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Final Project

ORB_SLAM2-docker images

ORB_SLAM (Localization and Simultaneous Mapping, SLAM) is an open source [1] algorithm for automatic vehicle in an unknown environment. I am researching in SLAM algorithm for my double degree master in China. There is the complexity configuration the library environment for ORB_SLAM especially in wins and also ubuntu system because of compatible problems of platform for ORB-SLAM. So, this is my objective to develop an image for simplifying the implement of ORB-SLAM.

My ORB-SLAM docker images are pushed in my GitHub and Docker hub[2] where you can find Dockerfiles and images. In my hub, you can find two versions of ORB-SLAM image.

✧ V1.0[3] is based on Ubuntu 16.04 and VNC for desktop connection

Get image

Pull the image from Docker hub:

```
docker pull qihaoliu/orbslam2-docker:v1.0
```

Or use Dockerfile to build locally

```
git clone --branch v1.0 https://github.com/buaalqh/orbslam-docker.git
cd ./orbslam-docker
docker build -t qihaoliu/orbslam2-docker:v1.0 .
```

Run the docker container

Download Dataset

This ORB_SLAM2 routine provides a demonstration program for the KITTI odometry Dataset. Here, using sequence 04 in data_odometry_gray.

Create container

Execute the following command to instantiate the container:

```
docker run -it --rm -v YOUR_PATH_TO_KITTI/sequences/04:/root/Dataset/04 -p 5900:5900
qihaoliu/orbslam2-docker:v1.0
```

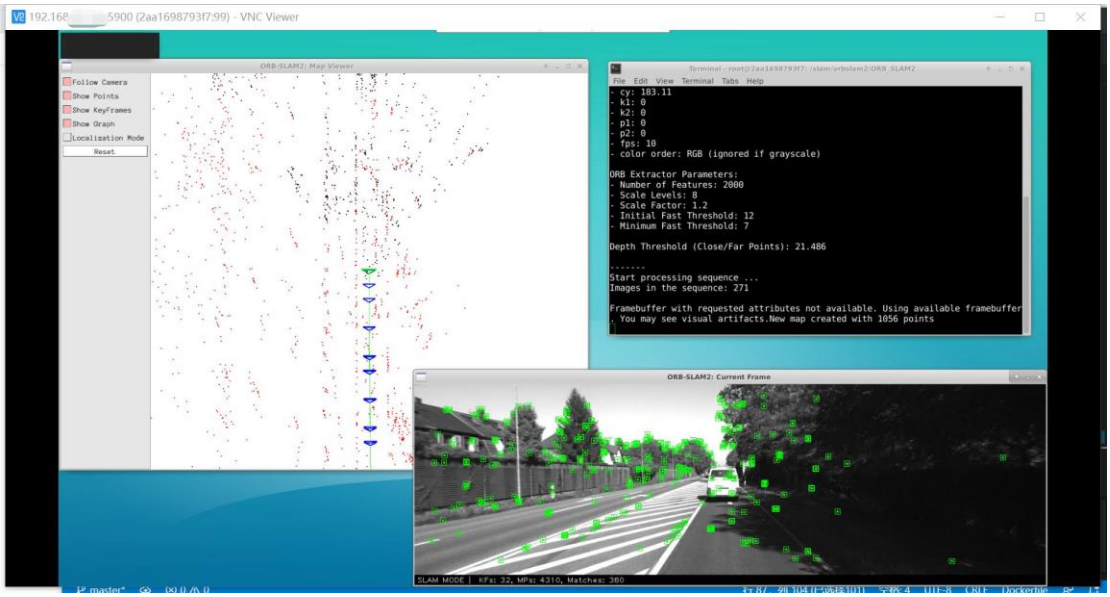
Connect VNC Desktop port 5900 to host:

Then open VNC Viewer Desktop and use adress localhost:5900 to connect. And in this image, the access is free (no password) as default. (Note: docker toolbox in wins, the adress of localhost is a special adress assigned to your docker VM, ex: http://192.168.xx.xx:5900/)

[1] https://github.com/raulmur/ORB_SLAM2
[2] https://hub.docker.com/r/qihaoliu/orbslam2-docker
[3] https://github.com/buaalqh/orbslam-docker/tree/v1.0

Pangolin routines

```
cd /slam/orbslam2/ORB_SLAM2
./Examples/Stereo/stereo_kitti Vocabulary/ORBvoc.txt Examples/Stereo/KITTI04-12.yaml
/root/Dataset/04
```



✧ V2.0[4] is based on Ubuntu 20.04

Get image

Pull the image from DockerHub:

```
docker pull qihaoliu/orbslam2-docker:v2.0
```

Or use Dockerfile to build locally:

```
git clone --branch v2.0 https://github.com/buaalqh/orbslam-docker.git
cd ./orbslam-docker
docker build -t qihaoliu/orbslam2-docker:v2.0 .
```

Run the docker container

Download Dataset

This ORB_SLAM2 routine provides a demonstration program for the KITTI odometry Dataset. Here, using sequence 04 in data_odometry_gray.

