

Deep Learning –HW#5

About the Assignment

The main aim of the assignment is to gain some fundamental knowledge about deep learning on Python. The gains of this homework are:

- Able to design a time series model for classification
- Able to setting the parameter of a CNN model
- Able to use to Pytorch or Keras library
- Able to analyze performance of a model
- Able to save and load a CNN model

Tasks:

Dataset link: https://figshare.com/articles/dataset/Gear_Fault_Data/6127874/1

1. Context

There are few dataset on mechanical engineering, in particular devoted to apply Machine Learning in industrial environment.

2. Gear Fault Data

Time domain gear fault vibration data (DataForClassification_TimeDomain)
And Gear fault data after angle-frequency domain synchronous analysis (DataForClassification_Stage0)

Number of gear fault

types=9={'healthy','missing','crack','spall','chip5a','chip4a','chip3a','chip2a','chip1a'}

Number of samples per type=104

Number of total samples=9x104=936

The data are collected in sequence, the first 104 samples are healthy, 105th ~208th samples are missing, and etc.

You will use DataForClassification_TimeDomain.npy (3600x936) for classification purpose.

You are expected to train with any time-series model (LSTM or GRU or CNN1D or Dense NN) for the classification of gear samples. You are expected use sklearn splitting method as 70% train, 10% validation and 20% testing.

There are two options for classification: save voice data as a image or handle voice data with a specified size.

- 1- Implement a model by using Pytorch or Keras.
- 2- Save model with by considering high accuracy score.
- 3- Load model and evaluate model with test samples.
- 4- Show the confusion matrix, accuracy of model.

Use seaborn library to plot your confusion matrix.

<https://stackoverflow.com/questions/35572000/how-can-i-plot-a-confusion-matrix>

Send colab notebook and pdf as zip file

Send your code as zip. Yourname-surname-hw#.zip