SiameseAux

August 8, 2023

[1]:
```
"""Delete ths cell when done!"""
%load_ext autoreload
%autoreload complete
```

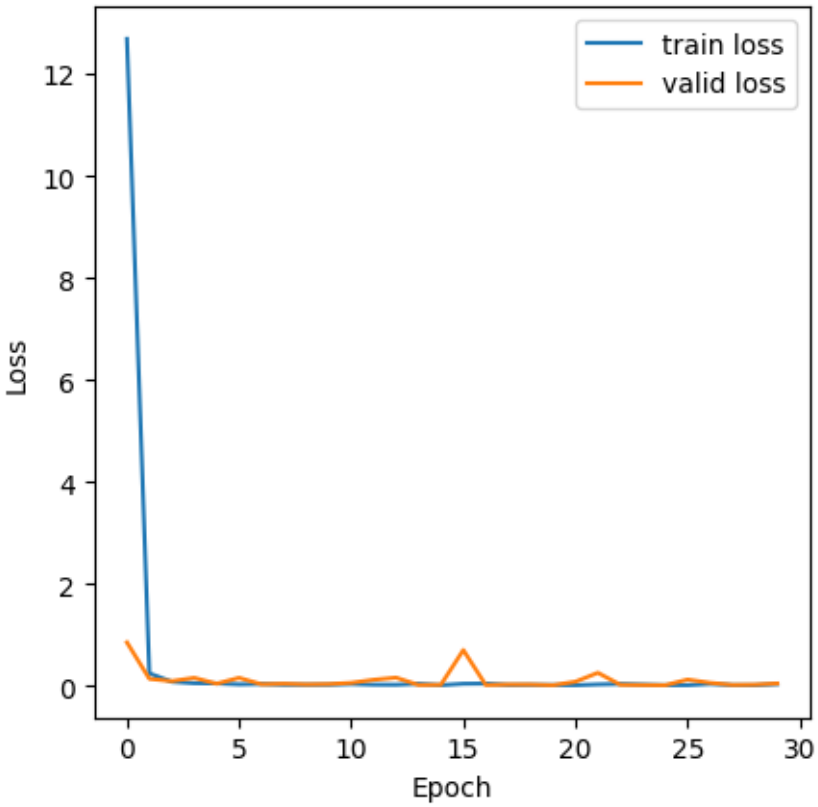
[2]:
```
import numpy as np
import torch
device = torch.device("cuda" if torch.cuda.is_available() else "cpu")
s = {
    'problem'           : "regression",
    'approach'          : "metric learning/non-parametric",
    'algorithm'         : "triplet network",
    'input'             : "samples from a distribution",
    'input type'        : "vectors",
    'input meaning'     : "spectrum",
    'output'            : "samples from a distribution",
    'output type'       : "one number",
    'output meaning'    : "temperature or pressure, depending on distribution",
    'learning rate'     : 1e-4,
    'input dimension'   : 10000,
    'output dimension'  : 1,
    'feature dimension' : 300,
    'epoch'             : 1000,
    'epoch-development' : 1,
    'cross validation round': 16,
    'cross validation round-development' : 1,
    'batch size'        : 64,
    'best model folder' : 'triplet_best_model/'
}
# https://arxiv.org/pdf/1412.6622.pdf
import data_accessor as acc
datas = [
    'temperature_230509_discrete',
    'pressure_230516_discrete'
    ]
data_dictionary = acc.setup(datas)
```

```
loading temperature_230509_discrete____________________________
        input shape (number, dimension): (6000, 10000)
```

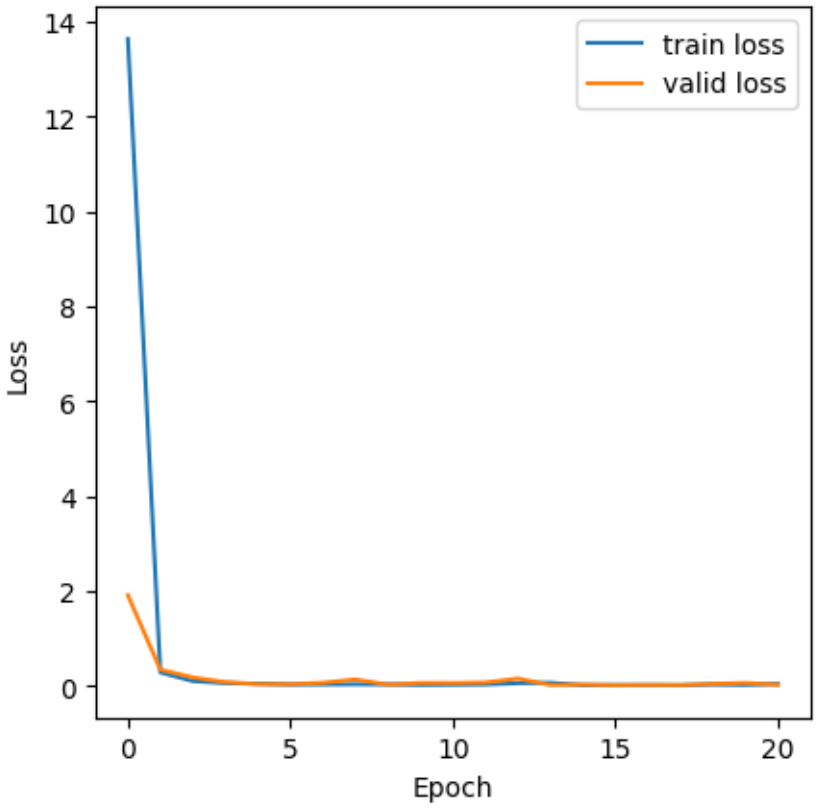
```
        label shape (number, dimension): (6000, 1)
        there are 16 folds
        4200 for training, 600 for validating, 1200 for testing
loading pressure_230516_discrete__________________________
        input shape (number, dimension): (5000, 10000)
        label shape (number, dimension): (5000, 1)
        there are 16 folds
        3500 for training, 500 for validating, 1000 for testing
```

