Number of Model Parameters vs Training Time

The computer processor used for this project was an AMD Ryzen 7 4800HS. All scripts were executed using this processor.

For this training time comparison, the first CNN architecture (Table 1) has a total of 170,738 parameters. The second CNN architecture (Table 2) has a total of 708,034 parameters.

Table 1 First CNN architecture.

Layer Type	Kernels	Kernel Size	Kernel Stride Size	# of Neurons	Rate	Activation
2D Convolutional	8	5x5	-	-	-	ReLU
2D Max Pooling	-	5x5	2	-	-	-
Batch Normalization	-	-	-	-	-	-
2D Convolutional	32	5x5	-	-	-	ReLU
2D Max Pooling	-	5x5	2	-	-	-
Batch Normalization	-	-	-	-	-	-
Flatten	-	-	-	-	-	-
Dense	-	-	-	32	-	ReLU
Dropout	-	-	-	-	0.3	-
Dense (Output)	-	-	-	2	-	Softmax

Table 2 Second CNN architecture.

Layer Type	Kernels	Kernel Size	Kernel Stride Size	# of Neurons	Rate	Activation
2D Convolutional	32	5x5	-	-	-	ReLU
2D Max Pooling	-	5x5	2	-	-	-
Batch Normalization	-	-	-	-	-	-
2D Convolutional	64	5x5	-	-	-	ReLU
2D Max Pooling	-	5x5	2	-	-	-
Batch Normalization	-	-	-	-	-	-
Flatten	-	-	-	-	-	-
Dense	-	-	-	64	-	ReLU
Dropout	-	-	-	-	0.45	-
Dense (Output)	-	-	-	2	-	Softmax

The first CNN architecture (Table 1) took 17.28 minutes to train, whereas the second CNN architecture (Table 2) took double the time at 34.18 minutes. This demonstrates that architectures with more parameters take significantly longer to train.