Camera Rig for Visual SLAM

Description:

For many visual simultaneous localization and mapping (visual SLAM) methods, more than one camera are considered to provide the robot with depth information of the current scene, or with a wider view angle. In most settings, the cameras are fixed with respect to each other and accurately calibrated to yield good results. For depth information to be recovered, the cameras should share a large field of view, while for a wider angle of view, the opposite is true.

The goal of this project is to create a camera rig that can provide the user with both options. The lab possesses 4 Raspberry Pi cameras, as pictured above, that should be combined to a configurable camera rig, where the relative poses of the cameras can be chosen and fixed. The whole rig should be easily mountable on a robot or a movable microphone stand. This should enable the lab to do high quality visual-acoustic SLAM experiments.

The student is free in the choice of materials and designs, as long as the cost stays reasonable and the above requirements are met. The manufacturing can be done by an internal workshop, or by the student him/herself. If time allows, and depending on the student's interest, experimental data can be acquired and analyzed or the camera rig can be extended with IMU devices or a more powerful processing board.

Level: BS or MS

Skills required:

Experience with a common CAD software (Catia, Solidworks, etc.), knowledge of common manufacturing techniques (laser cutting, 3D printing, etc.), preferably some practical skills with common mechanical tools.

Type of work:

70% design and 30% manufacturing / management

Supervisor:

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