Experiment Report: MNIST Digits Experiment

Metadata

- *Description*: In this experiment, a neural network is trained with different hyperparameters to classify MNIST digits.
- *Start Time*: 2024-10-08 11:54:30
- *Total Duration*: 0:00:17.585
- *Directory*: Link

Summary

Hyperparameters

	units1	units2	learning_rate	Chapters
Trial 2	256	128	0.0010	Chapter
Trial 1	128	64	0.0010	Chapter

Test Results

	accuracy	precision	recall	f1	Chapters
Trial 2	0.9871	0.9525	0.9197	0.9358	Chapter
Trial 1	0.9865	0.9506	0.9150	0.9325	Chapter

Trial 2

- *Start Time*: 2024-10-08 11:54:39
- *Duration*: 08.101
- *Directory*: Link

Hyperparameters:

Hyperparameter	Value
units1	256
units2	128
learning_rate	0.001

Evaluation Metrics:

	train	val	test
accuracy	0.9869	0.9858	0.9871
precision	0.9510	0.9486	0.9525
recall	0.9208	0.9130	0.9197
f1	0.9356	0.9305	0.9358

Figures:

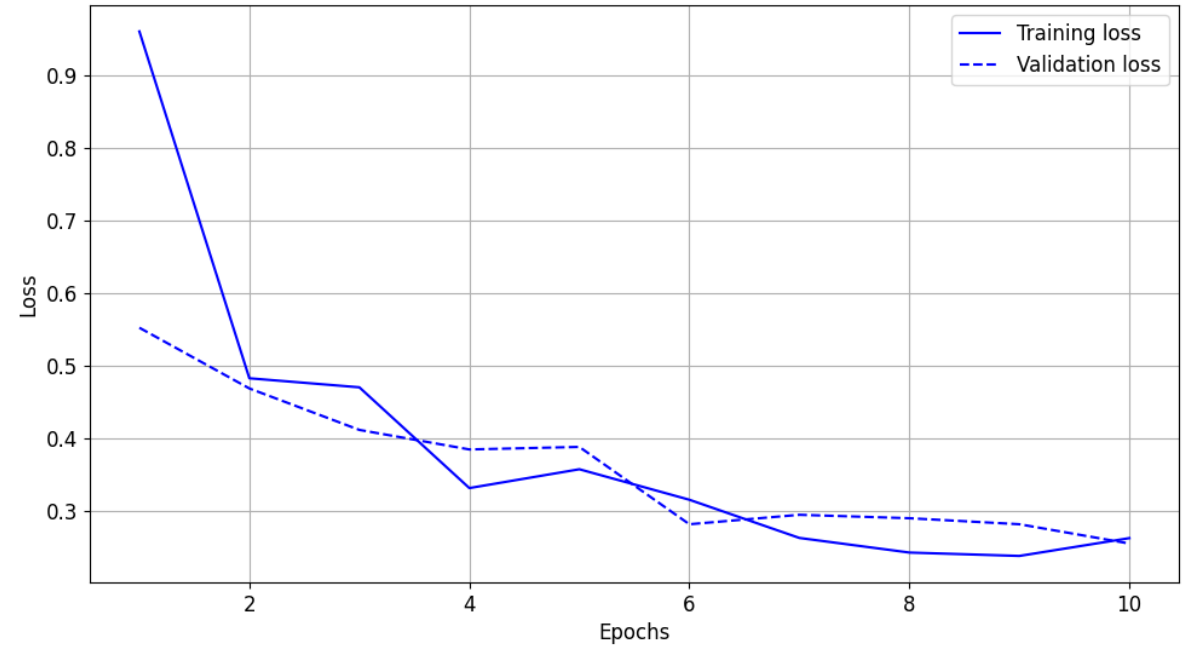
Model Summary

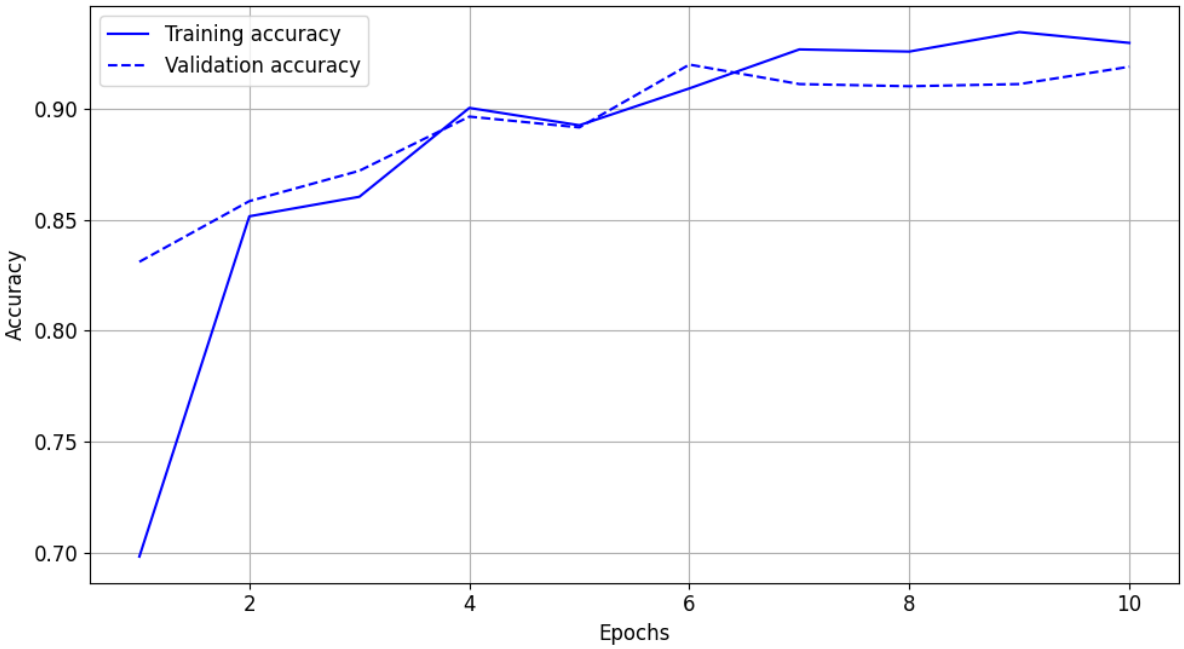
Model: "sequential_1"

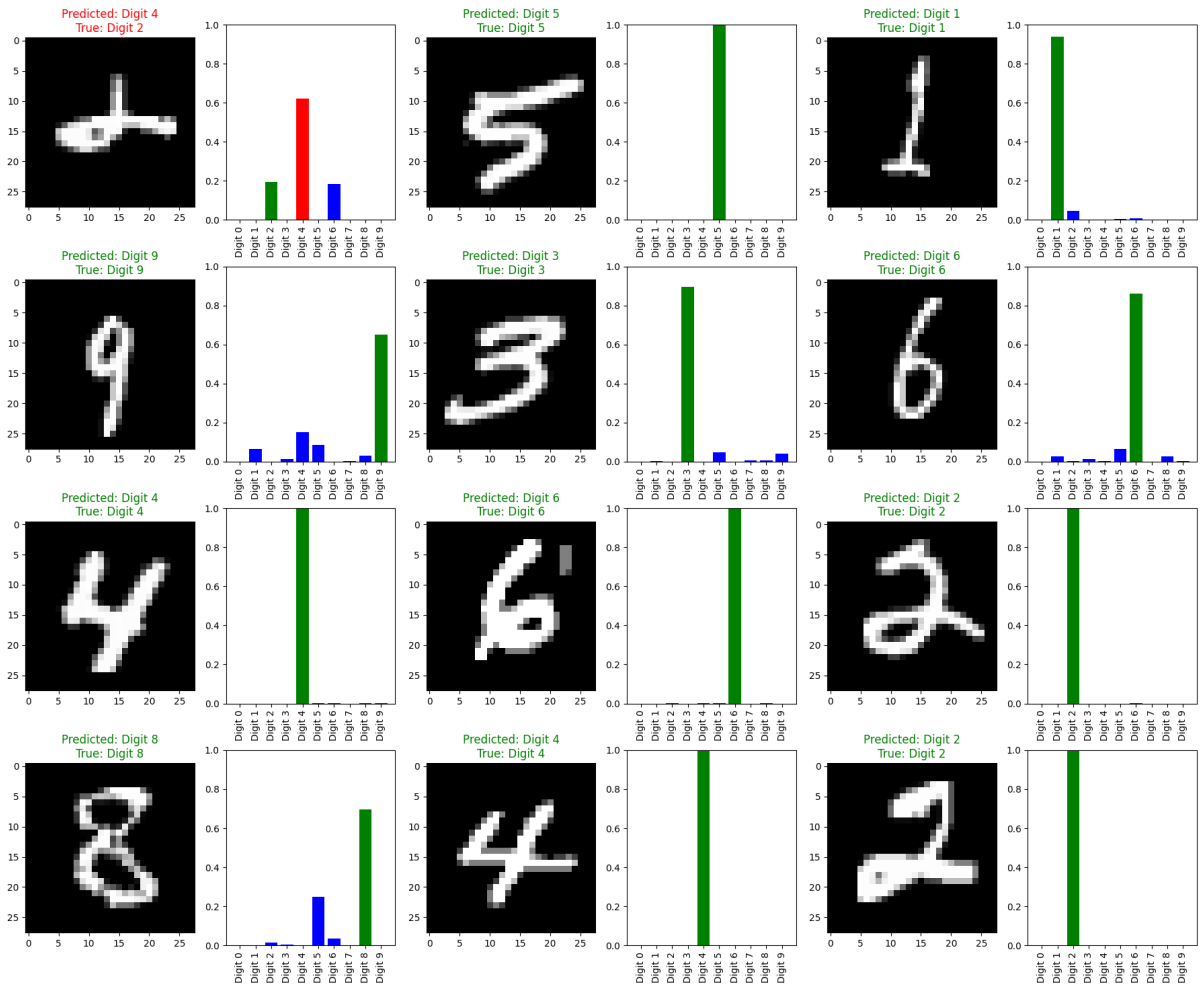
Layer (type)	Output Shape	Param #
flatten_1 (Flatten)	(None, 2352)	0
dense_3 (Dense)	(None, 256)	602368
dense_4 (Dense)	(None, 128)	32896
dense_5 (Dense)	(None, 10)	1290

