Kiarash Ghasemzadeh

Email Linkedin GitHub Website Scholar

Education

Shahid Beheshti University [September 2020 - Present]
Bachelor of Science in Electrical Engineering *Last 2 years GPA: 3.83/4.00 or 17.75/20*

Research Area Interests

Computer Vision	Scene Understanding	SLAM
3D Computer Vision	Generative Models	Deep Learning

Skills

- **Programming Languages:** Python, C++, MATLAB
- **Robotics & Computer Vision & Deep Learning:** OpenCV, PyTorch, TensorFlow , ROS
- **Core Competencies:** Machine Learning, Signal Processing, Search Algorithms, Internet of Things (IoT)
- **Embedded Systems:** Nvidia Jetson, Raspberry Pi, ESP, Arduino
- **Software & Tools:** Microsoft Office, Adobe Photoshop, Adobe Illustrator
- **Languages:** English (Fluent)
  TOEFL: 99 (R:28, L:25, S:24, W:22)

Publications

Kiarash Ghasemzadeh and Sedigheh Dehghani, "AurigaNet: Real-Time End-to-End Multi-Task Network for Enhanced Urban Driving Perception"
Springer Journal of Automotive Innovation **[Under Review]**

- A multi-task network architecture excels in urban autonomous driving perception by performing object detection, lane detection, and drivable area instance segmentation simultaneously. It **achieved state-of-the-art** accuracy and efficiency, particularly in drivable area instance segmentation, and demonstrates adequate real-time performance on embedded devices.

Erfan Amoozad Khalili, **Kiarash Ghasemzadeh**, et al, Mohammad Hossein Moaiyeri, **"Technical Report of Mobile Manipulator Robot for Industrial Environments"**,
https://doi.org/10.48550/arXiv.2409.06693 **[arxiv]**

- Technical report of mobile manipulator robot for Industrial Environments to compete in RoboCup 2024 hosted in the Netherlands. The paper was accepted by the technical committee of the Industrial Robots League of Robocup (@work League).

Research Experience

Research Assistant | Robotics and Intelligent Automation Laboratory [Fall 2022 - Present]
Department of Electrical Engineering, Shahid Beheshti University
Principal Investigator: **Dr. Mohammad Hossein Moaiyeri** (Senior Member, IEEE)

- Led the development of advanced machine vision algorithms, significantly improving the accuracy and efficiency of robotic perception systems.
- Engineered and optimized deep neural networks for mobile robot vision, achieving precise object segmentation and detection in complex environments.
- Designed and trained a deep learning model for autonomous lane detection, enhancing navigation capabilities in dynamic, real-world conditions.
- Developed and deployed an object detection and object localization system for a robotic arm with a depth camera, enabling accurate grasping and manipulation of objects in 3D space.

Projects

1/10 Scale Self-Driving Car Robot Vision **[Video1][Video2]**

- Developed and integrated deep learning models for traffic object detection and lane detection, enabling autonomous navigation on a small-scale self-driving car.

Mobile Manipulator Robot Vision **[Video]**

- Implemented deep learning models for real-time object detection and pose estimation using an Intel RealSense camera.
- Used Hector-SLAM with 2D LIDAR for precise mapping and localization on a mobile robot.
- Integrated depth camera and 2D LIDAR data for enhanced obstacle avoidance, improving robotic navigation safety.

Tiago Mobile Manipulator for Home Service with ROS **[GitHub]**

- Vision-Based Object Detection using ArUco markers to detect and localize objects in 6-DOF, giving the robot the ability to grasp objects precisely.
- The robot navigates across a simulated room, moving between tables using the ROS Navigation.
- The robot arm manipulates objects with collision avoidance, ensuring smooth operation without damaging the environment

Visual Odometry on KITTI Dataset **[GitHub]**

- Developed a visual odometry algorithm that accurately estimates vehicle motion from video sequences using the KITTI dataset, contributing to advancements in autonomous driving.

GUI Camera Calibration Toolbox **[GitHub]**

- Designed and developed a user-friendly GUI for camera calibration, streamlining parameter tuning and providing real-time visualization for enhanced usability.

Professional & Teaching Experience

Member | Robotics Scientific Association [Fall 2021 - Fall 2023]

Department of Electrical Engineering, Shahid Beheshti Univerisity

- Actively contributed to knowledge-sharing, workshops, and robotics projects.
- Designed posters for coursers and workshops.

Member | IEEE Student Branch [Fall 2023 - Present]

Shahid Beheshti Univerisity

- Actively contributed to magazine and workshops.

Teaching Assistant, Signal and Systems Course [Winter 2023 Semester]

- Assisted Dr. Farah Torkamani Azar and Dr. Zahra Ahmadian simultaneously in their courses.
- Guided nearly 100 students to understand complex concepts.
- Taught signal processing with Python and MATLAB.
- Designed projects and assignments.

Teaching Assistant, Logic Circuits and Digital Systems [Fall 2023 Semester]

- Assisted Dr. Esfandiar Mehrshahi in his course.
- Designed projects and assignments.

Teacher, Python Programming Language | Danesh High School [Summer 2023]

- Taught a class of 9th grade intorduction to python pragramming.
- Total 12 hours and 2 hours per week in summer.

Volunteer Work

Member of the Executive Team | 6th Iran's Microelectronic Conference [Fall 2022]

- Collaborated to organize a successful conference, fostering networking.
- Designed Posters and Certificates.

Grants, Honors & Awards

Dean's Honor [Spring 2024]
- Awarded for exceptional performance in robotics competitions.

1st Place, Team Section | Industrial Mobile Robots League, IranOpen RoboCup [Spring 2024]
- Team Auriga achieved top honors in the competition.

Research Grant | Robotics and Intelligent Automation Laboratory [Fall 2023]
- Particpated in a team that received a $2,500 grant for developing a mobile manipulator robot.
- Project included using Jetson Nano, Intel RealSense D435I camera, and RPLIDAR.

1st Place, Team Section | Autonomous Urban Vehicles League, IranOpen RoboCup [Spring 2023]
- Team Auriga secured first place in the league.

1st Place, Team Section | Autonomous Urban Vehicles League, IranOpen RoboCup [Spring 2022]
- Team Auriga won first place in this competitive event.

1st Place, Technical Challenge | Autonomous Urban Vehicles League, IranOpen RoboCup [Spring 2022]
- Awarded first place in the technical challenge segment.

References

Dr. Mohammad Hossein Moayeri (Principal Investigator)
Associate Professor
Shahid Beheshti University
Tehran, Iran
Tel: +98 021 29904132
Email: h_moaiyeri@sbu.ac.ir

Professor Seyed Ebrahim Afjei (Dean and Co-Investigator)
Professor
Shahid Beheshti University
Tehran, Iran
Tel: +98 021 22431803
Email: E-Afjei@sbu.ac.ir

Dr. Sedigheh Dehghani (Supervisor)
Assistant Professor
Shahid Beheshti University
Tehran, Iran
Tel: +98 021 29904110
Email: S_dehghani@sbu.ac.ir