[5]:
```
from CrossValidation import CrossValidator
from tools import SaveBestCrossValidationModel
from Siamese import SiameseDataset, SiameseAuxManager
from data import alternate_rows_itertools
# datas.reverse()
CVtor = CrossValidator(s['cross validation round'],
                       s['epoch'],
                       SaveBestCrossValidationModel(s['best model folder']),
                       SiameseDataset,
                       datas,
                       data_dictionary,
                       SiameseAuxManager,
                       s,
                       device)
# CVtor.single_task_train(0)
# CVtor.multi_task_train_sequential()
CVtor.multi_task_train_weave(alternate_rows_itertools)
CVtor.complete_notify()
CVtor.test_all()
```

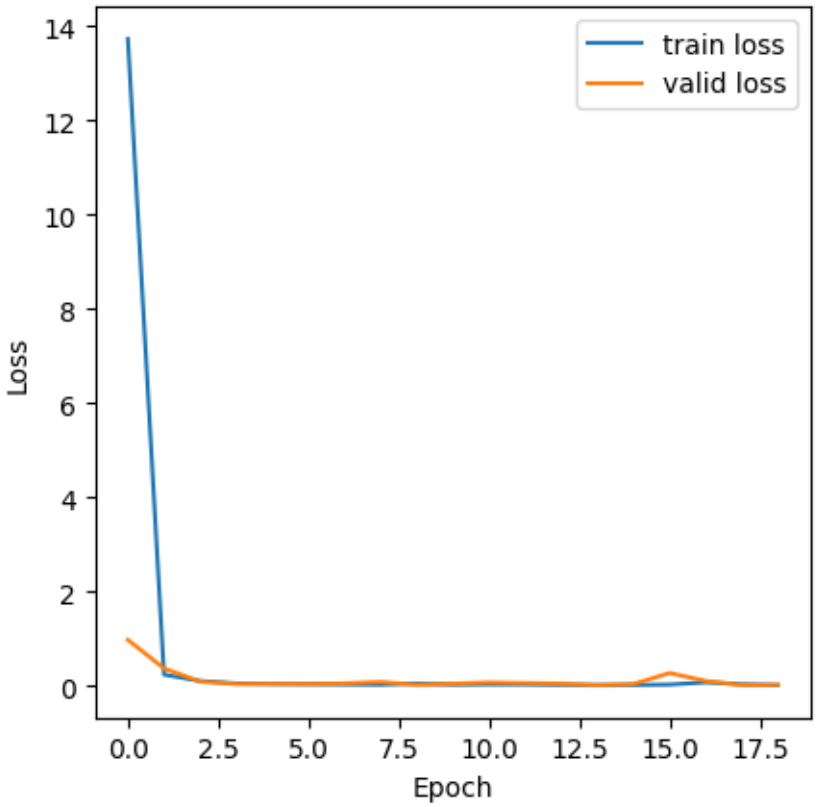
```
__________CROSS VALIDATION__________
Cross-validation rounds: 16
Epochs: 1000
Datas to learn:
        0: temperature_230509_discrete
        1: pressure_230516_discrete
 MULTI TASK, Interweave_____________________________
we're learning: multiple tasks
given [1, 2, 3], [a, b, c]: learn [1, a, 2, b, 3, c], simple handling of
different counts
>round 0
EARLY STOPPING @ epoch 29
min train loss: 0.013030182610627664
min valid loss: 0.012578394263982773
```