Total params: 636554 (2.43 MB)
Trainable params: 636554 (2.43 MB)
Non-trainable params: 0 (0.00 Byte)

Training History







Detailed Report of Test Set:

	precision	recall	f1-score	support
Digit 0	0.9670	0.9726	0.9698	693
Digit 1	0.9588	0.9831	0.9708	829
Digit 2	0.9058	0.9479	0.9264	710
Digit 3	0.9475	0.8882	0.9169	671
Digit 4	0.9707	0.9211	0.9452	684
Digit 5	0.8436	0.9561	0.8963	660
Digit 6	0.9751	0.9501	0.9624	701

	precision	recall	f1-score	support
Digit 7	0.9615	0.9427	0.9520	715
Digit 8	0.9293	0.8944	0.9115	691
Digit 9	0.9014	0.8866	0.8939	670
micro avg	0.9355	0.9355	0.9355	7024
macro avg	0.9361	0.9343	0.9345	7024
weighted avg	0.9370	0.9355	0.9357	7024
samples avg	0.9355	0.9355	0.9355	7024

Trial 1

- *Start Time*: 2024-10-08 11:54:30
- *Duration*: 08.194
- *Directory*: Link

Hyperparameters:

Hyperparameter	Value
units1	128
units2	64
learning_rate	0.001

Evaluation Metrics:

	train	val	test
accuracy	0.9863	0.9843	0.9865
precision	0.9499	0.9456	0.9506
recall	0.9136	0.9074	0.9150
f1	0.9314	0.9261	0.9325

Figures:

