



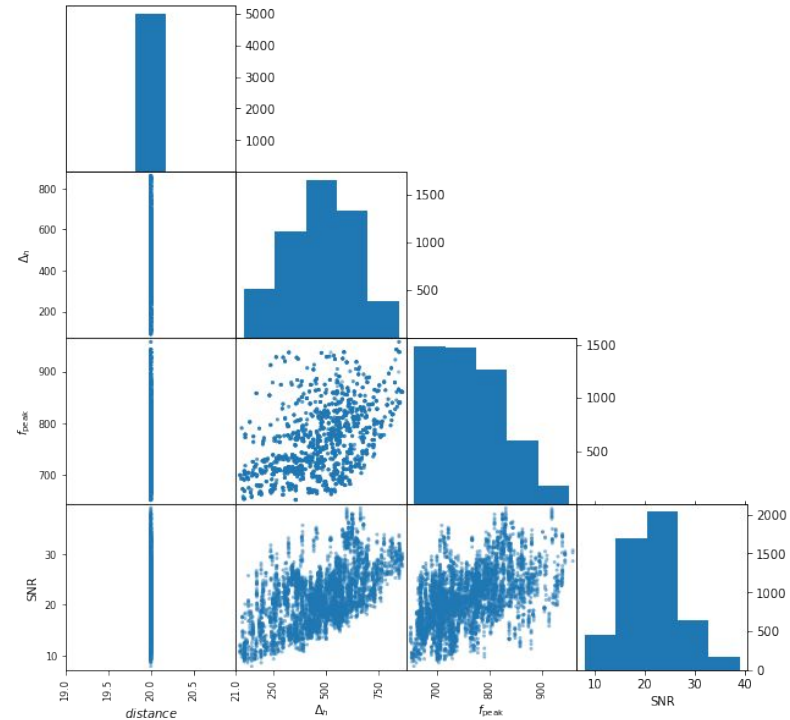
CCSN

Classification with TimeSeries



Dataset: 'noise' vs 'signal' - 10K

- 5126 TimeSeries of noise
- 5000 TimeSeries of signals:
 - 1 second window
 - Sample rate: 4096Hz
 - 999 different waveforms with $w_0 \geq 3.0$
 - Distance: 20 kPc
 - Inclination = $\pi/2$
 - Declination, polarization and right ascension = 0

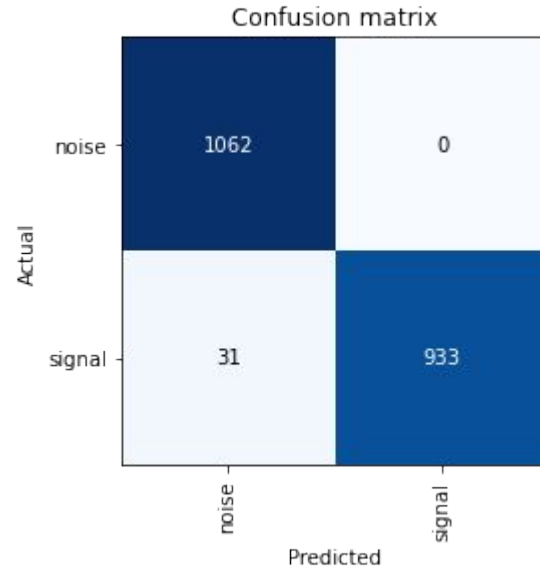
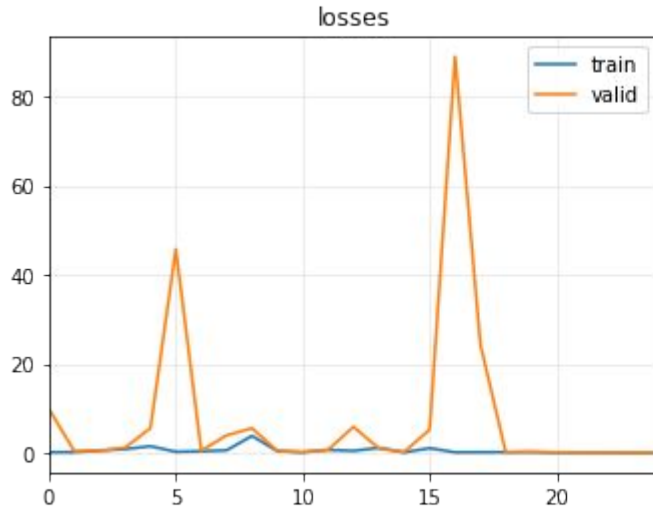


