Autonomous Navigation

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5 Sep 2022

Contents

1. Local Machine

1.1. Create virtual environment.

```
sudo pip install virtualenv
mkdir ugv
virtualenv ugv
source ugv/bin/activate
sudo apt install python3.9-venv
```

1.2. Install required packages.

```
cd ugv
wget https://raw.githubusercontent.com/
    LokeshBadisa/Effectiveness-of-
    Computing-Engines-on-ML-Models/
    main/requirements.txt
pip install pip==22.1.2
pip install -r requirements.txt
sudo apt-get install python3-tk
```

If you face 'failed building dependency wheels on numpy', try changing version of package which you face error.

1.3. Install required packages for nvidia(skip this if you dont have gpu on your local machine).

```
curl https://repo.anaconda.com/miniconda/
    Miniconda3-latest-Linux-x86_64.sh -o
     Miniconda3-latest-Linux-x86_64.sh
bash Miniconda3-latest-Linux-x86_64.sh
source ~/.bashrc
conda install -c conda-forge cudatoolkit
    =11.2 cudnn=8.1.0
export LD_LIBRARY_PATH=
    $LD_LIBRARY_PATH:
    $CONDA_PREFIX/lib/
mkdir -p $CONDA_PREFIX/etc/conda/
    activate.d
echo 'export LD_LIBRARY_PATH=
    $LD_LIBRARY_PATH:
    $CONDA_PREFIX/lib/' >
    $CONDA_PREFIX/etc/conda/activate.d/
    env_vars.sh
```

1.4. Download the dataset from

```
https://drive.google.com/drive/folders/1scWy-
    myyAPP6MhZwJ2w9j9JuZrmdV4Mm?
    usp=sharing
```

1.5. Unzip the dataset and download remaining codes.

```
unzip DataCollected.zip
mv DataCollected ugv/
cd ugv
svn co https://github.com/LokeshBadisa/
    Effectiveness-of-Computing-Engines-
    on-ML-Models
```

2. NVIDIA Server

This section demonstrates commands for using DGX2 Server.

2.1. Login to DGX server

```
ssh username@ipaddress
```

2.2. Repeat 1.3

2.3. Create Anaconda Virtual Environment(skip this if you already have anaconda environment on server)

```
conda create −−name venvname python=3.9
conda activate venvname
```

2.4. Create the UGV Folder in Server

```
mkdir foldername
```

On local machine,

```
scp −r location serverid@ipaddress:
    foldername
```

location refers to location of UGV folder on local machine.

2.5. Install required packages and run the code

```
cd foldername
pip install −r requirements.txt
cd Lane
```

3. Server Analysis

3.1. Run the code on different computing engines.
On local machine:

```
python3 trainingonlocalcpu.py
```

On Server GPU:

```
python3 trainingonservergpu.py
```

On Server CPU:

```
python3 trainingonservercpu.py
```

3.2. Analyse the time taken on different computing engines

```
cd ../finalanalysis
python3 analysis.py
```

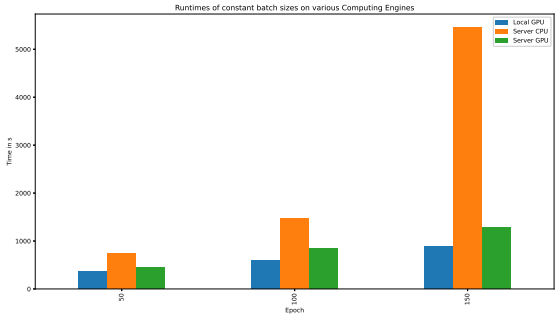

Fig. 3.2. Constant Batch Size (Batch Size=50)

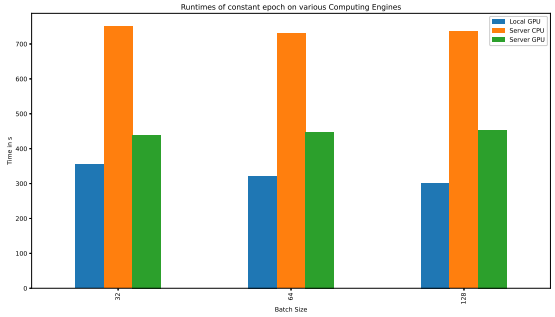

Fig. 3.2. Constant Epoch (Epochs=128)

4. Optional

4.1. Run runMain.py for visualizing the calculation of steering values.

```
cd ../Lane
python3 runMain.py
```