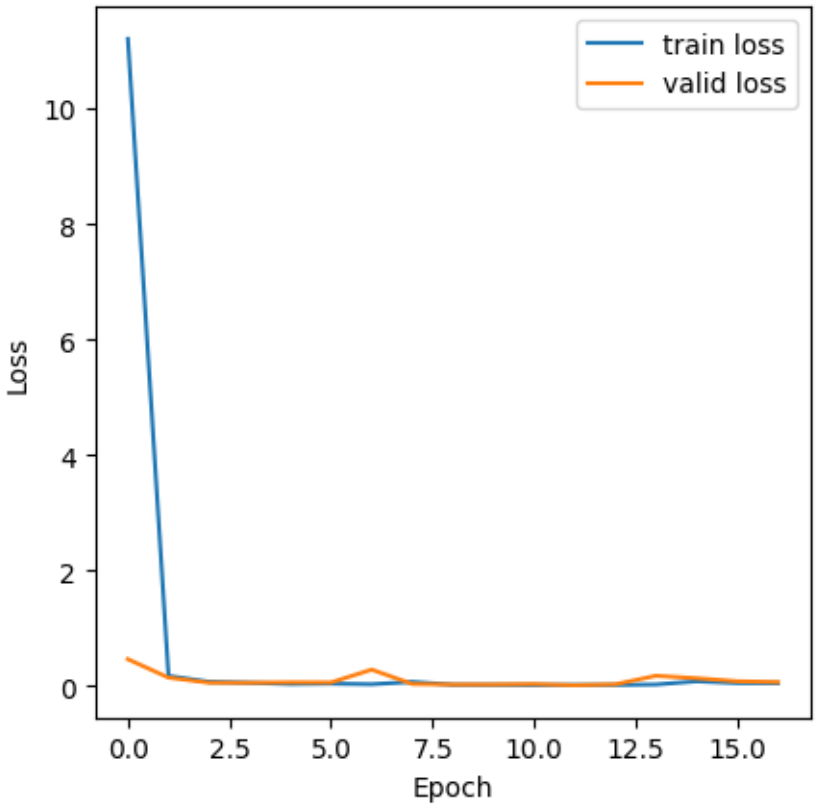

```
>round 1
EARLY STOPPING @ epoch 20
min train loss: 0.0122630851350971
min valid loss: 0.01291099138971832
```



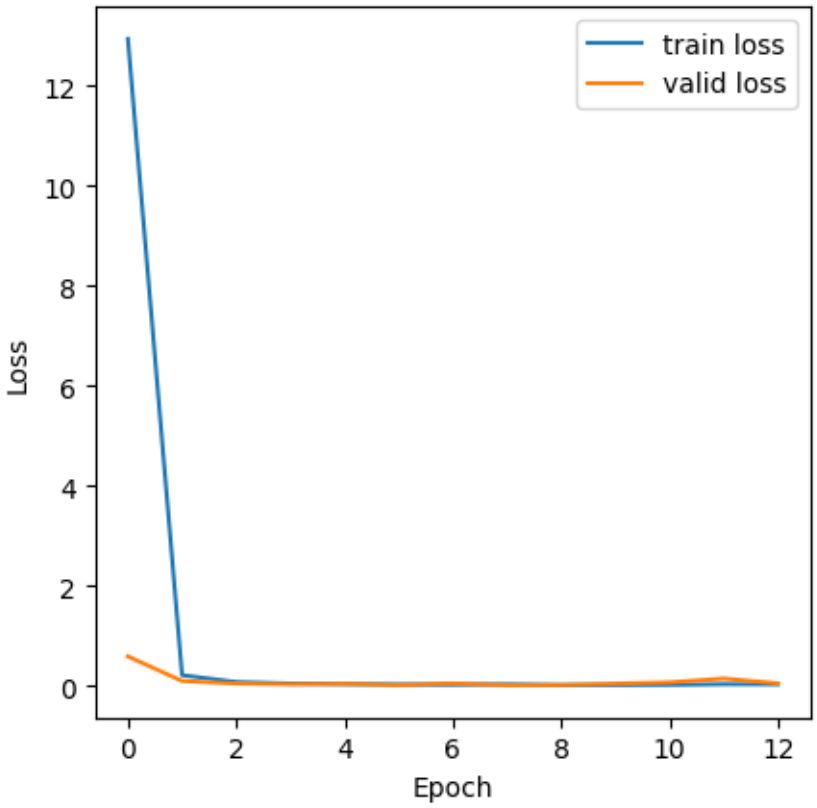

```
>round 2
EARLY STOPPING @ epoch 18
min train loss: 0.012994273092351422
min valid loss: 0.01000103090579311
```



