Institute of Robotics, University of Innopolis

Sensors and Sensing
Home Work 03

April 25, 2022

Attention

This is valid for the each and every lab class, you can do your lab tasks with the most preferred language but these standards need to be fulfilled.

- JAVA 8
- C++ 11
- C 99
- Python 2.7.x or 3.6.x
- Matlab 17a onwards

You need to submit your source code along with a clear description of how to run your implementation.

1 Task One

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The provided dataset contains left and right images in two different folders with the same name. For this task please select image pair corresponds to your id (0000[Id].png). You need to use 8 point algorithm in order to find the fundamental matrix. For the initial key points detection (minimum 8 corresponding points) you can either do it manually or use any key points detection technique. Next step is to estimate the disparity map for the selected image pair, you may use any existing implementation for this. You may or not need following information for calculating disparity map: baseline of the stereo camera as the 10cm and focal length of both the left and right side cameras as 2.8mm. If you need any additional assumptions, please elaborate them in the report.

Task Two

Take your smart phone and run for about 100 meters with a constant speed approximately. Your task is to estimate the trajectory where you ran with your phone. To estimate the trajectory, you are asked to incorporate sensor measurements that are available in your mobile phone (e.g., accelerometer, gyroscope, GPS sensor, etc). You need to implement **Multidimensional Kalman filter with sensor fusion** in order to solve this task. In the report clearly explain all the assumptions you made.

Submit

Please upload the single zip file which includes your source code, report, dataset you collected in task 2. Besides, include what you did and why you did it in the report.

Deadline

The deadline: May 7th, 23:59:59 GMT+3.