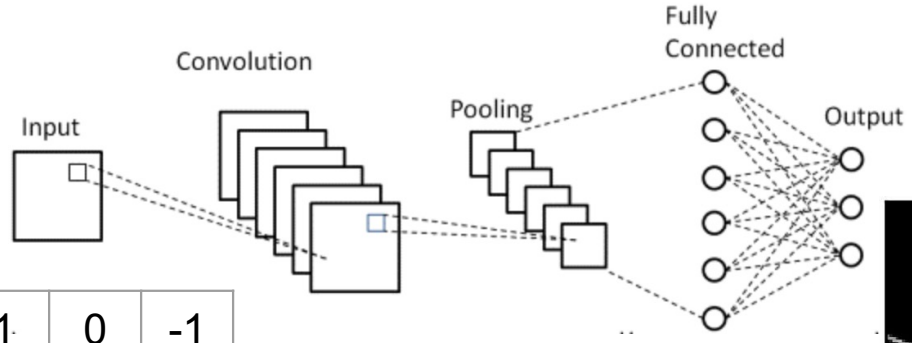
CNN model

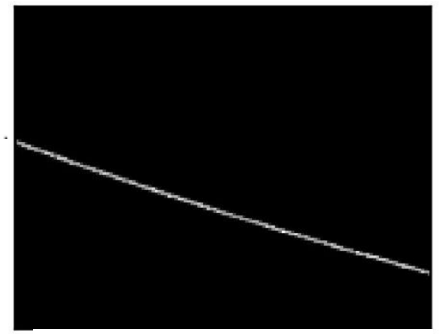


1	0	-1
2	0	-2
1	0	-1

filter f (entries trained)

$$\sum_{\vec{k}} f(\vec{k})\, s(\vec{n}-\vec{k}) = s'(\vec{n})$$

convolution



signal s

```
model = models.Sequential()

model.add(layers.Conv2D(32, (3, 3), activation='relu', input_shape=( 128, 128 , 1)))
model.add(layers.MaxPooling2D((2, 2)))
model.add(layers.Conv2D(64, (3, 3), activation='relu'))
model.add(layers.MaxPooling2D((2, 2)))
model.add(layers.Conv2D(64, (3, 3), activation='relu'))

model.add(layers.Flatten())
model.add(layers.Dense(64, activation='relu'))
model.add(layers.Dense(4, activation='softmax'))
```

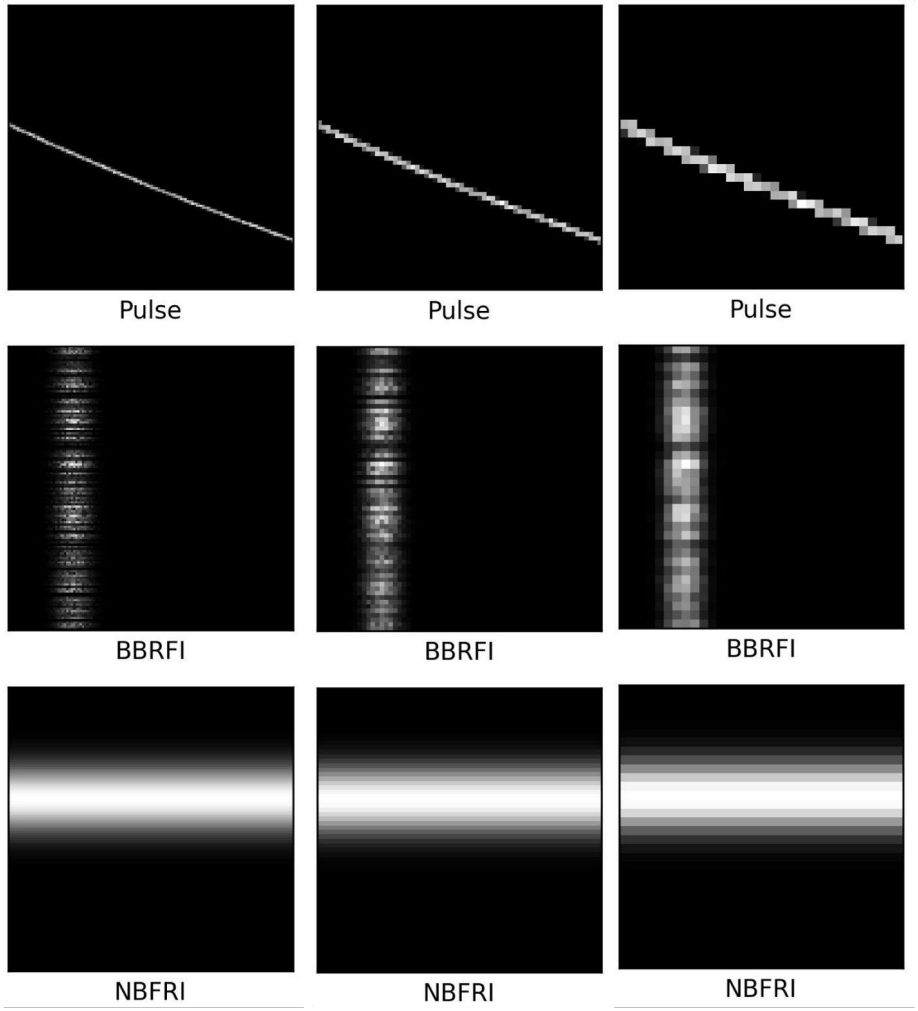
(64, 64)
(32, 32)

