White Paper on Obstacle Detection via a Stereoscopic Camera System, Using Deep Learning

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deep learning [?, ?, ?, ?, ?, ?, ?, ?, ?], via a convolution neural network (CNN).

1 Work-Breakdown Structure and Project Status

The initial distribution of tasks and project status are described as follows:

1. Michael Bass modified a robotic cyber-physical system to mount two video cameras and a laptop, so that
2. Khaled Nakhleh develop a *Python script* to sample greyscale images from video cameras mounted on the robotic cyber-physical system.
3. Drupad Khublani and Venkata Pydimarri suggested some techniques, and will examine CNN-based techniques for detection of static and dynamic obstacles.
4. Zhiyang Ong wrote the white paper.

Moving forward, Khaled Nakhleh and Michael Bass will develop *Python* scripts for preprocessing of the greyscale images from the video cameras, for statistical analysis of the experimental data, and for visualizing experimental data so that we can obtain figures/plots to include in the final report. Drupad Khublani and Venkata Pydimarri will implement the *Python* scripts for deep learning, via a CNN, that will classify the sampled greyscale images into obstacle detected or no obstacle detected. Lastly, Zhiyang Ong would be in charge of writing the final report, with assistance from other team members.

2 Alternate Plan

Data sets to use in lieu of poor, failed, and/or untimely data acquisition, and preprocessing of data set:

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1. Manuela Chessa's GENUA PESTO – GENoa hUman Active fixation database: PEripersonal space STereoscopic images and grOund truth disparity: https://www.manuelachessa.it/sample-page/benchmarking-datasets-2/
2. The KITTI Vision Benchmark Suite: http://www.cvlibs.net/datasets/kitti/eval_object.php
3. Mapillary Vistas Dataset: https://www.mapillary.com/dataset/vistas?pKey=cc5dEAyQECBFF9MN3Mbd
lat=20&lng=0&z=1.5
4. ApolloScape: http://apolloscape.auto/
5. BDD100K self-driving dataset:urlhttps://www.therobotreport.com/uc-berkeley-opens-self-driving-dataset-bdd100k/:
   (a) http://bdd-data.berkeley.edu/ and https://deepdrive.berkeley.edu/
6. nuScenes: https://www.nuscenes.org/
7. Cityscapes Dataset: https://www.cityscapes-dataset.com/
8. Top Open-Source Lidar Driving Data Sets: https://mighty.ai/blog/top_open_source_lidar_driving_datasets/
9. Apollo Data Open Platform : http://data.apollo.auto/?locale=en-us&lang=en

References