Create container

Execute the following command to instantiate the container:

[4] https://github.com/buaalqh/orbslam-docker/tree/v2.0

```
docker run -it --rm -v YOUR_PATH_TO_KITTI/sequences/04:/root/Dataset/04 -p
6080:80 -p 5900:5900 qihaoliu/orbslam2-docker:v2.0
```

Connect VNC Desktop port 5900 to host:

Then open VNC Viewer Desktop and use adress `localhost:5900` to connect. And in this image, the access is `free (no password)` as default. (Note: `docker toolbox` in wins, the adress of localhost is a special adress assigned to your docker VM, ex: `http://192.168.xx.xx:5900/`)

Connect VNC web port 6080 in browser[5]:

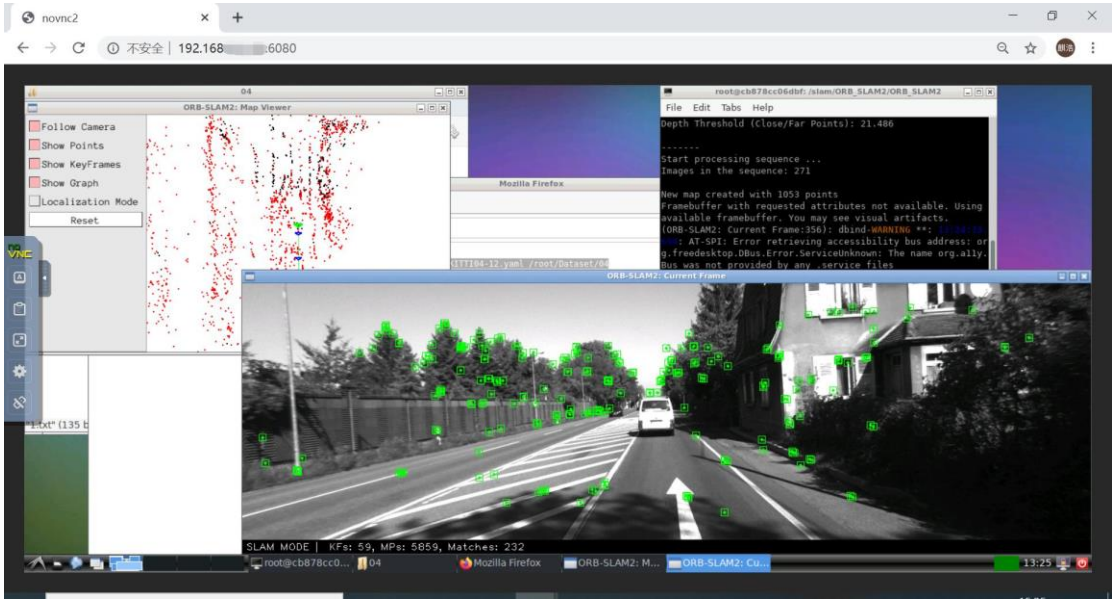
Note: If you would like to protect vnc service by password, set environment variable VNC_PASSWORD, for example

```
docker run -it --rm -e VNC_PASSWORD=mypassword -v
YOUR_PATH_TO_KITTI/sequences/04:/root/Dataset/04 -p 6080:80 -p 5900:5900
qihaoliu/orbslam2-docker:v2.0
```

A prompt will ask password either in the browser or vnc viewer.

Pangolin routines

```
cd /slam/ORB_SLAM2/ORB_SLAM2
./Examples/Stereo/stereo_kitti Vocabulary/ORBvoc.txt
Examples/Stereo/KITTI04-12.yaml /root/Dataset/04
```



End

[5] http://192.168.xx.xx:6080/

✧ **Dockerfile[6] of V1.0 (details see files in my Docker hub and Git hub):**

```
FROM ubuntu:16.04
MAINTAINER Qihao LIU <qihao.liu@student-cs.fr>
# Get dependencies for Pangolin (logical for visualization and user int
erface)
RUN apt-get update && apt-get install -y \
        libgtk2.0-dev \
        ……
ENV OPENCV 3.4.1 #Set environment
# Install OpenCV
RUN cd /root && \
    wget https://github.com/opencv/opencv/archive/3.4.1.zip && \
    unzip 3.4.1.zip && \
    cd opencv-3.4.1 && mkdir build && cd build && \
    cmake -D CMAKE_BUILD_TYPE=RELEASE -D WITH_CUDA=OFF -
D WITH_OPENGL=OFF .. && \
    make && make install
# Install Pangolin
# Install Eigen3
# Get orb-slam2 from github and compile it
RUN mkdir -p /slam
WORKDIR /slam
RUN cd /slam && \
    git clone https://github.com/buaalqh/orbslam2.git && \
    cd orbslam2/ORB_SLAM2 && chmod +x build.sh && sh build.sh
# Enable remote access to the Docker container desktop by VNC
ENV DEBIAN_FRONTEND noninteractive
RUN apt-get update -y && apt-get install -y \
    openssh-server xfce4 xfce4-goodies x11vnc sudo bash xvfb && \
    useradd -
ms /bin/bash ubuntu && echo 'ubuntu:ubuntu' | chpasswd && \
    echo "ubuntu ALL=(ALL) NOPASSWD:ALL" >> /etc/sudoers && apt-
get clean && \
    rm -rf /var/lib/apt/lists/*
COPY    x11vnc /etc/init.d/ # configuration remote vnc desktop
COPY    xvfb /etc/init.d/ # congifuration Virtual display server
COPY    entry.sh / # start vnc server

RUN     sudo chmod +x /entry.sh /etc/init.d/*
# port for connecting VNC
EXPOSE  5900
# Set the command to run when the container starts
ENTRYPOINT [ "/entry.sh" ]
```

[6] https://github.com/buaalqh/orbslam-docker/tree/v1.0