Computer Vision Course Project

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Title: Perception Based Tracker Robot for Following Objects of Interest

Abstract:

There are many cases in the world which demand a robot to follow a specific object for various purposes, such as in a warehouse setting for point-to-point delivery, in an open world for human assisted last mile delivery, or more recently, as a personal robot that does the heavy lifting for you. In this work, we propose to implement a visual tracking system for an object of interest - a unique marker or a person - enabling it to follow the object of interest. The work includes:
1. Visual tracking and trajectory prediction of objects such as fiducial markers, human lower bodies and vehicles
2. Differentiating between similar objects in a single frame to make a decision on which object to track
3. Use NVIDIA Isaac Sim for simulating the perception and behavior of the robot

Literature Survey:

1. NVIDIA Isaac Sim https://developer.nvidia.com/blog/nvidia-ai-perception-coming-to-ros-developers/
2. Robust Coordination of Small UAVs for Vision-based Tracking https://books.google.com/books?hl=en&lr=&id=LRqlDgAAQBAJ&oi=fnd&pg=PA51&dq=mpc+vision+tracking&ots=u1ntafgz1X&sig=v-k07oUCAdYFmyCVnzpScnc-Jp0#v=onepage&q=mpc%20vision%20tracking&f=false
3. Vision-based Tracking for a Mobile Robot http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.507.4259&rep=rep1&type=pdf
4. Person Following by Autonomous Robots - A Categorical Overview https://arxiv.org/pdf/1803.08202.pdf
5. Deep-Learning-Based Indoor Human Following of Mobile Robot Using Color Feature https://www.mdpi.com/1424-8220/20/9/2699