A-LOAM

Advanced implementation of LOAM

A-LOAM is an Advanced implementation of LOAM (J. Zhang and S. Singh. LOAM: Lidar Odometry and Mapping in Real-time), which uses Eigen and Ceres Solver to simplify code structure. This code is modified from LOAM and LOAM_NOTED. This code is clean and simple without complicated mathematical derivation and redundant operations. It is a good learning material for SLAM beginners.

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1. Prerequisites

1.1 **Ubuntu** and **ROS**

Ubuntu 64-bit 16.04 or 18.04. ROS Kinetic or Melodic. ROS Installation

1.2. **Ceres Solver**

Follow Ceres Installation.

1.3. **PCL**

Follow PCL Installation.

2. Build A-LOAM

Clone the repository and catkin_make:

```
cd ~/catkin_ws/src
git clone https://github.com/HKUST-Aerial-Robotics/A-LOAM.git
cd ../
catkin_make
source ~/catkin_ws/devel/setup.bash
```

3. Velodyne VLP-16 Example

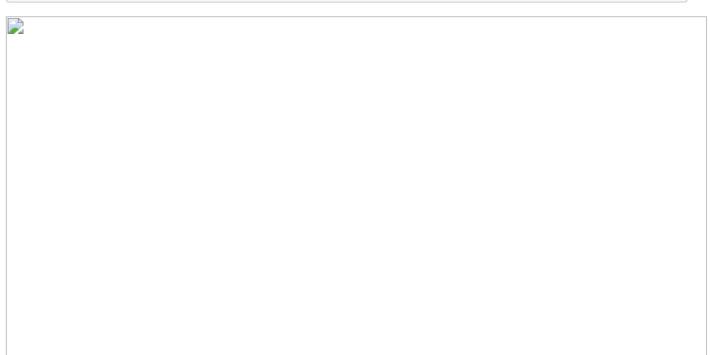Download NSH indoor outdoor to YOUR_DATASET_FOLDER.

```
roslaunch aloam_velodyne aloam_velodyne_VLP_16.launch
rosbag play YOUR_DATASET_FOLDER/nsh_indoor_outdoor.bag
```

4. KITTI Example (Velodyne HDL-64)

Download [KITTI Odometry dataset](#) to YOUR_DATASET_FOLDER and set the `dataset_folder` and `sequence_number` parameters in `kitti_helper.launch` file. Note you also convert KITTI dataset to bag file for easy use by setting proper parameters in `kitti_helper.launch`.

```
roslaunch aloam_velodyne aloam_velodyne_HDL_64.launch
roslaunch aloam_velodyne kitti_helper.launch
```


5. Docker Support

To further facilitate the building process, we add docker in our code. Docker environment is like a sandbox, thus makes our code environment-independent. To run with docker, first make sure [ros](#) and [docker](#) are installed on your machine. Then add your account to `docker` group by `sudo usermod -aG docker $YOUR_USER_NAME`. **Relaunch the terminal or logout and re-login if you get `Permission denied` error**, type:

```
cd ~/catkin_ws/src/A-LOAM/docker
make build
```

The build process may take a while depends on your machine. After that, run `./run.sh 16` or `./run.sh 64` to launch A-LOAM, then you should be able to see the result.

6.Acknowledgements

Thanks for LOAM(J. Zhang and S. Singh. LOAM: Lidar Odometry and Mapping in Real-time) and [LOAM_NOTED](#).