Progress Report

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August 22, 2022

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1 Specific Research Goals

- VPQEKF (—): On pause. Asif may look into it.
- DLO Manipulation Dataset (ICRA - Sept. 1st) - on-going.

2 To Do

- QEKF Paper - 30% extension (—):
- Implementation (—):
  - Noise issue: noise cannot be modeled - revisit
  - SfM: RQuEst cannot find solution – under investigation - HAVOK?
- DLO Manipulation: (ICRA - Sept. 1st)
  - Work on the paper everyday – up-coming
  - ICRA 2022 RL workshops: gym, stable-baseline3, and RL zoo – on-going
  - Setup digital twin reinforcement learing setup:
    - Unity Robotics extension setup – on-going.
    - Design dynamic DLO data collection system.
    - Build work cell. – on-going
    - Collect data and create a dataset.
    - Define evaluation metrics.
    - Create a high frequency RGBD dataset with UV-frames and open-loop input control actions as the ground truth.
  - Real-Time Preception – on hold
  - Learning DLO Dynamics and System Identification
    - List feasible approached for learing DLO dynamics – done
    - Model dynamics and deformity in a latent space

3 Progress

The following items are listed in the order of priority:

- XEst (RAL —): No update.
- DLO State Estimation (ICRA - Sept. 15th): Last week, I was mostly busy with Unity tutorials and dealing with the financial aid office. I had to figure out why they thought I make too much money to qualify for FAFSA. This week, I will work on the DLO environment [1] in Unity to extract state and input data.
- Maicol (REU): I have asked Maicol to wrap up his work on work-cell digital twin in Unity and prepare a short presentation. I asked him present his work to the lab as soon as possible and focus on his classes. He is taking Electronics, Embedded I, Operating Systems and another class. He is interested in helping with DLO project as well as his own DT project. I told him that I dont want him to slow me down but if anything comes up, I will discuss it with him.
- DoD SMART (Dec 1st.): I started the application.
- PyTorch Tutorials: Transfer learning.

References

[1] M. Yu, H. Zhong, and X. Li, "Shape control of deformable linear objects with offline and online learning of local linear deformation models," in *2022 International Conference on Robotics and Automation (ICRA)*, pp. 1337–1343, IEEE, 2022.