Arul Selvam Periyasamy

Munich, Germany
+49 1577-3423742 doktorandarul@gmail.com arulselvamperiyasamy
SelvamArul selvamarul.github.io

I am a Research Scientist in Edge Computing at Siemens AG. Previously, I earned my Ph.D. from the University of Bonn within the Autonomous Intelligent Systems group, where I contributed to developing award-winning robotics systems. I bring extensive expertise in cognitive robotics, machine learning, image processing, and artificial intelligence. I look forward to applying these skills at my new company to build intelligent robotic systems that help make the world a better place.

Education

University of Bonn **Feb. 2018 – Jan. 2024**
Ph.D. in Computer Science (Object Pose Estimation and Tracking) *Bonn, Germany*

University of Bonn **Apr. 2015 – Nov. 2017**
Master of Science (Computer Science) *Bonn, Germany*

Research Experience

Research & Pre-development, Siemens AG **Feb. 2024 – Present**
Researcher Scientist in Edge Computing *Garching bei München, Germany*

- Worked on a docker-based, real-time-capable open edge computing platform.
- Optimized AI Inference on Intel NPU accelerators.
- Set up research activities on confidential computing for industrial edge devices.

University of Bonn **Feb. 2018 – Jan. 2024**
Ph.D. Candidate *Bonn, Germany*

- Introduced novel vision-transformer algorithms for multi-object 6D pose estimation and tracking in cluttered environments.
- Developed pose refinement and shape refinement methods based on render-and-compare and co-developed a highly efficient differentiable renderer to perform scalable render-and-compare tasks.
- Implemented the simultaneous localization and mapping (SLAM), and navigation modules for a mobile robot.
- Deployed deep learning models on Google EDGE TPUs and NVIDIA Jetson cards.
- Supervised Master's & Bachelor's theses, lab courses, and seminars.

University of Bonn **Apr. 2015 – Nov. 2017**
Student Assitant (HiWi) *Bonn, Germany*

- Implemented the navigation stack for an exploration robot.
- Developed an object detection module for a mobile robot.
- Implemented the semantic segmentation and pose estimation modules for a bin-picking robot.

Research Projects

1. **Confidential Edge Computing**
   Feb. 2024 - Till date. Research & Pre-development Organization, Siemens AG.

2. **Learn2Grasp: Learning Human-like Interactive Grasping based on Visual and Haptic Feedback**
   Sep. 2021 - Jun. 2023 Funded by: Bundesministerium für Forschung und Bildung (BMBF).

3. **Amazon Research Award: Learning Structured Scene Modeling and Physics-Based Prediction for Manipulation**
   Jan. 2020 - Dec. 2020. Funded by: Amazon.

4. **Amazon Research Award: Generalizing Scene Parsing for Cluttered Bin Picking**
   Jan. 2019 - Dec. 2019. Funded by: Amazon.

5. **CENTAURO – Robust Mobility and Dexterous Manipulation in Disaster Response by Fullbody Telepresence in a Centaur-like Robot**
   Nov. 2015 - Oct. 2018. Funded by: European Union (EU).

Selected First Author Publications

1. **Efficient Methods for Learning Visual Multi-object 6D Pose Estimation and Tracking**
   Ph.D. Dissertation, Rheinische Friedrich-Wilhelms-Universität Bonn.

2. **MOTPose: Multi-object 6D Pose Estimation for Dynamic Video Sequences using Attention-based Temporal Fusion**
   IEEE International Conference on Robotics and Automation (ICRA), Yokohama, Japan, May 2024.

3. **YOLOPose: Transformer-based Multi-Object 6D Pose Estimation using Keypoint Regression**
   International Conference on Intelligent Autonomous Systems (IAS), Zagreb, Croatia, June 2022.
   Best Paper Award

4. **SynPick: A Dataset for Dynamic Bin Picking Scene Understanding**
   IEEE International Conference on Automation Science and Engineering (CASE), Lyon, France, August 2021.

5. **Refining 6D Object Pose Predictions using Abstract Render-and-Compare**
   IEEE-RAS International Conference on Humanoid Robots (Humanoids), Toronto, Canada, October 2019.

6. **Robust 6D Object Pose Estimation in Cluttered Scenes using Semantic Segmentation and Pose Regression Networks**
   IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Madrid, Spain, October 2018.

Awards

2nd Place in Grand Challenge,
Mohamed Bin Zayed International Robotics Challenge (MBZIRC), Abu Dhabi, UAE, February 2020.

2nd Place Overall & 2nd Place in Pick task,
Amazon Robotics Challenge (ARC), Nagoya, Japan, July 2017.

Winners of Grand Challenge & Ground Robotics Challenge,
Mohamed Bin Zayed International Robotics Challenge (MBZIRC), Abu Dhabi, UAE, March 2017.

3rd Place in Pick task & 2nd Place in Stow task,
Amazon Picking Challenge (APC), Leipzig, Germany, July 2016.

Skills

- **Computer Vision & Robotics:** CUDA, OpenCV, ROS, PCL
- **Machine Learning:** PyTorch, TensorFlow, Scipy, Numpy
- **Programming Languages:** Go, Rust, Python, C++
- **Cloud & Edge:** Docker, Kubernetes

Languages

- **English:** Full proficiency
- **German:** Limited working proficiency
- **Tamil:** Native