ORB-SLAM

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SLAM

• Simultaneous Localization And Mapping
• Various type of SLAM system
  – ORB-SLAM is a (stereo) RGB(D) camera SLAM system
ORB-SLAM Example

ORB-SLAM

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ORB-SLAM composition

Localization → Mapping → Loop closure
Localization

- Identification in the map
- In the example below, red camera is where agent localize himself
Mapping

• 2D point $\rightarrow$ 3D point
• Add new points and associate it with image features
Loop closure

- Parameter estimation implies error
- Fix unavoidable scale errors, especially on monocular camera
Your turn

• Use commands on next slide to get basic ORB-SLAM working

• Don’t worry on file/code size, we will focus on System, Tracking and folder under Examples/ROS
Your turn

mkdir git
cd git

sudo apt-get install -y libglew-dev cmake

git clone https://github.com/stevenlovegrove/Pangolin.git
git clone https://github.com/raulmur/ORB_SLAM2.git

cd Pangolin
mkdir build && cd build
make

cd ../..

cd ORB_SLAM2
chmod +x build.sh
./build.sh

export ROS_PACKAGE_PATH=${ROS_PACKAGE_PATH}:${(pwd)/Examples/ROS}
chmod +x build_ros.sh
./build_ros.sh
What can be done
Your turn

• Point cloud visualization of map
  – Your main has a reference to a System object
  – System has a reference to the Map object
  – Map has `GetAllMapPoints` method
  – Connect the dots

• More on this: publish pose of the camera on ROS topic (hint: `mTcw` is the name member on Tracking class)
  – Bonus: list of keyframes too (again, `GetAllKeyFrames` is a method on Map class)
  – Ultrabonus: publish points with color
Useful links

• Help
  – https://github.com/raulmur/ORB_SLAM2

• Dataset download
  – KITTI (car): http://www.cvlibs.net/datasets/kitti/eval_odometry.php

• Point cloud visualization
  – http://wiki.ros.orgpcl_ros