BURAK BOLAT

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RESEARCH INTERESTS

Robotics, Human-Robot Interaction, Deep Learning, Computer Vision, Reinforcement Learning

EXPERIENCE

Computer Vision Engineer

Rapsodo

July 2023 - ongoing

- Developed Blender-powered synthetic data generation for golf and baseball shots, boosting the computer vision team's performance before field testing. Focused on enhancing computer graphics skills.
- Created a web-based golf course editor with painting and sculpting interfaces, built in Unity. Focused on computer graphics techniques, including shader development.
- Developed a Unity plugin, Rapsodo Golf Course Builder, to assist 3D artists in building golf courses for a golf game. Features include merging 2D RGB and elevation scan data into 3D terrain, segmenting 2D RGB data for region classification, and more.

Researcher

ROMER & Kovan Research Lab

June 2021 - July 2023

- I conducted a Human-Robot Interaction study with Assoc. Prof. Erol Şahin. Adding lifeness on a robot arm (UR5) with breathing and gazing animations was the aim of study. I run experiments with 57 persons to investigate the impact of our proposed animations on humans. The paper will be submitted to IEEE Robotics and Automation Letters (RAL).
- We contributed a chapter for the book "*Human-Robot Collaboration: Unlocking the Potential for Industrial Applications*". I mostly contributed to the *Perception* section. The book is unpublished yet.
- We published an IROS paper. The study is learning furniture assembly by using point cloud, graph neural networks and reinforcement learning. The paper link.
- I was responsible for interns of ROMER and Kovan.
- I am responsible for ROMER's website, technology stuff purchase and maintenance.
- We completed the Çırak project for TÜBİTAK (Eng. The Scientific and Technological Research Council of Turkey). I made a live demo for the chair of TÜBİTAK Prof. Dr. Hasan Mandal. Video of the demo: link
- I was co-advisor for a graduation project called ChessMate. Video: link
- I hosted an online program of European Robotics Week - Turkey. It was a zoom event for children.

EDUCATION

M.Sc. CENG

Middle East Technical University

Sept 2021 – Sept 2024 Ankara / Turkey

CGPA: 3.93

B.Sc. CENG

Middle East Technical University

Sept 2016 – 2021 Ankara / Turkey

CGPA: 3.38

High School

Dr. Binnaz Ege – Dr. Ridvan Ege Anatolian High School

2012 – 2016 Ankara / Turkey

SKILLS

Python | PyTorch | Open CV | Unity/Blender

ROS | Moveit | Gazebo/MuJoCo/PyBullet

Experiences on:

C++/C | Reinforcement Learning | GAN

Driving Licenses: B class

PROJECTS

Master Courses' Projects

- I took the Deep Learning and Advanced Deep Learning courses from Assoc. Prof. Sinan Kalkan. For Deep Learning Course, I implemented part generator GAN for furniture generation (paper link). GitHub link.
- For Advanced Deep Learning Course, I implemented Reinforced Attention for Few-Shot Learning and Beyond. paper link
- I took Deep Generative Models course from Asst. Prof. Gökberk Cinbiş. I implemented HistoGAN (paper link) which is the modified version of StyleGAN. GitHub link

Graduation Project - URHuman

METU CENG - Advisors: Sinan Kalkan & Erol Şahin

September 2020 - June 2021 2nd among all grad projects

- We developed vision based real time robot arm (UR5) control system. Hands are detected via webcam to control the robot. I developed the vision system and ROS communication system among different nodes of the project. By mapping hand moves to the 3D world actions, the robot is controlled. We provided an user interface and custom world creation by using meshes and april tag detection. For more please see the website and the video below.
- Website: link / Video: link

Internship at Robotic Research Lab.

Kovan Research Lab - Advisors: Sinan Kalkan & Erol Şahin

June 2019 – June 2021

- Human-robot handover for UR5 arm.
- Experienced on ROS (The Robot Operating System), MoveIt, Gazebo Simulator and Rviz.
- Pick and Place on Gazebo for UR5 arm
- Path planning and Collision Avoidance were implemented for the quadrotors in the Gazebo.
- Implemented path planning algorithms: A*, LPA*, RRT, RRT*, RRT#.
- Implemented collision avoidance algorithm: ORCA
- Source codes at: link
- Deeplearning.ai Deep Learning Specialization courses are taken.

Hult Prize Entrepreneurship Competition

Dec 2018

International METU Robotics Day

May 2017

- Referee of Search and Rescue Robot

Member of METU Robotics Society

Sept 2016 – April 2017

- Line Follower and Maze Solver designer

Guided Research Course

CENG488

- Tool handover task for UR5 robotic arm wrt. dynamic hand pose
- Built on ROS, Moveit and Gazebo

Basic Robots

- Line Follower Robot with arduino: github.com/burakbolat/basicLineFollower
- Self Balancing Robot with arduino
- Levelling Plate with arduino: github.com/burakbolat/levellingPlate

LANGUAGES

Turkish ●●●●●

English ●●●●●

German ●○○○○