Classification with fixed parameters

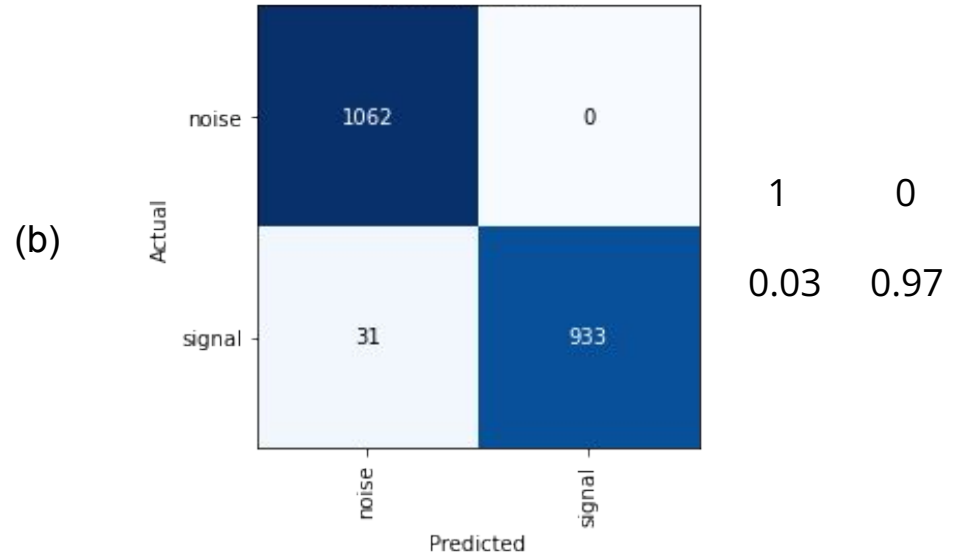
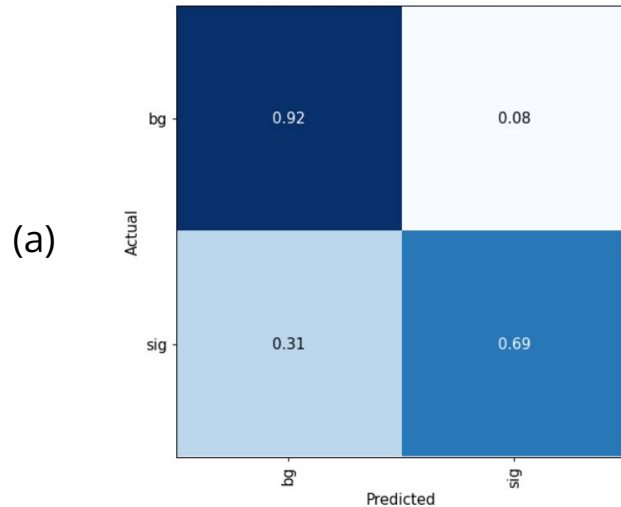
- Batch Size = 8
- Model: ResCNN(3,2)
- Weight decay: $1e-3$
- Maximum learning rate: 0.5
- Monitoring: valid loss

