Sassan Mokhtar

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Skill

Python, MATLAB, ROS, IsaacSim, Pybullet, Sapien, PyTorch, PyTorch Lightning, TensorFlow

Education

Freiburg University
M.Sc. in Computer Science

Focus: Robotics, Computer Vision
Thesis title: Joint Shape Reconstruction and 6-DoF Grasp Estimation of Articulated Objects
GPA: 95%
Graduation: April 2024

Heidelberg University
M.Sc. in Scientific Computing

Focus: Partial Differential Equations, Optimization
Thesis title: Analysis and Computation of Black-Scholes Equation with Local Volatility
GPA: 90%
Graduation: March 2019

Shiraz University
B.Sc. in Applied Mathematics

Focus: Mathematical Analysis, Differential Equations
Graduation: August 2015

Experience

Robot Learning lab, University of Freiburg
Research Assistant   *Jan 2022 - Apr 2024*

- Create a pipeline for generating synthetic data using the Isaac Sim simulator
- Generate a dataset in medical scenes for a range of Computer Vision tasks
- Generate a dataset for object detection and pose estimation of medical tools using Isaac Sim

Autonomous Intelligent Systems, University of Freiburg
Research Assistant   *Jan 2023 - Dec 2023*

- Configuring a mobile manipulation robot for executing grasping tasks in a real-world setting

Chair of Mathematics for Uncertainty Quantification, RWTH Aachen University
Research Associate   *Oct 2019 - Jul 2020*

- Analysis of Stochastic Differential Equations
- Optimal importance sampling for rare events

Project

Policy Learning for Real-time Generative Grasp Synthesis
Robot Learning lab, University of Freiburg

- 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
Autonomous Intelligent Systems, University of Freiburg

- 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
Chair of Mathematics for Uncertainty Quantification, RWTH Aachen University

- 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

Publication

CenterArt: Joint Shape Reconstruction and 6-DoF Grasp Estimation of Articulated Objects | PDF | Poster| Video
Robot Learning lab, University of Freiburg

- 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 | PDF | Webpage| Video
Robot Learning lab, University of Freiburg

- 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

Reference

- *Prof. Abhinav Valada, Robot Learning Lab, University of Freiburg, Freiburg, Germany*
  E-mail: valada@cs.uni-freiburg.de

- *Dr. Tim Welschehold, Autonomous Intelligent Systems, University of Freiburg, Freiburg, Germany*
  E-mail: twelsche@informatik.uni-freiburg.de

- *Dr. Daniele Cattaneo, Robot Learning Lab, Freiburg University, Freiburg, Germany*
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