Formative Assessment 2

Stereo Vision and Scale-Invariant Feature Transform (SIFT)

1. Capture two images of the same object but from two significantly different views on your phone. Then, refer to Lab 07 – SIFT to match their SIFT descriptors in a similar fashion to that demonstrated in the lab. Make sure to read the linked OpenCV documentations carefully to better understand SIFT keypoints extraction and descriptors, as well as OpenCV's Brute-Force descriptor matching technique. How many matches Then, answer the following questions:

- Briefly explain the five steps of the SIFT algorithm as explained in the documentation.
- What are the "image octaves" of the Gaussian Pyramid mentioned in the documentation?
- Briefly explain the idea behind OpenCV's "Brute-Force Matcher".
- Which distance measurement norm is best for SIFT? Why?
- When would we need to use the KNN version of the BFMatcher methods?

2. Now that you have good understanding of the SIFT algorithm and the BFMatcher, read up on how you can localize the detected object from this OpenCV tutorial. Then, read the following conference paper: https://www.researchgate.net/publication/221063740_Improving_Data_Association_in_Vision-based_SLAM and try to implement a pipeline that makes use of SIFT feature matching to extract stereo vision depth information from two images of the same object, slightly displaced, as discussed in the stereo vision tutorial.