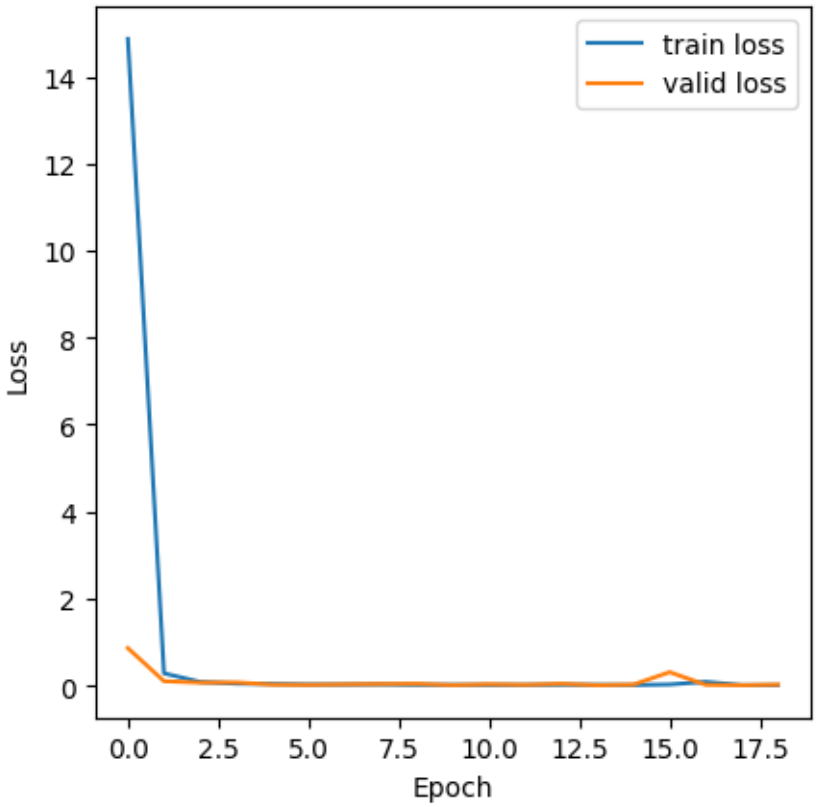

```
>round 3
EARLY STOPPING @ epoch 16
min train loss: 0.015948011955508025
min valid loss: 0.013863959660132727
```



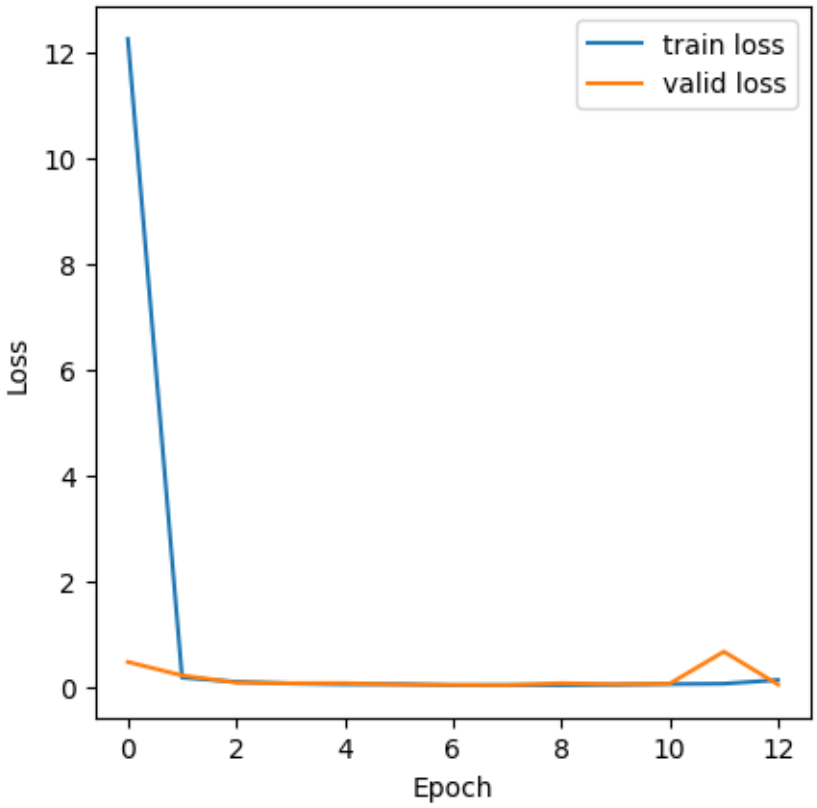

```
>round 4
EARLY STOPPING @ epoch 12
min train loss: 0.018368561698262356
min valid loss: 0.01565359765663743
```



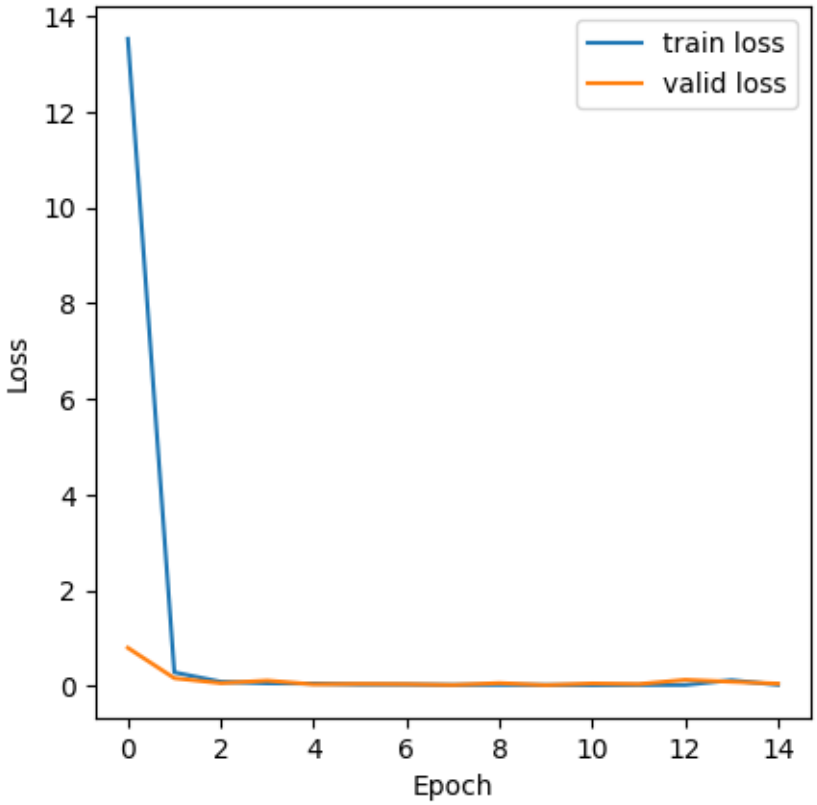

```
>round 5
EARLY STOPPING @ epoch 18
min train loss: 0.011263123401710071
min valid loss: 0.009631977959846457
```



