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# Egocentric RGB Hand Detection

## Documentation

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## 1 Get Started

### 1.1 Download trained model

Our trained hand detection model is available at gitlab. Run the download script to download the model:

```
>> bash download.sh
```

### 1.2 Data preparation

The dataset used are **DeepQ-Synth-Hand** and **DeepQ-VivePaper** dataset. We assume that you already have the dataset on your machine. However, the data directories should be the same as the original dataset (see Appendix for complete directory tree).

## 2 Environment Setup

Recommended System: Ubuntu 16.04

Our code is written and run in **Python 3.5**.

Required Packages & Version:

- keras 2.0.8
- tensorflow 1.4.0
- tqdm 4.19.4
- imgaug 0.2.5
- progressbar2 3.34.3
- opencv-python 3.3.0.10
- numpy 1.13.3

To install all the package needed, run:

```
>> pip3 install -r requirements.txt
```

### 3 Run inference task

Make sure you have the model in your directory (either downloaded or trained by yourself). Make sure you have prepared the dataset and setup the environment.

To run an inference task, type:

```
>> python3 upload.py -w <path_to_model>
```

The default *path to model* is *full\_yolo\_hand\_small.h5*

Our testing score on OpenAI platform is 0.0376678.

### 4 Run training task

Our default configuration of training process is written in `config.json`. You do not have to change the configuration to run a training task.

To start a training task, run:

```
>> python3 train.py -w <path_to_model> -i <data_directory>
```

The default *path to model* is *full\_yolo\_hand\_small.h5*

Note: If you train the model from scratch, the result might be slightly different from our trained model.

## Appendix

Structure of data directory is shown in figure below. Note that the figure only contains directories that are needed for training and testing.

```
path_to_data_directory/
├── Deep-Synth-Hand-01/
│   ├── data/
│   │   ├── s000~s004/
│   │   │   ├── img/
│   │   │   └── label/
│   └── Deep-Synth-Hand-02/
│       ├── data/
│       │   ├── s005~s004/
│       │   │   ├── img/
│       │   │   └── label/
│   └── Deep-VivePaper/
│       ├── data/
│       │   ├── air/
│       │   │   ├── img/
│       │   │   └── label/
│       │   └── book/
│       │       ├── img/
│       │       └── label/
│       └── frame/
│           ├── air/
│           └── book/
```