Classification with 25 epoch

- Best model found at epoch 24 with valid_loss value: 0.0642
- Accuracy: 0.9847



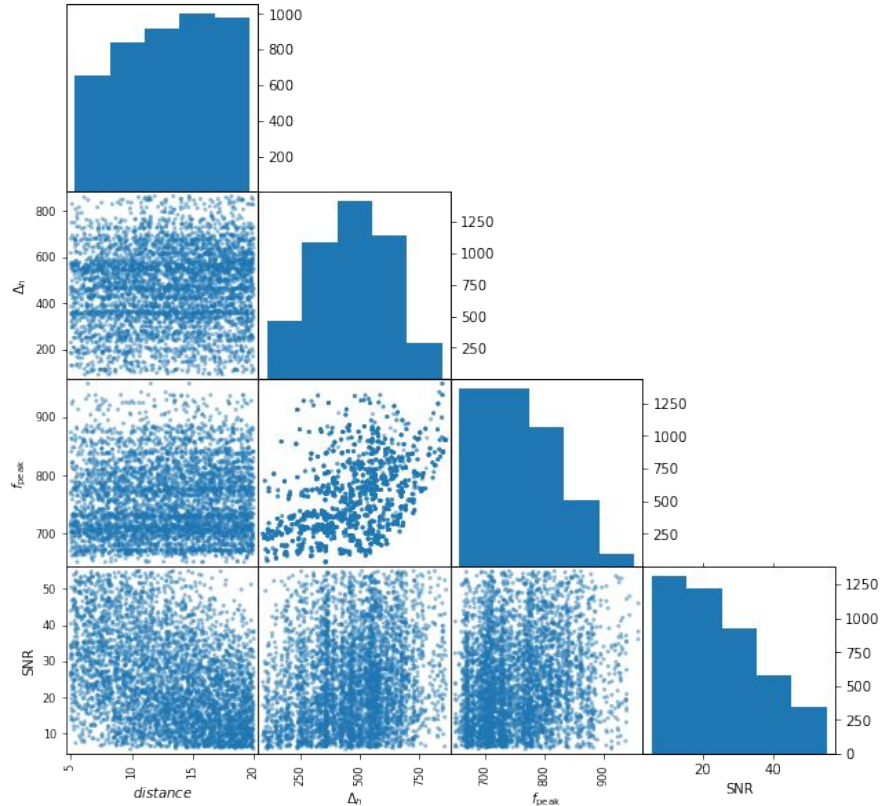
Spectrograms vs Time Series



(a) the confusion matrix obtain by Gabriel Mas with a similar dataset using Spectrograms and in (b) the confusion matrix obtain with a dataset of Time Series.
Differences: in (a) is used the noise from O2 and in (b) O3a; in (a) the signals have a window of 4 seconds and in (b) 1 second.

Dataset: 'noise' vs 'signal' - 10K

- 5126 TimeSeries of noise
- 5000 TimeSeries of signals:
 - 1 second window
 - Sample rate: 4096Hz
 - 999 different waveforms with $w_0 \geq 3.0$
 - Distance: [5, 20] kPc
 - Inclination = $\pi/2$

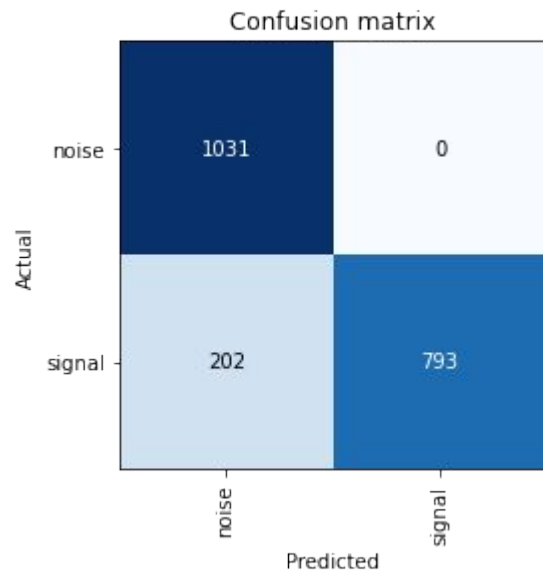
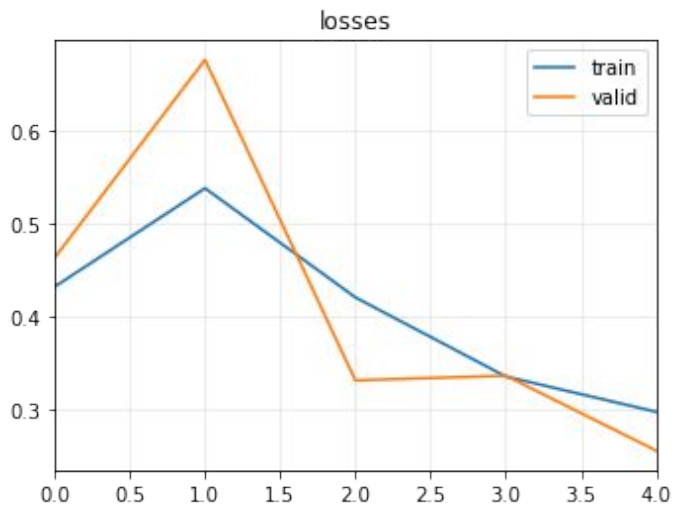


