Ali Ekin Gurgen

Phone: +1 609-933-4300 | +90 534-254-7200 **Website:** https://aliekingurgen.github.io/
E-mail: agurgen@princeton.edu **GitHub:** https://github.com/aliekingurgen

Education

Princeton University, Princeton, NJ *2017 - 2021*
B.S.E. in Mechanical & Aerospace Engineering, GPA: 3.75/4.00
Certificates: Applications of Computing, Robotics & Intelligent Systems, Statistics & Machine Learning

- Princeton Robotics Club (Member): Build autonomous mobile robots and drones to participate in intercollegiate competitions. Won first prize in Micromouse Competition 2019 against teams from Harvard, Brown, Rutgers, etc.
- Turkish Student Association (President): Organize events for the Turkish community at Princeton.

Robert College, Istanbul, Turkey *2012 - 2017*
High School Diploma, GPA: 96.28/100

- Koç Family Outstanding Success Award, Alfred Friendly Scholarship, National High Honors

Work Experience

Software Engineering Intern (Autonomous Vehicles) *Jun 2020 - Aug 2020*
Ford Motor Company - Istanbul, Turkey

- Worked as the principal full-stack developer to create a web-based Human-Machine Interface for autonomous trucks.
- Wrote JavaScript libraries to read and convert raw autonomy data from ROS into the XVIZ protocol in real-time.
- Developed a web app that lets drivers visualize and interact with autonomous vehicle data, utilizing React and WebGL.

Robotics Engineering Intern *January 2020*
Samsung AI Research Center - New York, NY

- Collaborated with 2 other interns on a project to control a 7-DOF robotic arm that can autonomously hook rings.
- Conducted research on vision-based robotic manipulation methods for novel circular objects, performed inverse kinematics calculations, and utilized an RGB-D camera and Dynamixel motors for actuating the manipulation task.

Physics Tutor *Feb 2019 - Jun 2020*
McGraw Center at Princeton University, Princeton, New Jersey

- Tutored Princeton students (~10 tutees/wk) in physics courses: Mechanics (PHY 103) and Electromagnetism (PHY 104).

Research Experience

Robust Deep Learning Based Motion Planning Using Funnel Libraries *Sep 2020 - Present*
Intelligent Robot Motion Lab at Princeton University - Princeton, NJ

- Develop an online motion planning policy that utilizes computer vision, neural networks, and funnel libraries to plan collision-free paths that are robust to bounded unknown uncertainties and can generalize to novel environments.
- Perform reachability analyses for nonlinear systems to compute funnel libraries around motion primitive trajectories, and design a deep reinforcement learning based online motion planner that utilizes the computed funnel libraries.
- Currently implementing this framework on a simulation of a quadrotor navigating through an obstacle-dense environment. Aiming to perform a simulation as well as a hardware implementation on an object manipulation task.

Deep Learning Based Motion Planning for Mobile Robots *Jan 2020 - Aug 2020*
Intelligent Robot Motion Lab at Princeton University - Princeton, NJ

- Investigated applications of CV and ML in the robot navigation problem in Prof. Anirudha Majumdar's research lab.
- Implemented a PyBullet simulation of an UGV in an obstacle dense environment, designed and conducted a dataset collection procedure to collect more than 50,000 RGB-D images to be used for training.
- Designed, trained and validated a neural-network-based motion planner that uses the input from an onboard FPV camera to predict a sequence of control inputs that result in collision-free paths, using PyTorch for deep learning.

Mechanical Tunability of Elastomer Membranes *May 2019 - Jun 2019*
Princeton University - Princeton, NJ

- Investigated the mechanical tunability of thin elastomer membranes on liquid substrates upon applied compression, being advised by Prof. Andrej Košmrlj. Conducted various compression tests using an Instron testing machine.

Skills

Programming Lang.	ML / Computer Vision	Full-Stack Web Dev.	Hardware	Spoken Languages
• C/C++	• PyTorch	• React, NodeJS	• CAD/CAM	• Turkish (Native)
• Python	• TensorFlow	• HTML, CSS	• Machining	• English (Fluent)
• Java	• OpenCV	• PyQt, Flask	• 3D Printing	• German (Novice)
• JavaScript	• AWS	• SQL	• Laser Cutting	
• MATLAB	• PyBullet			