DeepRob

Discussion 5
Overview of Final Project Topics II
University of Michigan and University of Minnesota

Self-Supervised Learning

Core List

1. Making Sense of Vision and Touch: Self-Supervised Learning of Multimodal Representations for Contact-Rich Tasks, Lee et al., 2019
2. VICRegL: Self-Supervised Learning of Local Visual Features, Bardes et al., 2022
3. Fully Self-Supervised Class Awareness in Dense Object Descriptors, Hadjivelichkov and Kanoulas, 2022
4. Self-Supervised Geometric Correspondence for Category-Level 6D Object Pose Estimation in the Wild, Zhang et al., 2022

Tactile Perception for Grasping and Manipulation

Core List

1. More Than a Feeling: Learning to Grasp and Regrasp using Vision and Touch, Calandra et al., 2018
2. Tactile Object Pose Estimation from the First Touch with Geometric Contact Rendering, Bauza et al., 2020
3. Visuotactile Affordances for Cloth Manipulation with Local Control, Sunil et al., 2022
4. ShapeMap 3-D: Efficient shape mapping through dense touch and vision, Suresh et al., 2022

Dataset

Core List

1. Deep Learn
2. Isaac Gym:
3. Grounding
4. All You Nee

Pre-training for Robot Manipulation and Transformer Architectures

Core List

1. SORNet: Spatial Object-Centric Representations for Sequential Manipulation, Yuan et al., 2021
2. CLIPort: What and Where Pathways for Robotic Manipulation, Shridhar et al., 2021
3. Masked Visual Pre-training for Motor Control, Xiao et al., 2022
4. R3M: A Universal Visual Representation for Robot Manipulation, Nair et al., 2022
5. Do As I Can, Not As I Say: Grounding Language in Robotic Affordances, Ahn et al., 2022
6. RT-1: Robotics Transformer for Real-World Control at Scale, Brohan et al., 2022

Grasp Pose Detection

Core List

1. Real-Time Grasp Detection Using Convolutional Neural Networks, Redmon and Angelova, 2015
2. Using Geometry to Detect Grasps in 3D Point Clouds, ten Pas and Platt, 2015
3. Dex-Net 2.0: Deep Learning to Plan Robust Grasps with Synthetic Point Clouds and Analytic Grasp Metrics, Mahler et al., 2017
4. Contact-GraspNet: Efficient 6-DoF Grasp Generation in Cluttered Scenes, Sundermeyer et al., 2021
5. Sample Efficient Grasp Learning Using Equivariant Models, Zhu et al., 2022

More Frontiers

Interpreting Deep Learning Models

- Deep Inside Convolutional Networks: Visualising Image Classification Models and Saliency Maps, Simonyan et al., 2013
- Grad-CAM: Visual Explanations from Deep Networks via Gradient-based Localization, Selvaraju et al., 2016
- The Building Blocks of Interpretability, Olah et al., 2018
- Multimodal Neurons in Artificial Neural Networks, Goh et al., 2021

Fairness and Ethics

- Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification, Buolamwini and Gebru, 2018
- Saving Face: Investigating the Ethical Concerns of Facial Recognition Auditing, Raji et al., 2020