**RELU-RELU**

Epoch 1/3

60000/60000 [==============================] - 4s 64us/sample - loss: 0.2644 - accuracy: 0.9244

Epoch 2/3

60000/60000 [==============================] - 4s 63us/sample - loss: 0.1093 - accuracy: 0.9662

Epoch 3/3

60000/60000 [==============================] - 4s 65us/sample - loss: 0.0730 - accuracy: 0.9776

**RELU-LeakyRELU**

Epoch 1/3

60000/60000 [==============================] - 4s 66us/sample - loss: 0.2701 - accuracy: 0.9197

Epoch 2/3

60000/60000 [==============================] - 4s 67us/sample - loss: 0.1098 - accuracy: 0.9650

Epoch 3/3

60000/60000 [==============================] - 4s 66us/sample - loss: 0.0740 - accuracy: 0.9768

**RELU-SIGMOID**

Epoch 1/3

60000/60000 [==============================] - 4s 67us/sample - loss: 0.3412 - accuracy: 0.9035

Epoch 2/3

60000/60000 [==============================] - 4s 67us/sample - loss: 0.1340 - accuracy: 0.9590

Epoch 3/3

60000/60000 [==============================] - 4s 67us/sample - loss: 0.0895 - accuracy: 0.9725

**RELU-SWISH**

Epoch 1/3

60000/60000 [==============================] - 4s 71us/sample - loss: 0.2687 - accuracy: 0.9211

Epoch 2/3

60000/60000 [==============================] - 4s 72us/sample - loss: 0.1088 - accuracy: 0.9662

Epoch 3/3

60000/60000 [==============================] - 4s 72us/sample - loss: 0.0743 - accuracy: 0.9763

**RELU-TANH**

Epoch 1/3

60000/60000 [==============================] - 4s 72us/sample - loss: 0.2437 - accuracy: 0.9277

Epoch 2/3

60000/60000 [==============================] - 4s 72us/sample - loss: 0.0985 - accuracy: 0.9693

Epoch 3/3

60000/60000 [==============================] - 4s 72us/sample - loss: 0.0669 - accuracy: 0.9785

**LeakyRELU-RELU**

Epoch 1/3

60000/60000 [==============================] - 4s 74us/sample - loss: 0.2769 - accuracy: 0.9180

Epoch 2/3

60000/60000 [==============================] - 4s 75us/sample - loss: 0.1215 - accuracy: 0.9626

Epoch 3/3

60000/60000 [==============================] - 5\s 75us/sample - loss: 0.0853 - accuracy: 0.9729

**LeakyRELU-LeakyRELU**

Epoch 1/3

60000/60000 [==============================] - 5s 78us/sample - loss: 0.2767 - accuracy: 0.9174

Epoch 2/3

60000/60000 [==============================] - 5s 79us/sample - loss: 0.1270 - accuracy: 0.9613

Epoch 3/3

60000/60000 [==============================] - 5s 79us/sample - loss: 0.0898 - accuracy: 0.9726

**LeakyRELU-SIGMOID**

Epoch 1/3

60000/60000 [==============================] - 5s 82us/sample - loss: 0.3680 - accuracy: 0.8977

Epoch 2/3

60000/60000 [==============================] - 5s 82us/sample - loss: 0.1646 - accuracy: 0.9502

Epoch 3/3

60000/60000 [==============================] - 5s 82us/sample - loss: 0.1144 - accuracy: 0.9654

**LeakyRELU-SWISH**

Epoch 1/3

60000/60000 [==============================] - 5s 86us/sample - loss: 0.2853 - accuracy: 0.9146

Epoch 2/3

60000/60000 [==============================] - 5s 86us/sample - loss: 0.1280 - accuracy: 0.9609

Epoch 3/3

**LeakyRELU-TANH**

Epoch 1/3

60000/60000 [==============================] - 5s 88us/sample - loss: 0.2729 - accuracy: 0.9197