Classification with batch size=12

- Model: ResCNN(3,2)
- Weight decay: $1e-3$
- Maximum learning rate: 0.05
- Monitoring: valid loss

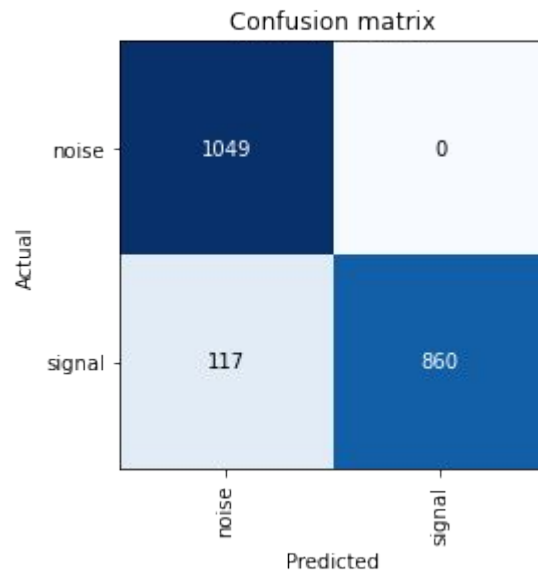
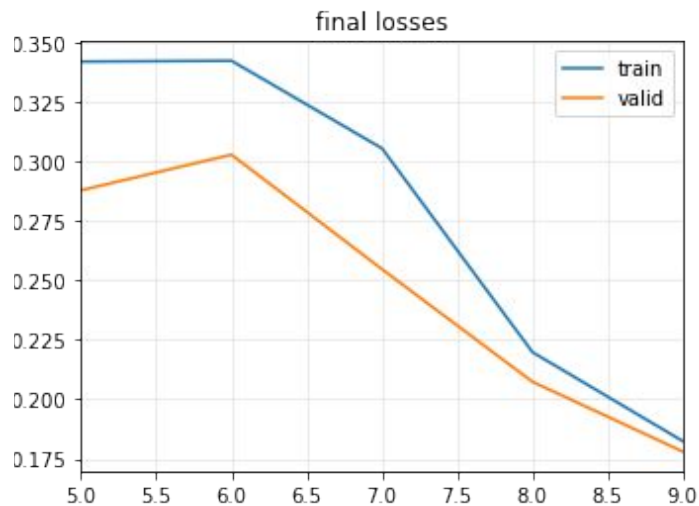
Classification with 5 epoch

- Best model found at epoch 4 with valid_loss value: 0.255.
- Accuracy: 0.9003



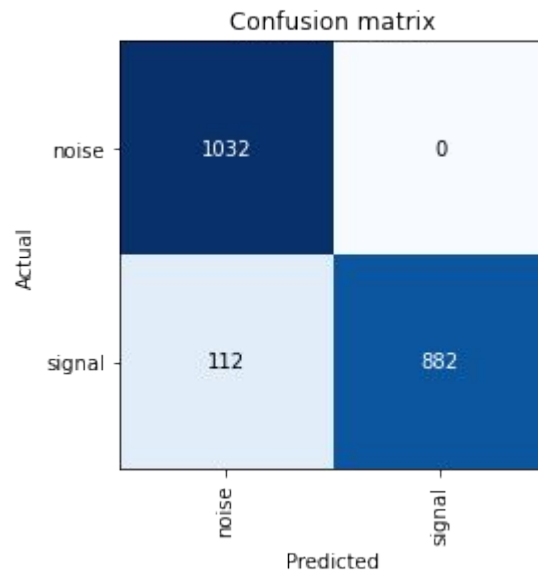
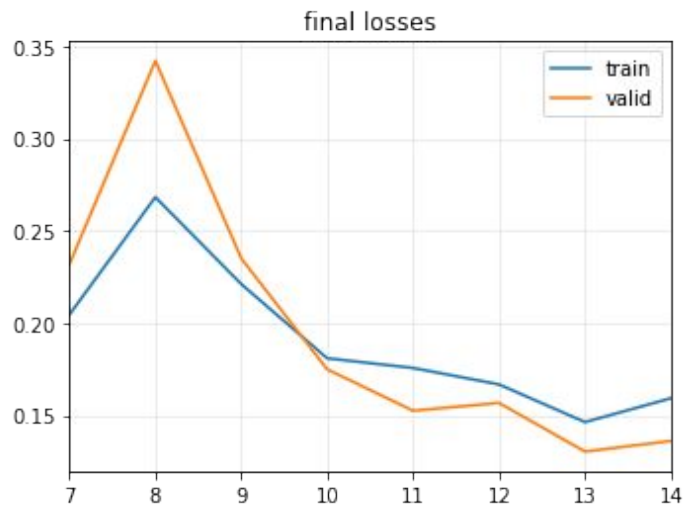
Classification with 10 epoch