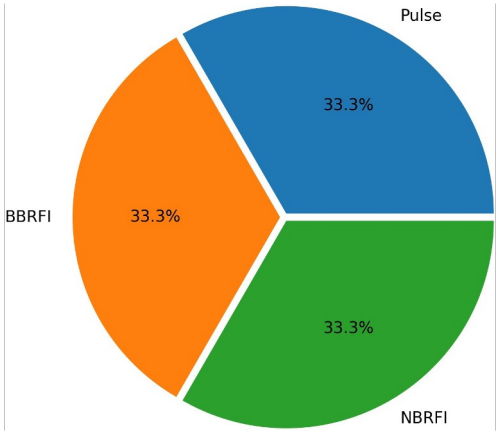
Param #
320
18496
36928
3211328
260

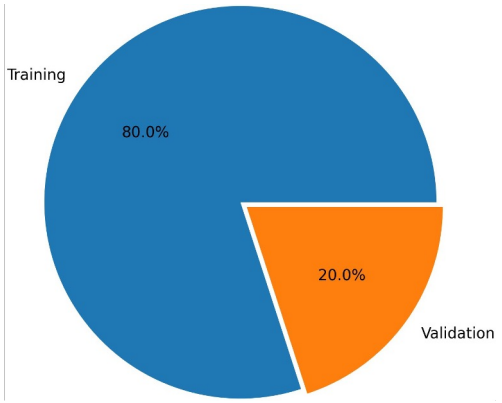
[TensorFlow snippet]

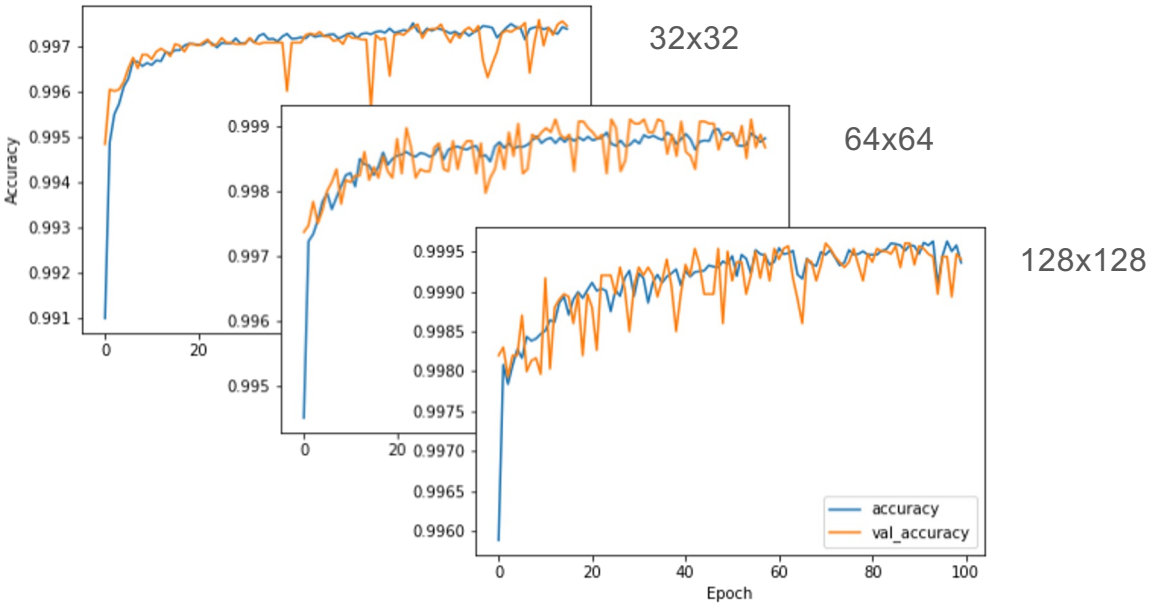
3 or 4 (# of final signal classes)

