TwitchSLAM

Docker

```
docker build -t twitchslam .
docker run --runtime=nvidia --gpus all  --net=host -e DISPLAY --rm -v
/tmp/.X11-unix -e NVIDIA_DRIVER_CAPABILITIES=all --env
DISPLAY_COOKIE="Bubonic/unix:  MIT-MAGIC-COOKIE-1
473e1095109aad74bd0f5f72462e2d24" -it twitchslam

docker run --runtime=nvidia --gpus all  --net=host -e DISPLAY --rm -v
/tmp/.X11-unix -e NVIDIA_DRIVER_CAPABILITIES=all --env
DISPLAY_COOKIE="Bubonic/unix:  MIT-MAGIC-COOKIE-1
473e1095109aad74bd0f5f72462e2d24" -v $PWD:/app/twitchslam -it twitchslam
/bin/bash
```

Install nvidia-docker2

```
xhost +local:docker

sudo apt install nvidia-docker2

sudo systemctl daemon-reload
sudo systemctl restart docker
```

You'll need to replace DISPLAY_COOKIE with your your display cookie which you can get from xauth, it should look like the following

```
$ xauth list
username/machine:0 MIT-MAGIC-COOKIE-1 [32 character string]


F=984 python3 slam.py
videos/2011_09_26/2011_09_26_drive_0048_sync/image_00/data/test.mp4
```

Point Cloud Generation

Depth Perception from Stereoscopic Vision on Edge Devices

A library to simplify disparity calculation and 3D depth map generation from a stereo pair

- Authors: Dhruval PB, Aditya NG

About the Project

Depth estimation and 3D object detection are important for autonomous systems to be able to estimate their own state and gain greater context of their external environment. The project is an implementation of the software side of a perception stack.

Quick Start

Install with pip

```
python3 -m pip install git+https://github.com/AdityaNG/Depth-Perception-
from-Stereoscopic-Vision-on-Edge-Devices.git
```

Run the demo

```
python3 -m stereo_vision --demo
```

Dependencies

- [Cuda Toolkit](#)
- A C++ compiler (*e.g.*, [G++](#) or [Clang](#))
- [LIBELAS](#)
- [OpenCV](#)
- [Kitti Dataset](#)
- popt.h (for command line input)
- OpenGL
- Python 3 interpreter with all the packages in `requirements.txt` installed

Compiling and running

Install the dependencies:

```
$ sudo apt install libpopt-dev freeglut3-dev       # popt.h and OpenGL
$ python3 -m pip install -r requirements.txt
```

Clone the repository:

```
$ git clone https://github.com/AdityaNG/Depth-Perception-from-Stereoscopic-
Vision-on-Edge-Devices.git
```

Compile using the make utility:

```
$ make stereo_vision -j$(($(nproc) * 2)) -s        # binary
$ make shared_library -j$(($(nproc) * 2)) -s       # shared object file
```

Stereo Calibration

A calibrated pair of cameras is required for stereo rectification and calibration files should be stored in a `.yml` file. github.com/sourishg/stereo-calibration contains all the tools and instructions to calibrate stereo cameras.

The above should produce the camera intrinsic matrices K1 and K2 along with the distortion matrices D1 and D2. The extrinsic parameters of the stereo pair is calculated during runtime.

The rotation and translation matrices for the point cloud transformation should be named as XR and XT in the calibration file. XR should be a **3 x 3** matrix and XT should be a **3 x 1** matrix. Please see a sample calibration file in the `calibration/` folder.