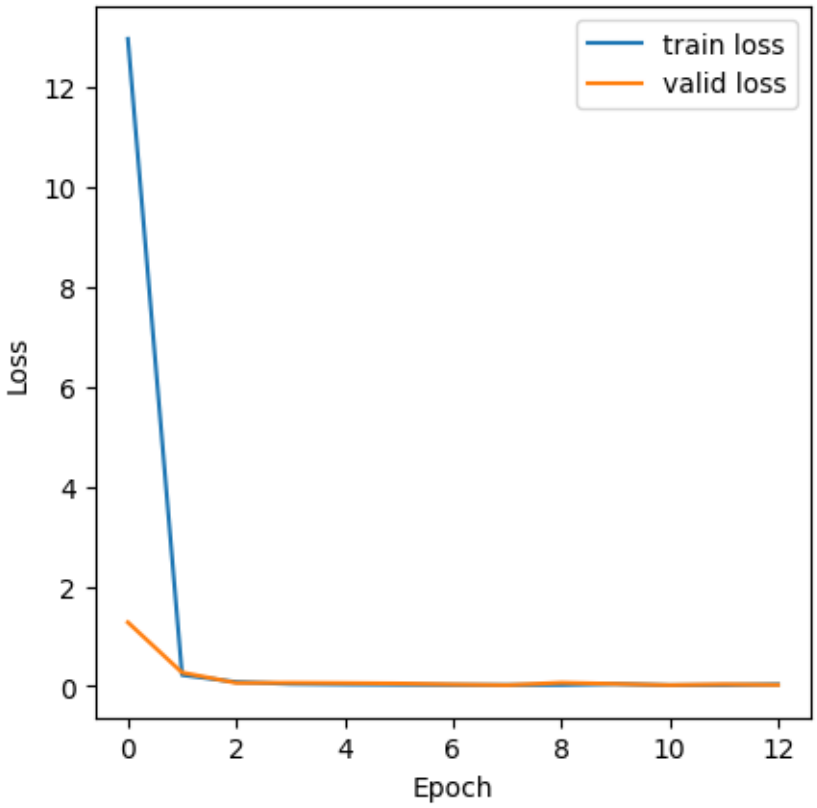

```
>round 6
EARLY STOPPING @ epoch 12
min train loss: 0.023634952508405714
min valid loss: 0.026065678439206548
```



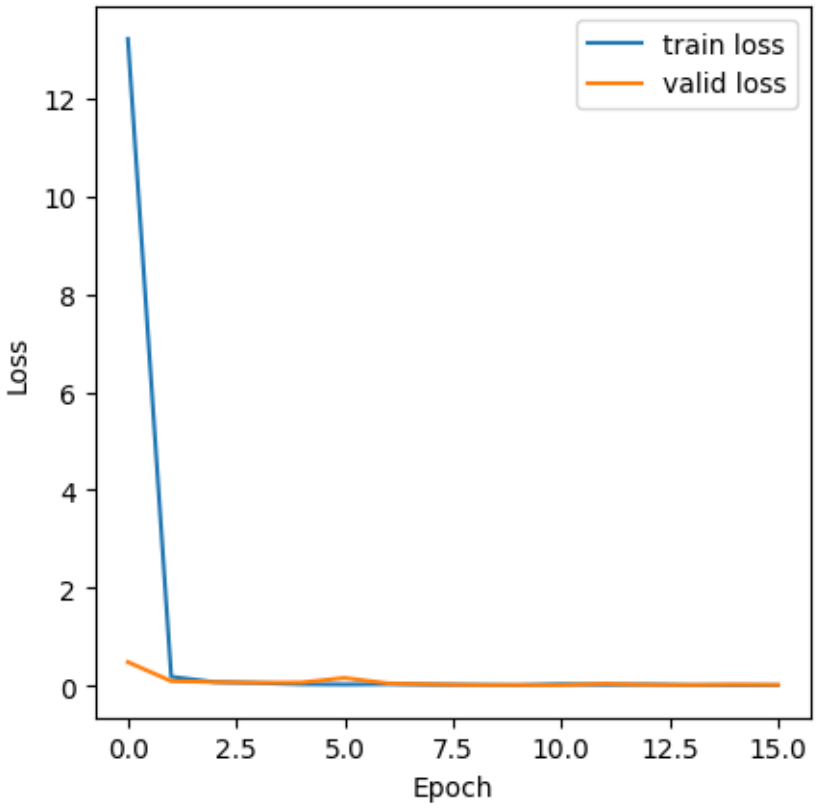

```
>round 7
EARLY STOPPING @ epoch 14
min train loss: 0.017334501482238453
min valid loss: 0.019438179520269234
```