Synthetic data (without background noise)

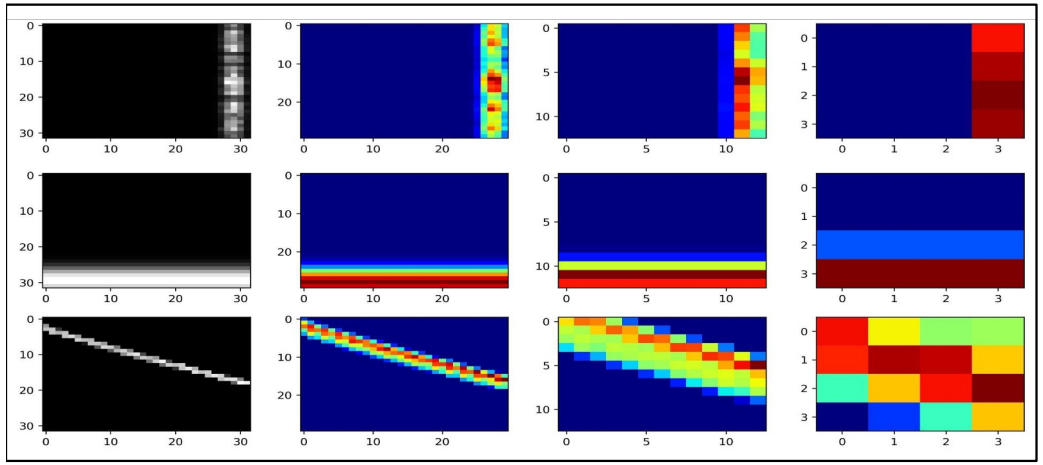




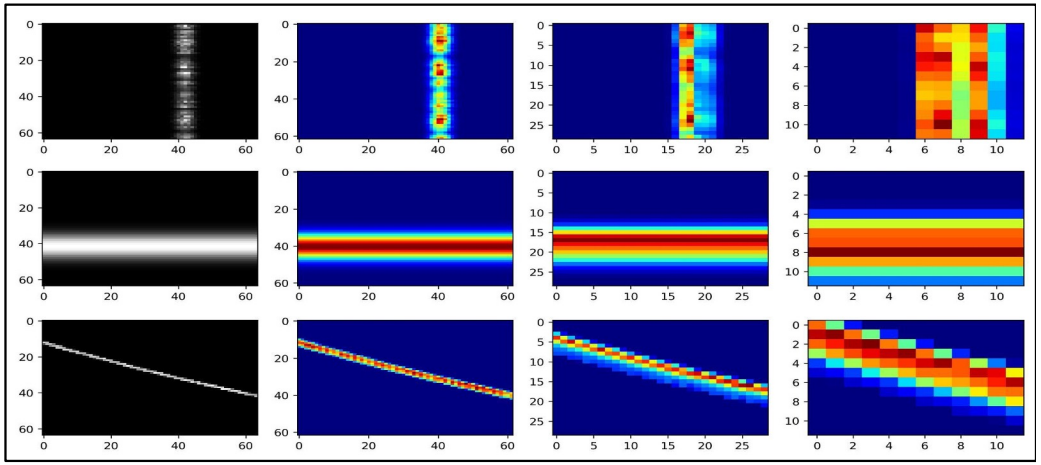




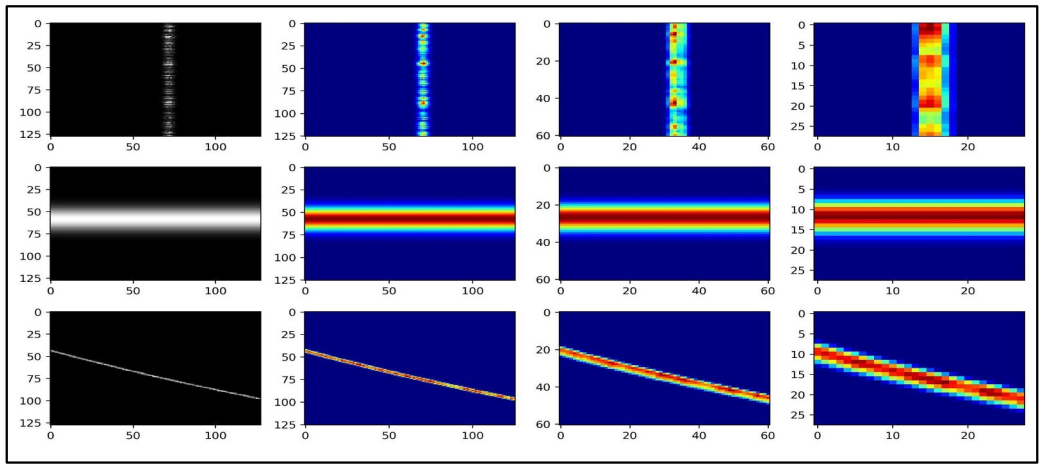
Heatmap analysis (mean weights per convolutional layer)



