Sassan Mokhtar *Master of Sciences*

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Skills

Python | MATLAB | PyTorch | PyTorch Lightning | TensorFlow | Isaac Sim | Pybullet | Sapien | ROS

Education

MSc. in Computer Science
Freiburg University
Focus: Robotics, Computer Vision
Thesis title: Joint Shape Reconstruction and 6-DoF Grasp Estimation of Articulated Objects
GPA: 1.3
Graduation: April 2024

MSc. in Scientific Computing
Heidelberg University
Focus: Partial Differential Equations, Optimization
Thesis title: Analysis and Computation of Black-Scholes Equation with Local Volatility
GPA: 1.5
Graduation: March 2019

BSc. in Applied Mathematics
Shiraz University
Focus: Mathematical Analysis, Differential Equations
Graduation: August 2015

Professional Experience

Internship 10/2024 – present
Endress+Hauser Company Maulburg, Germany
- Project: Text-Guided Anomaly Detection
- Objective: Develop a method that leverages semantic insights from LLMs and VLMs to enhance industrial anomaly detection.

Research Assistant 01/2022 – 04/2024
Robot Learning Lab, University of Freiburg Freiburg, Germany
- Create a pipeline for generating synthetic data using the IsaacSim
- Generate a dataset for a range of computer vision tasks
- Generate a dataset for object detection and pose estimation of medical tools

Rsearch Associate 10/2019 – 07/2020
Chair of Mathematics for Uncertainty Quantification, RWTH Aachen University Aachen, Germany
- Analysis of Stochastic Differential Equations

- Optimal importance sampling for rare events

Projects

Policy Learning for Real-time Generative Grasp Synthesis
- Design a realistic setup for mobile manipulation robot grasping in Isaac Sim
- Develop an interactive imitation learning model that outperforms existing models in this setup

Robot Skill Adaptation via Soft Actor-Critic Gaussian Mixture Models
- Learn a dynamical model with Gaussian mixture models from a few demonstrations
- Refine the learned Gaussian mixture model with the Soft Actor-Critic model
- Apply Autoencoder to process the input images in latent space

Optimal Importance Sampling Change of Measure for Large Sums of Random Variables
- Evaluate different approaches based on Importance Sampling to estimate rare-event probabilities
- Develop an alternative change of measure using Exponential twisting that leads to the same performance as the optimal change of measure but without its computational limitations

Publications

CenterArt: Joint Shape Reconstruction and 6-DoF Grasp Estimation of Articulated Objects
ICRA Workshop
- Introduce the first approach capable of jointly reconstructing 3D shapes and predicting 6-DoF grasp poses for articulated objects
- Generate a dataset of valid 6-DoF grasp poses for articulated objects
- Generate a dataset of photo-realistic kitchen scenes consisting of articulated objects

Syn-Mediverse: A Multimodal Synthetic Dataset for Intelligent Scene Understanding of Healthcare Facilities
RA-L Journal
- The first hyper-realistic multimodal synthetic dataset of diverse healthcare facilities
- Provide more than 1.5M annotations spanning five different scene understanding tasks
- Provide an online evaluation benchmark along with the public dataset

References

Prof. Abhinav Valada, *Director of Robot Learning Lab,* University of Freiburg
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Dr. Tim Welschehold, *Group Leader,* University of Freiburg
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Dr. Daniele Cattaneo, *Group Leader,* University of Freiburg
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