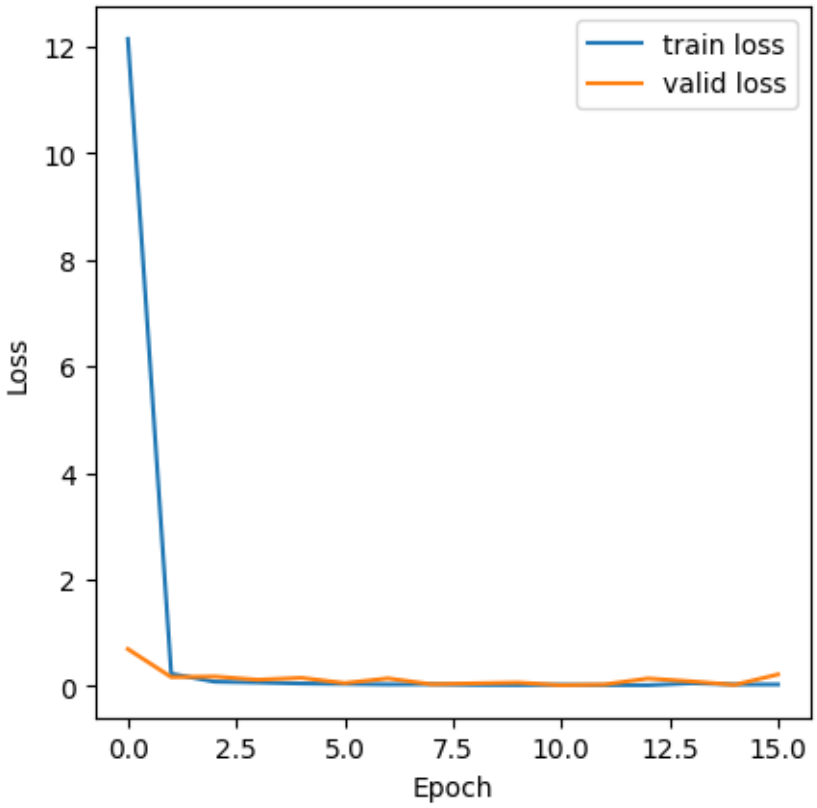

```
>round 8
EARLY STOPPING @ epoch 12
min train loss: 0.02145709556119501
min valid loss: 0.023158702585432265
```



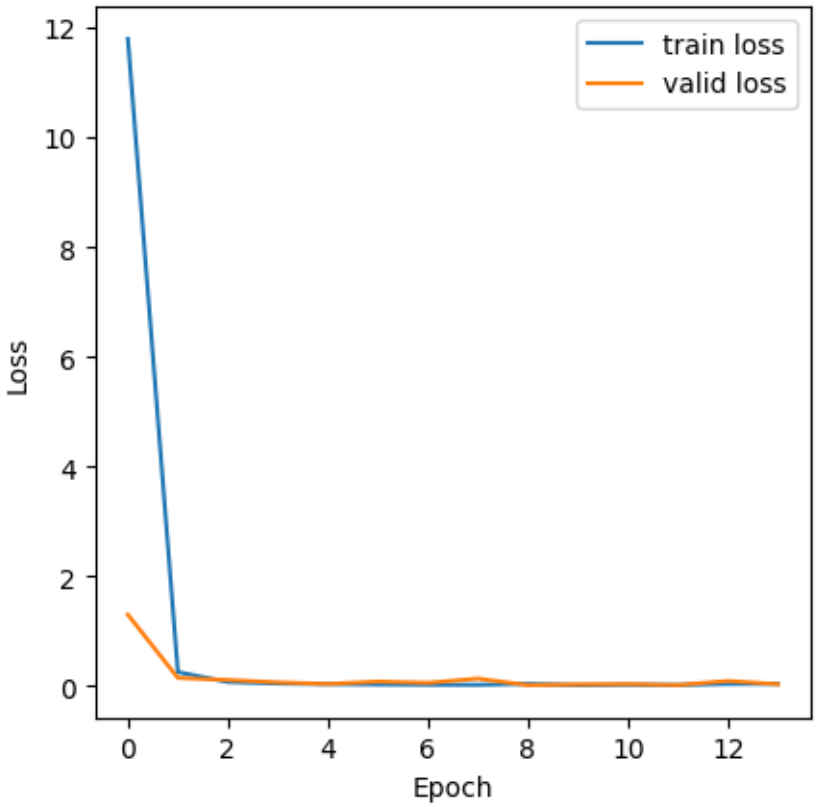

```
>round 9
EARLY STOPPING @ epoch 15
min train loss: 0.01674494007602334
min valid loss: 0.016886432525805302
```



