Progress Report

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1 To Do

- PIL tutorial: Next.
- PyTorch tutorials: On-going.
- Implement a dense pose estimation algorithm with keypoint estimation: next.
- PVNet implementation: Paused.
- Look into methods of generating uncertainty data.
- Vision-based robotic grasping from object localization, object pose estimation to grasp estimation for parallel grippers - a review, [1]: Will read after PVNet implementation.
- Look into PyBullet for RL.
- Look into Facebook Flashlight C++ library, [2].
- Look into Nvidia Omniverse, [3].

2 Reading List

- [4]
- [5]
- [6]
- [1]

3 Progress

The following items are listed in the order of priority:

- NASA MSI Fellowship: Next, I need to read papers from NASA [7] and develop the proposal.
- PyTorch Tutorials: I did a tutorial on image semantic segmentation, [8]. I also read Mask R-CNN paper, [9] by FAIR.

- Normalized Objects [10]: This is to be implemented.
- PVNet: Currently working on PyTorch tutorials. I will continue this in parallel until I finish it.
- NBV Grasping Project: We installed the mounting piece onto UR5. Next, I will install ROS client on UR5 and my lab station.
- UTARI: No new development.
- YCB Dataset [11]: Start with YCB data and look into Berk Calli's work.
- Implement features from PoseCNN, DOPE, and BayesOD. - On pause.

4 Plans

The following items are listed in the order of priority:

- Pose Estimation in Simulation [12]: Use Nvidia Isaac SDK for in-simulation pose estimation training.
- Look into domain randomization and adaptation techniques.
- Project Alpe with Nolan: On pause for right now.
- UR5e: Finish ROS Industrial tutorials.

5 2021 Goals and Target Journals/Conferences

- Submit a paper on pose estimation with uncertainty to ICIRS.
- Get comfortable with TensorFlow and related Python modules.
- Keep writing.

References

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[4] "roadmap-2020.pdf." `https://cra.org/ccc/wp-content/uploads/sites/2/2020/10/roadmap-2020.pdf`. (Accessed on 04/30/2021).

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[12] Nvidia, "Nvidia isaac sdk — nvidia developer." `https://developer.nvidia.com/Isaac-sdk`, 2021. (Accessed on 02/05/2021).