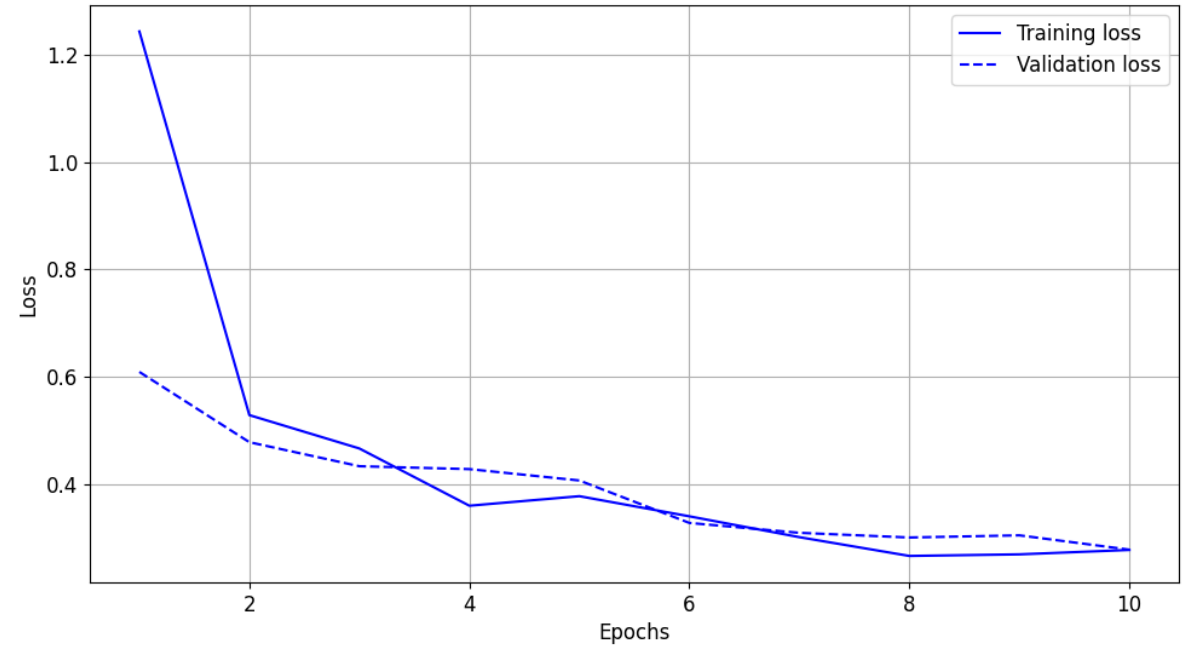
Model Summary

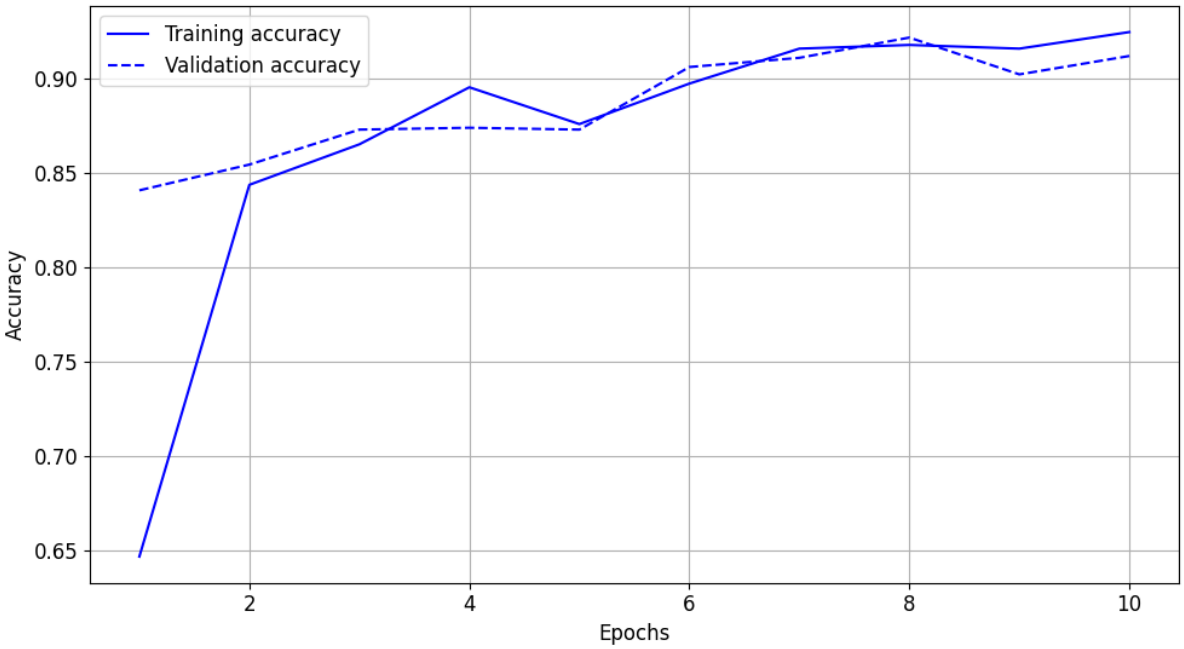
Model: "sequential"