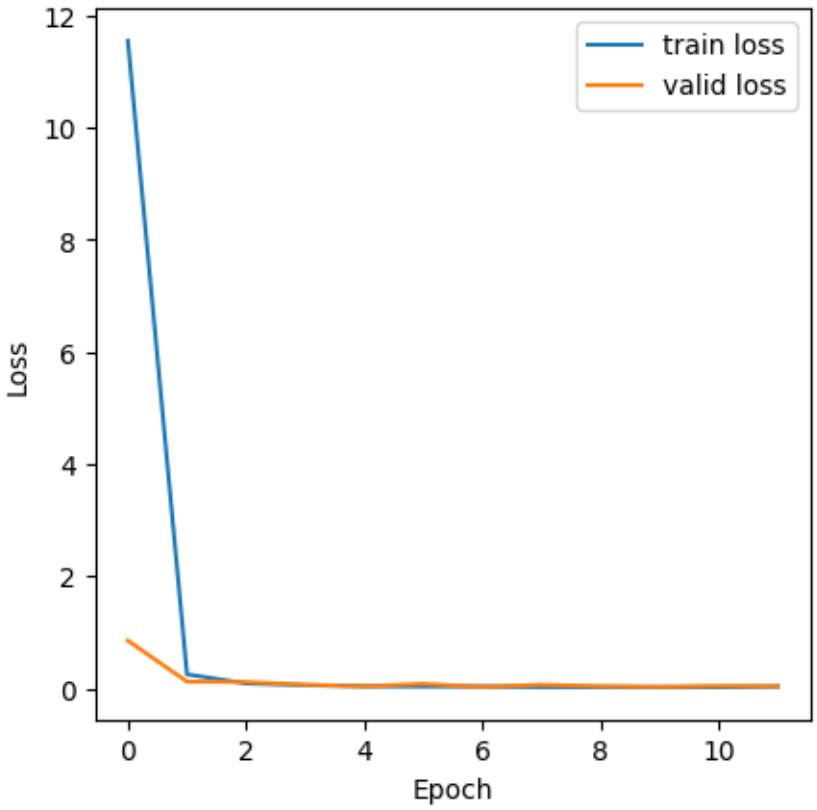

```
>round 10
EARLY STOPPING @ epoch 15
min train loss: 0.018467134865354902
min valid loss: 0.01804866258882814
```



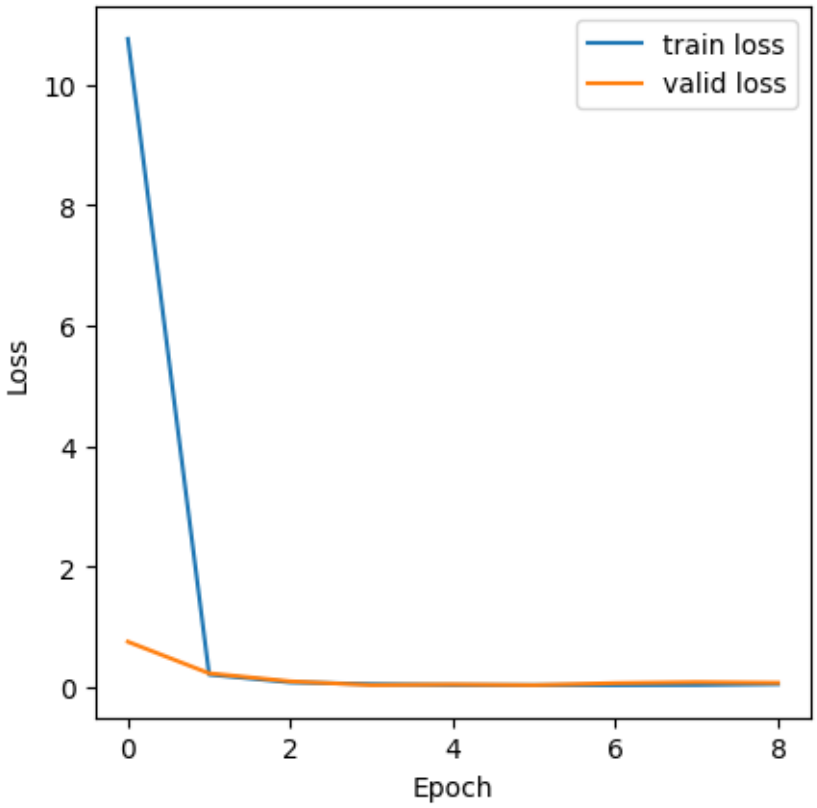

```
>round 11
EARLY STOPPING @ epoch 13
min train loss: 0.01843406846131052
min valid loss: 0.019786855516334374
```