- Best model found at epoch 9 with valid_loss value: 0.178.
- Accuracy: 0.9423



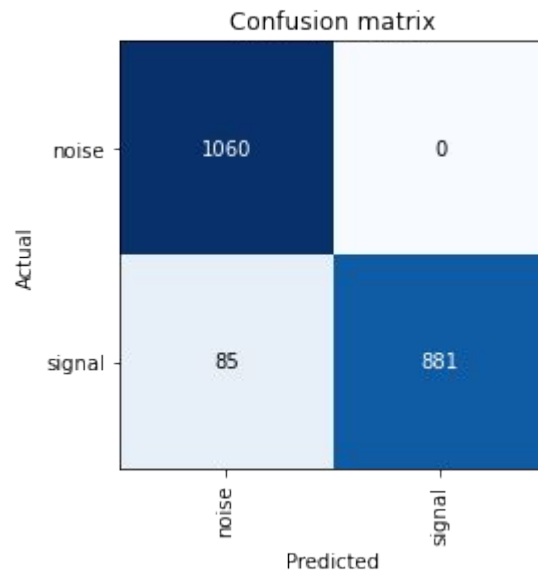
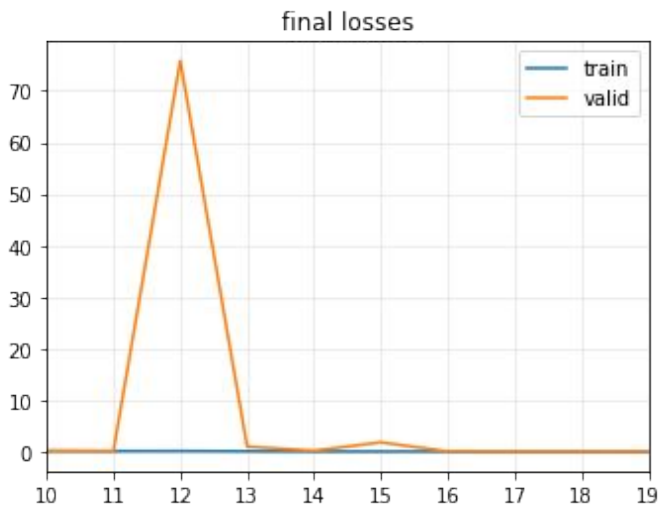
Classification with 15 epoch

- Best model found at epoch 14 with valid_loss value:0.174.
- Accuracy: 0.9447



Classification with 20 epoch

- Best model found at epoch 18 with valid_loss value: 0.147.
- Accuracy: 0.9580

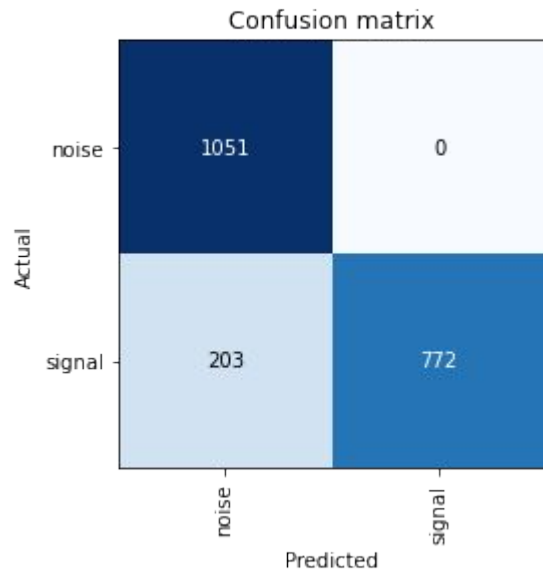
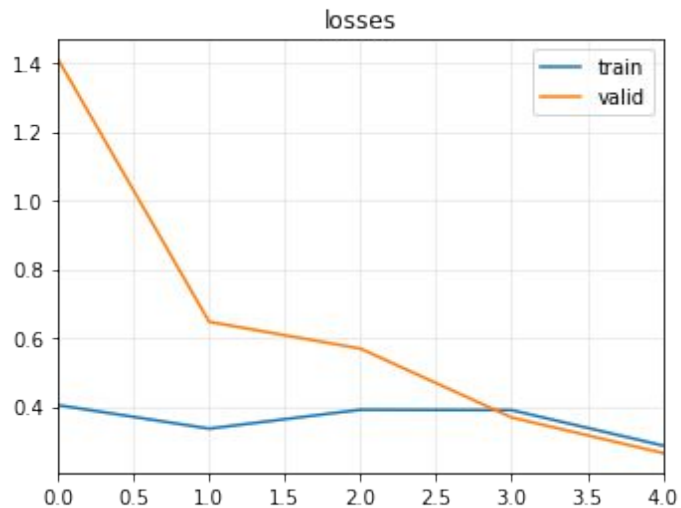