Epoch 2/3

60000/60000 [==============================] - 5s 89us/sample - loss: 0.1219 - accuracy: 0.9631

Epoch 3/3

60000/60000 [==============================] - 5s 88us/sample - loss: 0.0854 - accuracy: 0.9734

**SIGMOID-RELU**

Epoch 1/3

60000/60000 [==============================] - 5s 90us/sample - loss: 0.4305 - accuracy: 0.8781

Epoch 2/3

60000/60000 [==============================] - 5s 90us/sample - loss: 0.2140 - accuracy: 0.9358

Epoch 3/3

60000/60000 [==============================] - 5s 90us/sample - loss: 0.1574 - accuracy: 0.9523

**SIGMOID-LeakyRELU**

Epoch 1/3

60000/60000 [==============================] - 6s 92us/sample - loss: 0.4182 - accuracy: 0.8804

Epoch 2/3

60000/60000 [==============================] - 6s 93us/sample - loss: 0.2147 - accuracy: 0.9357

Epoch 3/3

60000/60000 [==============================] - 6s 94us/sample - loss: 0.1572 - accuracy: 0.9525

**SIGMOID-SIGMOID**

Epoch 1/3

60000/60000 [==============================] - 6s 97us/sample - loss: 0.5274 - accuracy: 0.8560

Epoch 2/3

60000/60000 [==============================] - 6s 97us/sample - loss: 0.2225 - accuracy: 0.9337

Epoch 3/3

60000/60000 [==============================] - 6s 98us/sample - loss: 0.1632 - accuracy: 0.9514

**SIGMOID-SHISH**

Epoch 1/3

60000/60000 [==============================] - 6s 107us/sample - loss: 0.4226 - accuracy: 0.8772

Epoch 2/3

60000/60000 [==============================] - 6s 104us/sample - loss: 0.2297 - accuracy: 0.9314

Epoch 3/3

60000/60000 [==============================] - 6s 104us/sample - loss: 0.1686 - accuracy: 0.9494

**SIGMOID-TANH**

Epoch 1/3

60000/60000 [==============================] - 6s 106us/sample - loss: 0.4135 - accuracy: 0.8816

Epoch 2/3

60000/60000 [==============================] - 6s 107us/sample - loss: 0.2173 - accuracy: 0.9352

Epoch 3/3

60000/60000 [==============================] - 6s 106us/sample - loss: 0.1599 - accuracy: 0.9518

**SWISH-RELU**

Epoch 1/3

60000/60000 [==============================] - 7s 124us/sample - loss: 0.2794 - accuracy: 0.9183

Epoch 2/3

60000/60000 [==============================] - 7s 115us/sample - loss: 0.1203 - accuracy: 0.9626

Epoch 3/3

60000/60000 [==============================] - 7s 115us/sample - loss: 0.0810 - accuracy: 0.9746

**SWISH-LeakyRELU**

Epoch 1/3

60000/60000 [==============================] - 7s 121us/sample - loss: 0.2912 - accuracy: 0.9145

Epoch 2/3

60000/60000 [==============================] - 7s 121us/sample - loss: 0.1227 - accuracy: 0.9622

Epoch 3/3

60000/60000 [==============================] - 7s 120us/sample - loss: 0.0827 - accuracy: 0.9741

**SWISH-SIGMOID**

Epoch 1/3

60000/60000 [==============================] - 8s 128us/sample - loss: 0.3625 - accuracy: 0.8972

Epoch 2/3

60000/60000 [==============================] - 8s 127us/sample - loss: 0.1613 - accuracy: 0.9513

Epoch 3/3

60000/60000 [==============================] - 8s 126us/sample - loss: 0.1076 - accuracy: 0.9676

**SWISH-SHISH**

Epoch 1/3

60000/60000 [==============================] - 8s 140us/sample - loss: 0.2935 - accuracy: 0.9134

