

Progress Report

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1 To Do

- Start putting together literature reviews for Pose Estimation survey paper.
- I need to read more papers on Pose Estimation. Some survey papers have over 100 cited sources.
- Look into transfer learning. Read [1].
- Look into domain randomization and adaptation.
- Understand Lie algebra.
- Reconstruct a pose estimation model to familiarize myself and then start modifying it.
- Read [2].
- Learn to use UE4.

2 Progress

Following items are listed in order of priority:

- Pose Estimation: I still need to finish dissecting [1], it seems to be based on Lie algebra. This makes it more interesting to me. I also created a list of papers for Pose Estimation and added to the NIST project folder on RVL drive.
- OCRTOC: I successfully setup Unreal Engine 4, [3]. Next, we need to look into Domain Randomization and other techniques for developing a data with diverse features and patterns.
- TensorFlow [4]: I am still working through chapter 2.
- MoreFusion [5]: Still need to write a literature review on this.
- Reading list: [6] and [7].
- Project Alpe with Nolan: We skipped this week due to my schedule.
- Quaternions:

- UR5e: I can work on putting together something presentable with UR5e but that might take some time.
- Fellowship:
- System Identification Presentation:

3 Plans

Following items are listed in order of priority:

- (On pause) Continue with ROS Industrial tutorials and documentation.
- (On pause) Resume Robotic Perception course as soon as possible.
- (On pause) Read Digital Image Processing by Gonzalez and Woods.

References

- [1] J. Tobin, R. Fong, A. Ray, J. Schneider, W. Zaremba, and P. Abbeel, “Domain randomization for transferring deep neural networks from simulation to the real world,” in *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 23–30, IEEE, 2017.
- [2] C. Choi and H. I. Christensen, “Rgb-d object tracking: A particle filter approach on gpu,” in *2013 IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 1084–1091, IEEE, 2013.
- [3] M. S. Unreal, “Unreal engine [en línea].”
- [4] B. Planche and E. Andres, “Hands-on computer vision with tensorflow 2,” 2019.
- [5] K. Wada, E. Sucar, S. James, D. Lenton, and A. J. Davison, “Morefusion: Multi-object reasoning for 6d pose estimation from volumetric fusion,” in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, pp. 14540–14549, 2020.
- [6] J. Lampinen and A. Vehtari, “Bayesian approach for neural networks—review and case studies,” *Neural networks*, vol. 14, no. 3, pp. 257–274, 2001.
- [7] R. Li, Z. Liu, and J. Tan, “A survey on 3d hand pose estimation: Cameras, methods, and datasets,” *Pattern Recognition*, vol. 93, pp. 251–272, 2019.