficacy of the tool in robotic grasping applications and specifically via minimizing the forces applied onto an object grasped by a robot arm.

Teaching Experience

Teaching Assistant
Department of Mechanical Engineering, Carnegie Mellon University

24-775: Robot Design & Experimentation Spring 2020
Graduate Course, taught by Prof. Aaron Johnson

- Advised students on robot design projects, organized and supervised group meetings and graded assignments and projects.

24-281: Introduction to Scientific Computing Spring 2019, Fall 2019
Undergraduate/Graduate Course, taught by Dr. Zhenguo Nie, Dr. Hugo Penelas

- Delivered MATLAB recitations, held weekly office hours, created and graded weekly assignments.

24-686: Advanced Mechanical Design Fall 2018
Graduate Course, taught by Prof. Rahul Panat

- Offered SolidWorks recitations, held weekly office hours and designed/graded assignments and projects.

Skills

Programming
C/C++, Python, MATLAB, Visual Basic, Fortran, SQL, OpenGL

Machine Learning Libraries/Toolkits
PyTorch, Scikit-Learn, Open AI Gym

Engineering Software
Solidworks, Catia, AutoCAD, Gazebo

Technologies
Linux, Git

Languages
English (Fluent, CPE, University of Cambridge 2008)
French (Intermediate, DALF C2 2010)
Greek (Native)

Teamwork & Class Projects

Automatic Parking using Reinforcement Learning Fall 2020
CSMC 828W: Foundations of Deep Learning, taught by Soheil Feizi, UMD

- Presented a Curriculum Learning-based setup for the efficient training of a Reinforcement Learning policy on autonomous parking.
- Demonstrated the benefits of the proposed approach in parking environments of varying traffic density on an OpenAI gym-based simulator.

Reinforcement Learning-based Object Placement on Small Surfaces Fall 2020
CMSC 818B: Decision-Making for Robotics, taught by Pratap Tokekar, UMD

- Developing a model-free Reinforcement Learning algorithm for training an agent to place objects of unknown mass distribution on top of small surfaces in cluttered workspace environments.

Deep Learning Project Spring 2020
24-789: Deep Learning, taught by Amir Barati Farimani, CMU

- Collaborated with a team of students to develop a multi-modal deep learning framework for extracting the sentiment of a short audiovisual speech sample.
- Implemented a deep neural network which receives text as input and outputs the polarity of the given text (positive/negative sentiment).

Autonomous Vehicle Controller Design Fall 2019
24-677: Linear Control Systems, taught by Ding Zhao, CMU

- Designed a lateral and a longitudinal controller to track the route of an autonomous vehicle around the CMU campus.
- Investigated various methods for improved performance (PID, pole placement, Discrete Time Infinite Horizon LQR) and used Kalman Filter for noise filtering.

Bioinspired Robot Design Spring 2019

24-775: Robot Design & Experimentation, taught by Aaron Johnson, CMU

- Collaborated with a team of students to design and manufacture an underwater penguin-inspired robot.
- Incorporated a ball-and-socket motion transmission mechanism for the movement of the flippers.
- Designed a control system using Arduino microcontroller and tested the robot in underwater environments.

Game Design Fall 2018

24-780: Engineering Computation, taught by Nestor Gomez, CMU

- Implemented applications with 3D graphics and audio programming, using C++ and the openGL library.
- Orchestrated a team project on the development of an interactive entertainment software package (a fighting game).

Manipulation Project Fall 2018

16-741: Mechanics of Manipulation**,** taught by Matt Mason, CMU

- Collected a synthetic dataset of manipulator postures and object poses in OpenAI Gym.
- Trained a multilayer perceptron in order to map changes in hand pose to object displacements.
- Modified the OpenAI Gym simulator to demonstrate the predicted object pose and validated the method on occluded object tracking problems.

Computational Robotics Project Fall 2016

MEA-KY3: Robotics**,** taught by Nikos Aspragathos, UoP

- Developed forward and inverse kinematics software in Matlab for a KUKA KR 6 R700 sixx WP industrial robot.
- Applied the framework to trajectory planning problems and visualized the joint and end-effector trajectories.

Extracurricular Coursework

Machine Learning Spring 2019

Online course taught by Prof. Andrew Ng, offered by Stanford University through Coursera.

Introduction to Computer Science and Programming Using Python Fall 2013
Online course taught by Prof. Eric Grimson, offered by MIT through edx.

Startup Engineering Fall 2013
Online course taught by Prof. Balaji Srinivasan, offered by Stanford University through Coursera.

Internships

Jr. Technical Superintendent Summer 2012, Summer 2013
Euronav Ship Management Hellas Ltd, Athens, Greece

- Interned in the technical department of the company and assisted with various day-to-day tasks.
- Reviewed weekly fleet reports to analyze and optimize on-ship oil and energy consumption.

Outreach

Intelligent Control Lab Tour, Carnegie Mellon University May 2019

- Presented the lab equipment and gave a brief talk for a group of students from Choate Rosemary Hall.

Makerspace and Machine-Shop Tour, Carnegie Mellon University December 2018

- Gave a tour of the makerspace and the machine-shop to a group of CMU kindergarten kids.

F1 in Schools, 4x4 in Schools, Athens, Greece May 2018

- Constructed a set of different racetracks and supervised the F1 in Schools STEM Challenge.
- Collaborated with a team of engineers to inspect and validate F1 and 4x4 student-designed vehicles.