Arul Selvam Periyasamy

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Research Scientist in Edge Computing with expertise in developing and deploying AI models for advanced scene understanding applications. Specialized in object pose estimation algorithms and contributed perception modules for award-winning research robots. Proven track record in the complete AI development lifecycle, from model training to deployment across both cloud and edge computing environments. Combines deep technical knowledge in computer vision and machine learning with practical experience in robotics applications and cloud-based AI deployment strategies.

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*

Work Experience

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

- Established research initiatives and successfully secured European Union (EU) funding for confidential edge computing.
- Developed real-time confidential computing capabilities for a Docker-based edge platform, contributing across the full technology stack from real-time networking and virtualization layers to guest kernel components and system-level integration.
- Contributed to the development of a large language model (LLM)-based internal code search service.
- Supervised interns and working students, providing mentorship and guidance in technical projects.

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 using render-and-compare techniques, and co-developed a highly efficient differentiable renderer for scalable render-and-compare operations.
- Implemented simultaneous localization and mapping (SLAM) and navigation modules for mobile robotics applications.
- Deployed deep learning models on Google Edge TPUs and NVIDIA Jetson platforms for edge computing applications.
- Supervised Master's and Bachelor's theses, laboratory courses, and academic seminars.

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

- Implemented a comprehensive navigation stack for autonomous exploration robotics applications.
- Developed an object detection module for mobile robot perception and autonomous operation.
- Implemented semantic segmentation and pose estimation modules for automated bin-picking robotic systems.

Tata Consultancy Services **Dec. 2012 – Feb. 2015**
Software Engineer *Chennai, India*

- Worked as a software engineer on large scale data analytics platform used by several S&P 500 companies.
- Served as a lead instructor in the onboarding academy.

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. **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, virtual machines, Confidential Containers

Languages

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