Classification with batch size=22

- Model: ResCNN(3,2)
- Weight decay: $1e-3$
- Maximum learning rate: 0.03
- Monitoring: valid loss

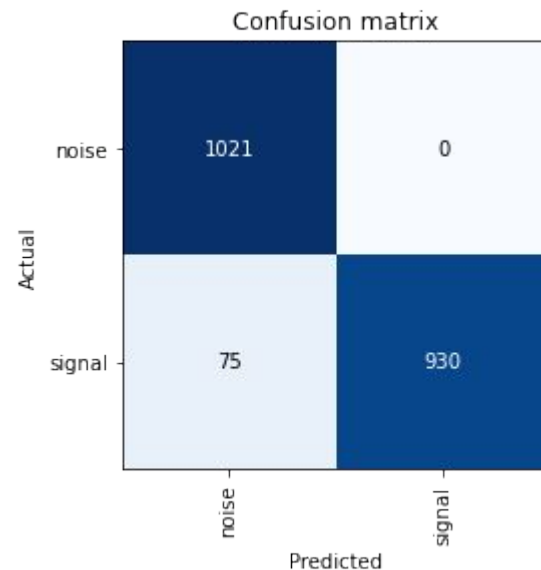
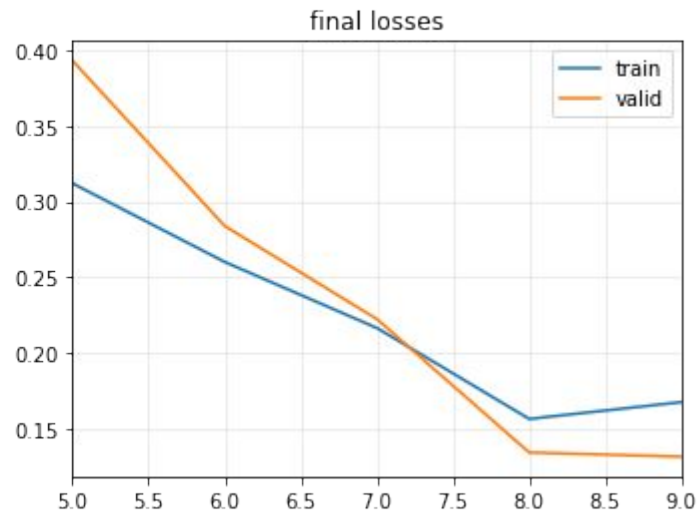
Classification with 5 epoch