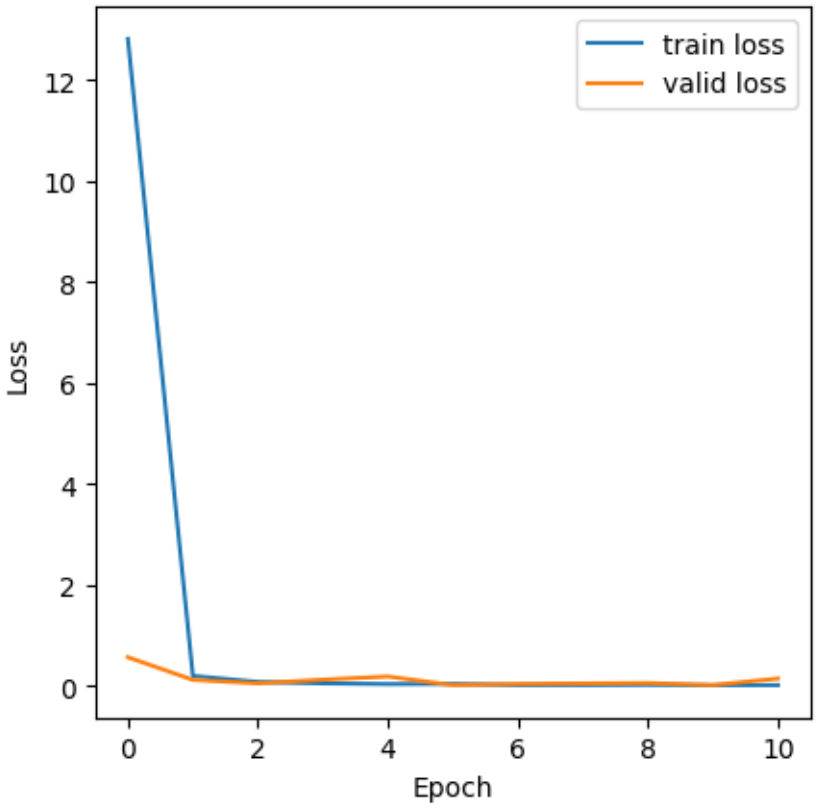

```
>round 12
EARLY STOPPING @ epoch 11
min train loss: 0.02128748052314786
min valid loss: 0.025703240392936602
```



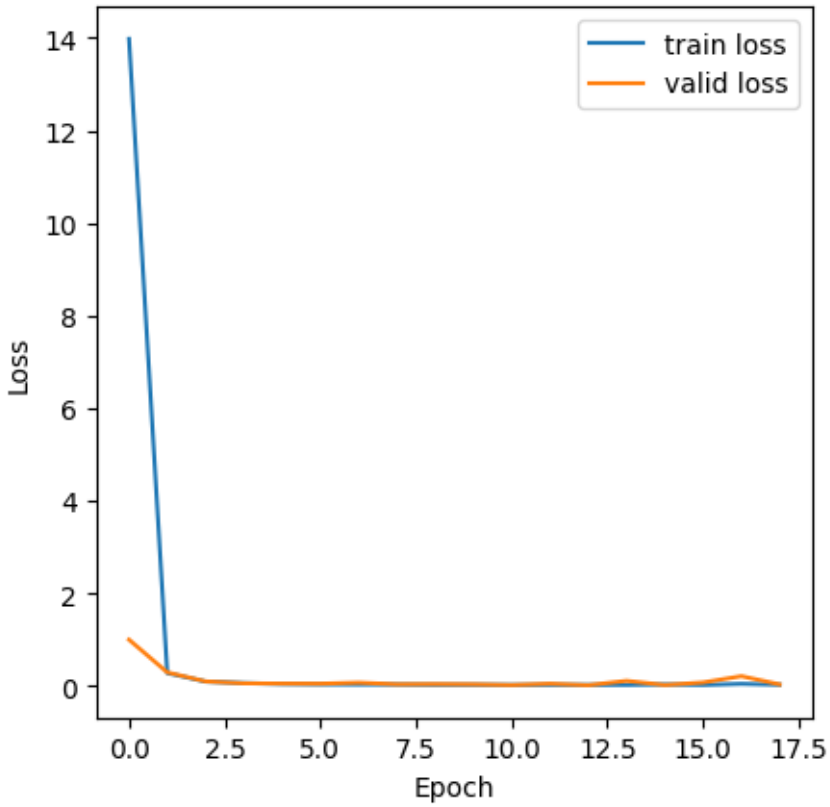

```
>round 13
EARLY STOPPING @ epoch 8
min train loss: 0.032394076512803224
min valid loss: 0.03393614561193519
```




```
>round 14
EARLY STOPPING @ epoch 10
min train loss: 0.020360886209744435
min valid loss: 0.02276985290356808
```




```
>round 15
EARLY STOPPING @ epoch 17
min train loss: 0.019365475274437716
min valid loss: 0.0139809458826979
```




```
BEST model: CV=5.pth with 0.009631977959846457
trained datas by weaving them
Aggregate performance: Valid loss mean 0.018400915487695277, std
0.006421233115831717
  TRAINing COMPLETE_____________________________
TEST_____________________________
Testing temperature_230509_discrete, loss:  0.005709894075009383
Testing pressure_230516_discrete, loss:  0.008035598701098934
```