Epoch 2/3

60000/60000 [==============================] - 8s 140us/sample - loss: 0.1243 - accuracy: 0.9624

Epoch 3/3

60000/60000 [==============================] - 8s 141us/sample - loss: 0.0838 - accuracy: 0.9736

**SWISH-TANH**

Epoch 1/3

60000/60000 [==============================] - 9s 146us/sample - loss: 0.2938 - accuracy: 0.9139

Epoch 2/3

60000/60000 [==============================] - 9s 145us/sample - loss: 0.1259 - accuracy: 0.9607

Epoch 3/3

60000/60000 [==============================] - 9s 146us/sample - loss: 0.0841 - accuracy: 0.9733

**TANH-RELU**

60000 samples

Epoch 1/3

60000/60000 [==============================] - 9s 146us/sample - loss: 0.2728 - accuracy: 0.9210

Epoch 2/3

60000/60000 [==============================] - 9s 147us/sample - loss: 0.1257 - accuracy: 0.9606

Epoch 3/3

60000/60000 [==============================] - 9s 146us/sample - loss: 0.0893 - accuracy: 0.9716

**TANH-LeakyRELU**

Epoch 1/3

60000/60000 [==============================] - 9s 152us/sample - loss: 0.2982 - accuracy: 0.9119

Epoch 2/3

60000/60000 [==============================] - 9s 149us/sample - loss: 0.1476 - accuracy: 0.9545

Epoch 3/3

60000/60000 [==============================] - 9s 151us/sample - loss: 0.1041 - accuracy: 0.9677

**TANH-SIGMOID**

Epoch 1/3

60000/60000 [==============================] - 9s 158us/sample - loss: 0.3576 - accuracy: 0.9014

Epoch 2/3

60000/60000 [==============================] - 10s 174us/sample - loss: 0.1663 - accuracy: 0.9502

Epoch 3/3

60000/60000 [==============================] - 10s 162us/sample - loss: 0.1128 - accuracy: 0.9655

**TANH-SWISH**

Epoch 1/3

60000/60000 [==============================] - 12s 206us/sample - loss: 0.2850 - accuracy: 0.9156

Epoch 2/3

60000/60000 [==============================] - 10s 166us/sample - loss: 0.1305 - accuracy: 0.9588

Epoch 3/3

60000/60000 [==============================] - 10s 174us/sample - loss: 0.0914 - accuracy: 0.9711

**TANH-TANH**

Epoch 1/3

60000/60000 [==============================] - 10s 167us/sample - loss: 0.3117 - accuracy: 0.9101

Epoch 2/3

60000/60000 [==============================] - 10s 167us/sample - loss: 0.1629 - accuracy: 0.9512

Epoch 3/3

60000/60000 [==============================] - 10s 166us/sample - loss: 0.1132 - accuracy: 0.9654

**MNIST Dataset 3Katman Modelin İlk 2Katman İçin Bazı Aktivasyon Fonksiyonlarının Kombinasyonlarının Denenmesi**

**Ve Bu Kombinasyonların Performansı**

* Son katman aktivasyon fonksiyonu hepsinde: SOFTMAX.
* Optimizer: ADAM
* LOSS: sparse\_categorical\_crossentropy

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 2.L A.F  1.L AF | **RELU** | **L-RELU** | **SIGMOID** | **SWISS** | **TANH** |
| **RELU** | 0.9776 | 0.9768 | 0.9725 | 0.9763 | 0.9785 |
| **L-RELU** | 0.9729 | 0.9726 | 0.9654 | 0.9609 | 0.9734 |
| **SIGMOID** | 0.9523 | 0.9525 | 0.9514 | 0.9494 | 0.9518 |
| **SWISS** | 0.9746 | 0.9741 | 0.9676 | 0.9736 | 0.9733 |
| **TANH** | 0.9716 | 0.9677 | 0.9655 | 0.9711 | 0.9654 |