- Best model found at epoch 4 with valid_loss value: 0.265.
- Accuracy: 0.8998



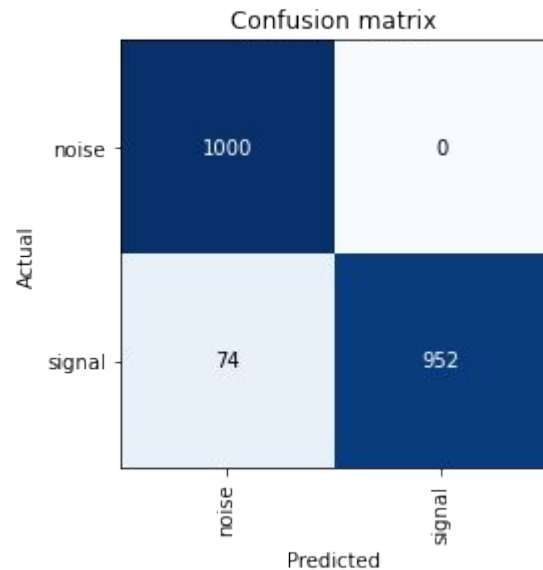
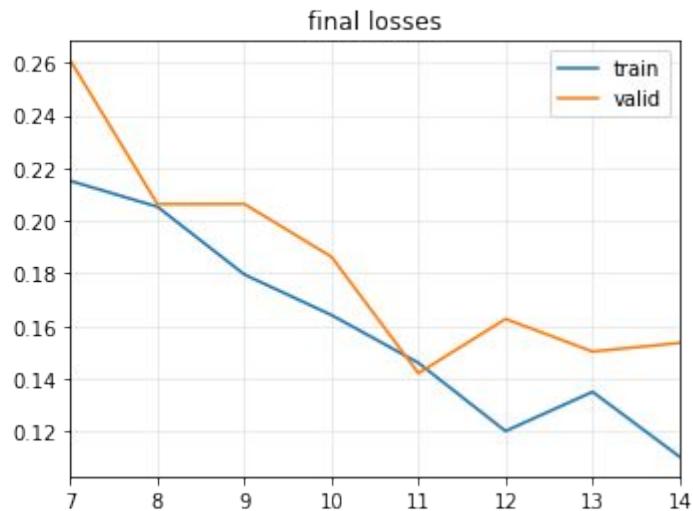
Classification with 10 epoch

- Best model found at epoch 9 with valid_loss value: 0.131.
- Accuracy: 0.9630
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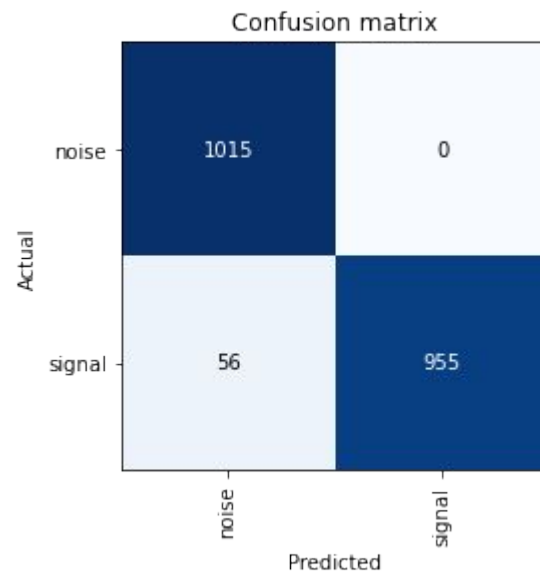
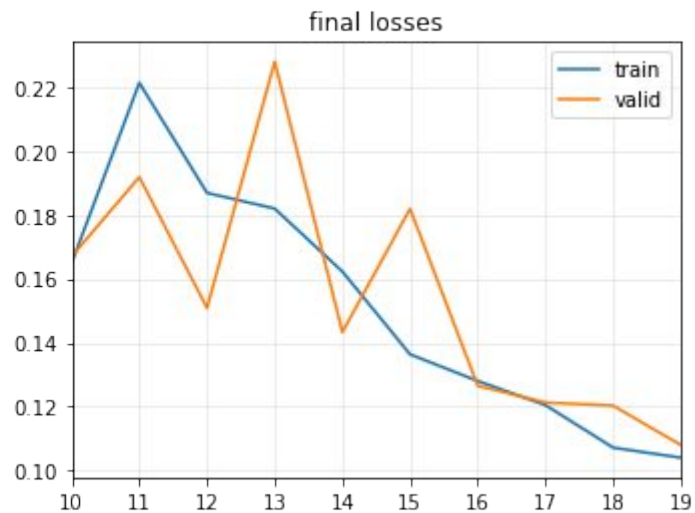
Classification with 15 epoch

- Best model found at epoch 13 with valid_loss value: 0.150.
- Accuracy: 0.9635



Classification with 20 epoch

- Best model found at epoch 19 with valid_loss value: 0.108.
- Accuracy: 0.9724



Next steps

- Bigger Dataset;
- Regression;