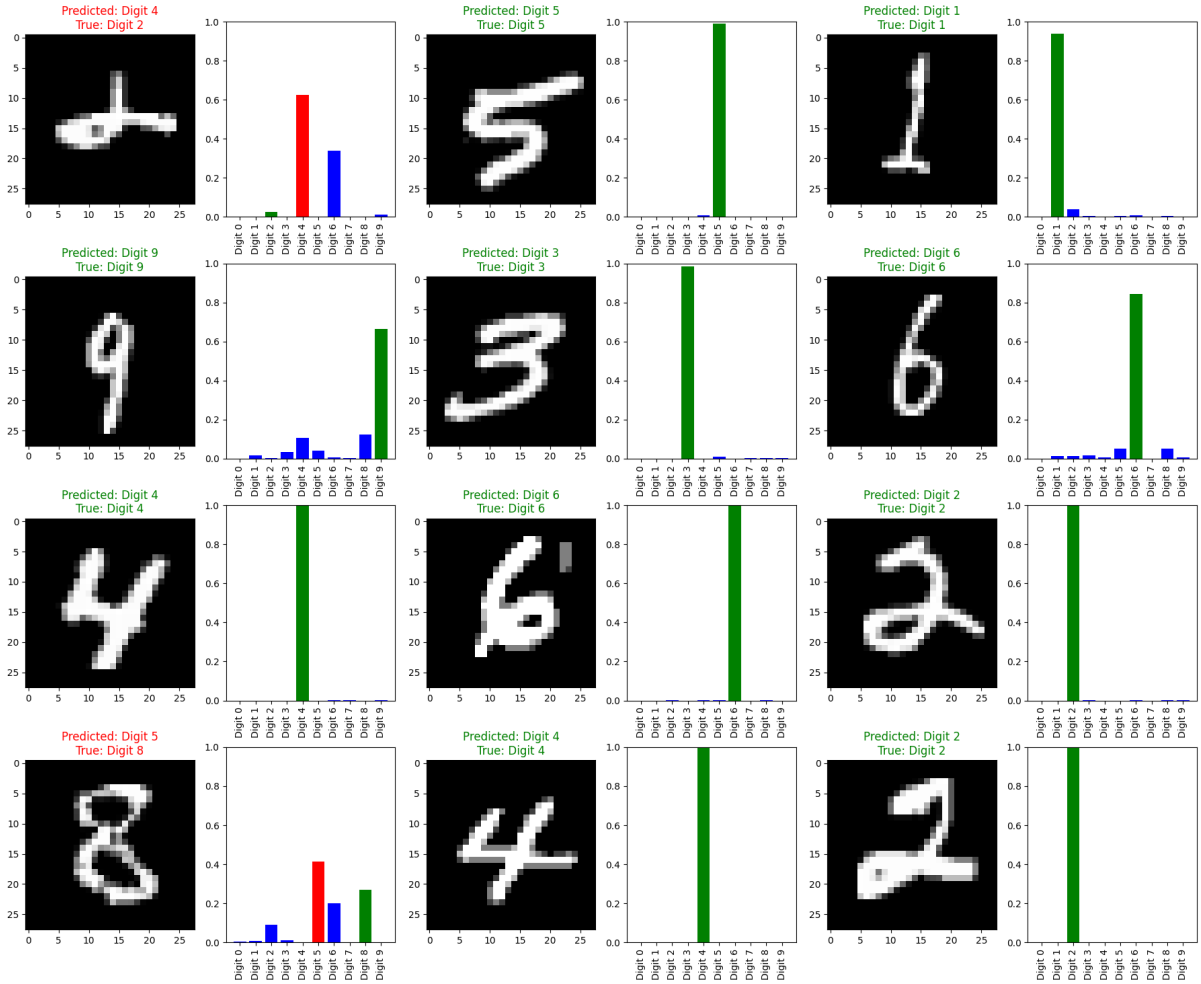
Layer (type)	Output Shape	Param #
flatten (Flatten)	(None, 2352)	0
dense (Dense)	(None, 128)	301184
dense_1 (Dense)	(None, 64)	8256
dense_2 (Dense)	(None, 10)	650

Total params: 310090 (1.18 MB)
Trainable params: 310090 (1.18 MB)
Non-trainable params: 0 (0.00 Byte)

Training History







Detailed Report of Test Set:

	precision	recall	f1-score	support
Digit 0	0.9710	0.9668	0.9689	693
Digit 1	0.9642	0.9747	0.9694	829
Digit 2	0.8980	0.9423	0.9196	710
Digit 3	0.8903	0.9195	0.9047	671
Digit 4	0.9496	0.9371	0.9433	684
Digit 5	0.9021	0.9212	0.9115	660
Digit 6	0.9782	0.9586	0.9683	701

	precision	recall	f1-score	support
Digit 7	0.9633	0.9175	0.9398	715
Digit 8	0.9127	0.8929	0.9027	691
Digit 9	0.8887	0.8821	0.8854	670
micro avg	0.9324	0.9324	0.9324	7024
macro avg	0.9318	0.9313	0.9314	7024
weighted avg	0.9329	0.9324	0.9325	7024
samples avg	0.9324	0.9324	0.9324	7024