**Drone and Bird Detection Python Code**

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**Cut\_drone\_bird.py** :

Cut the raw data reduce the size to 20 x 30 (each file has 1000 time stamps)

And merge all the data and save them to the directory, total\_cut\_data

Data/cut\_data/cut\_\*pkl, Data/total\_cut\_data/bird\_data\_total.pkl

Data/cut\_data/bird\_\*pkl, Data/total\_cut\_data/mavik\_data\_total.pkl

**Extract\_angles.py**

Extract angles over time at the estimated positions of propellor of drones and wings of bird

The saved data shape is ( number of time samples, ) = (1000, ). Save data in the folder, for example,

Data/sample\_data/mavik\_angle\_112.5.txt ,

Data/sample\_data/bird\_angle\_112.5.txt

**Classification\_models.py**

It includes all the necessary classes. 1) ResidualCovnet, 2) ShallowCovnet, 3) ConvLSTM

**Drone\_bird\_classification\_with\_convnet.py**

Drown and bird classification using simple convolutional networks

**Drone\_bird\_classification\_with\_conv\_lstm.py**

Drown and bird classification using convolutional LSTM networks.

**Matlab\_files/Plot\_phase\_fig2.m**

MATLAB file to plot phase variation in time domain, Figure 2

**Matlab\_files/Plot\_spectrogram\_fig3.m**

MATLAB file to plot spectrogram for one example case, Figure 3

**Matlab\_files/Plot\_comparison\_of\_robustness\_fig4.m**

MATLAB file to plot model robustness, Figure 4.

**DATA Structure**

**Cut\_data/\*.pkl:** Total data files, each of which has the 20\*30 size from the original data.

All the ‘cut files” are integrated into these files.

**Total\_data/ mavik\_data\_total.pkl**: mavik file including all the cases

**Total\_data/ bird\_data\_total.pkl:** bird file including all the cases.