32x32

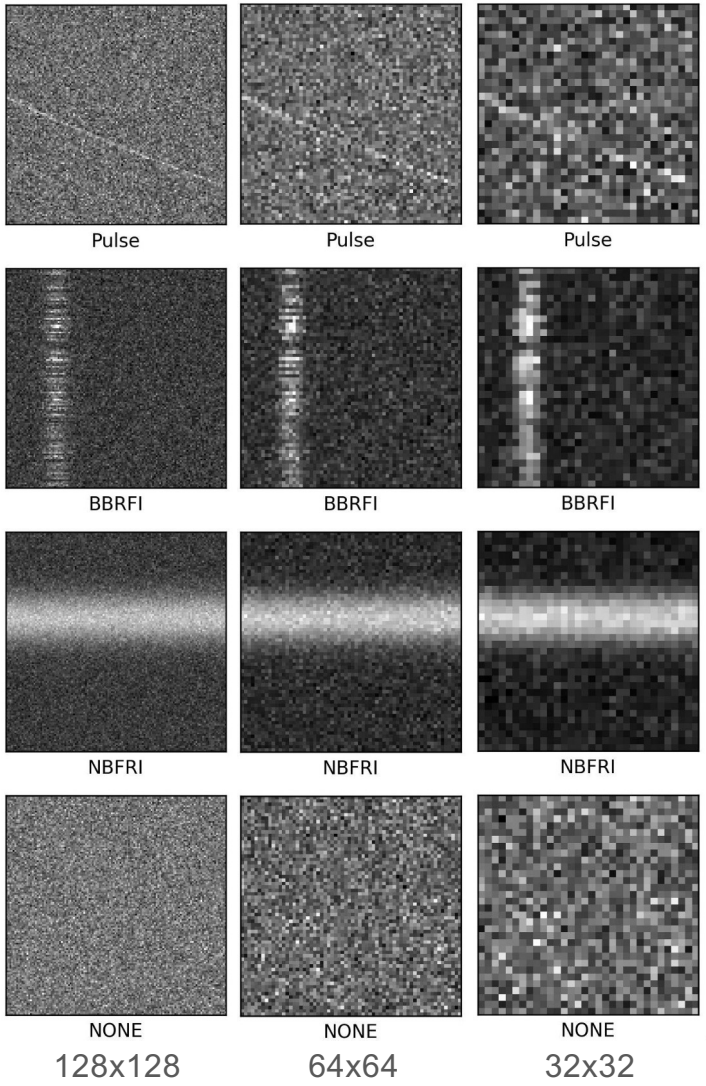


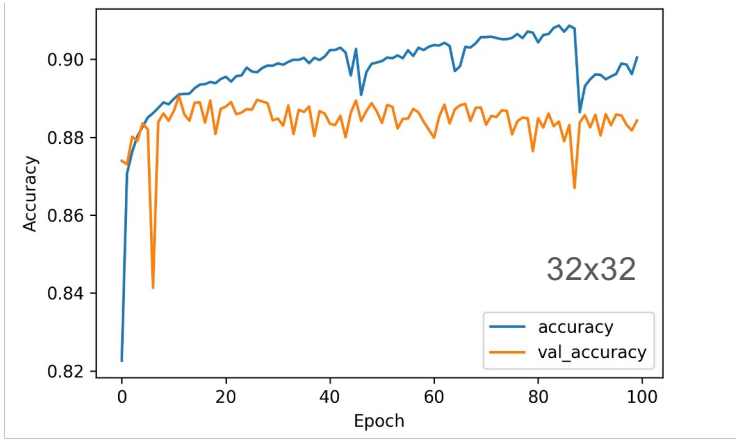
64x64

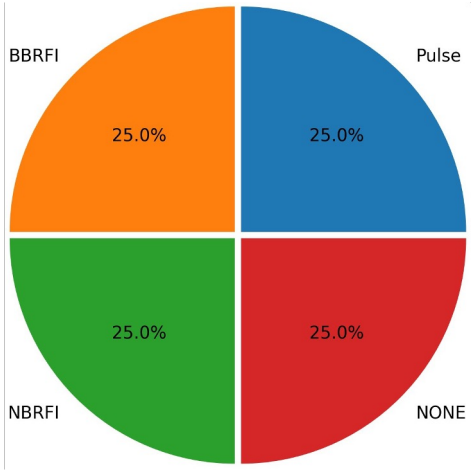


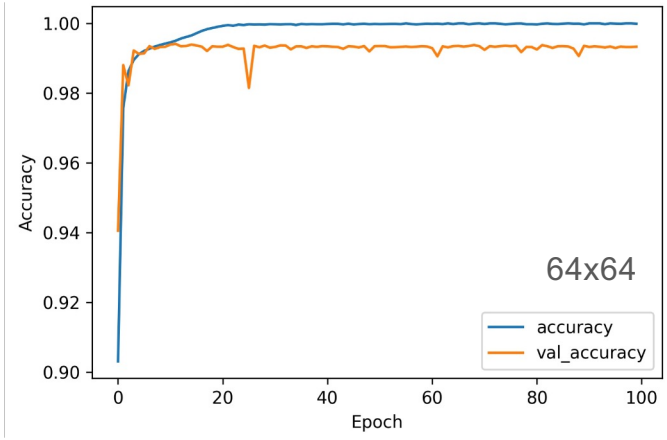
128x128

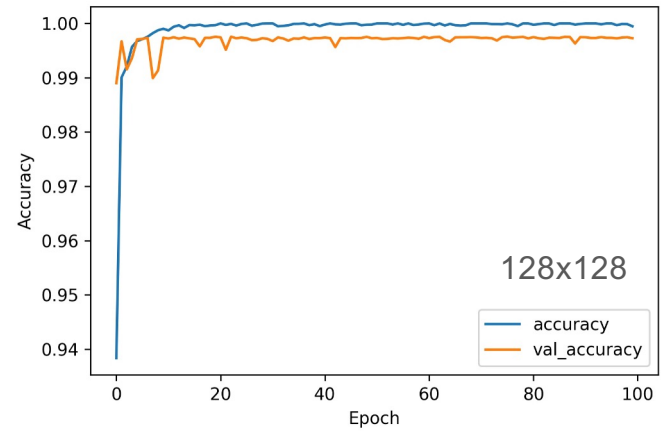
Synthetic data (with NONE signals and background noise)











Test with unseen set (additional validation set)

- Parameters of the uniform Gaussian background have been changed (not extremely).
- Duration of RFIs (for broadband RFI - in time-domain, for narrowband FRI - in frequency-domain) have been increased (+ 10 f.channels/timesamples).
- For NONE signals, the range of noise amplitude has been increased.

Resolution	**Accuracy**	**Val. accuracy**	**Ad. val. accuracy**
32x32	90.9%	88.4%	95.9%
64x64	100.0%	99.3%	98.6%
128x128	100.0%	99.8%	99.6%