

Epoch 1/100  
1872/1872 ————— 10s 4ms/step - accuracy: 0.8026 - loss: 0.4327 -  
val\_accuracy: 0.8682 - val\_loss: 0.3213

Epoch 2/100  
1872/1872 ————— 9s 5ms/step - accuracy: 0.8674 - loss: 0.3222 -  
val\_accuracy: 0.8773 - val\_loss: 0.3078

Epoch 3/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.8818 - loss: 0.2988 -  
val\_accuracy: 0.8791 - val\_loss: 0.2968

Epoch 4/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.8874 - loss: 0.2855 -  
val\_accuracy: 0.8839 - val\_loss: 0.2906

Epoch 5/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.8883 - loss: 0.2791 -  
val\_accuracy: 0.8871 - val\_loss: 0.2829

Epoch 6/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.8929 - loss: 0.2706 -  
val\_accuracy: 0.8892 - val\_loss: 0.2789

Epoch 7/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.8961 - loss: 0.2631 -  
val\_accuracy: 0.8933 - val\_loss: 0.2709

Epoch 8/100  
1872/1872 ————— 13s 7ms/step - accuracy: 0.9001 - loss: 0.2571 -  
val\_accuracy: 0.8956 - val\_loss: 0.2664

Epoch 9/100  
1872/1872 ————— 9s 5ms/step - accuracy: 0.9006 - loss: 0.2543 -  
val\_accuracy: 0.8981 - val\_loss: 0.2610

Epoch 10/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9040 - loss: 0.2460 -  
val\_accuracy: 0.8992 - val\_loss: 0.2582

Epoch 11/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9061 - loss: 0.2399 -  
val\_accuracy: 0.8993 - val\_loss: 0.2560

Epoch 12/100  
1872/1872 ————— 9s 5ms/step - accuracy: 0.9079 - loss: 0.2375 -  
val\_accuracy: 0.9025 - val\_loss: 0.2524

Epoch 13/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9090 - loss: 0.2326 -  
val\_accuracy: 0.9074 - val\_loss: 0.2441

Epoch 14/100  
1872/1872 ————— 9s 5ms/step - accuracy: 0.9092 - loss: 0.2336 -  
val\_accuracy: 0.9051 - val\_loss: 0.2472

Epoch 15/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9139 - loss: 0.2249 -  
val\_accuracy: 0.9093 - val\_loss: 0.2432

Epoch 16/100

1872/1872 ————— 10s 6ms/step - accuracy: 0.9158 - loss: 0.2230 -  
val\_accuracy: 0.9117 - val\_loss: 0.2379  
Epoch 17/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9157 - loss: 0.2190 -  
val\_accuracy: 0.9111 - val\_loss: 0.2364  
Epoch 18/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9190 - loss: 0.2124 -  
val\_accuracy: 0.9095 - val\_loss: 0.2389  
Epoch 19/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9167 - loss: 0.2154 -  
val\_accuracy: 0.9141 - val\_loss: 0.2316  
Epoch 20/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9189 - loss: 0.2131 -  
val\_accuracy: 0.9110 - val\_loss: 0.2341  
Epoch 21/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9181 - loss: 0.2142 -  
val\_accuracy: 0.9121 - val\_loss: 0.2360  
Epoch 22/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9196 - loss: 0.2101 -  
val\_accuracy: 0.9139 - val\_loss: 0.2299  
Epoch 23/100  
1872/1872 ————— 9s 5ms/step - accuracy: 0.9208 - loss: 0.2076 -  
val\_accuracy: 0.9171 - val\_loss: 0.2264  
Epoch 24/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9259 - loss: 0.1993 -  
val\_accuracy: 0.9181 - val\_loss: 0.2273  
Epoch 25/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9246 - loss: 0.2033 -  
val\_accuracy: 0.9130 - val\_loss: 0.2329  
Epoch 26/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9262 - loss: 0.1992 -  
val\_accuracy: 0.9175 - val\_loss: 0.2259  
Epoch 27/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9268 - loss: 0.1948 -  
val\_accuracy: 0.9175 - val\_loss: 0.2255  
Epoch 28/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9274 - loss: 0.1955 -  
val\_accuracy: 0.9186 - val\_loss: 0.2251  
Epoch 29/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9260 - loss: 0.1994 -  
val\_accuracy: 0.9197 - val\_loss: 0.2229  
Epoch 30/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9294 - loss: 0.1900 -  
val\_accuracy: 0.9179 - val\_loss: 0.2240  
Epoch 31/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9285 - loss: 0.1924 -  
val\_accuracy: 0.9219 - val\_loss: 0.2221  
Epoch 32/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9278 - loss: 0.1912 -  
val\_accuracy: 0.9219 - val\_loss: 0.2216  
Epoch 33/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9288 - loss: 0.1904 -  
val\_accuracy: 0.9231 - val\_loss: 0.2188  
Epoch 34/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9306 - loss: 0.1871 -  
val\_accuracy: 0.9223 - val\_loss: 0.2171  
Epoch 35/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9311 - loss: 0.1848 -

val\_accuracy: 0.9207 - val\_loss: 0.2233

Epoch 36/100

1872/1872 ————— 7s 4ms/step - accuracy: 0.9320 - loss: 0.1819 -

val\_accuracy: 0.9253 - val\_loss: 0.2140

Epoch 37/100

1872/1872 ————— 7s 4ms/step - accuracy: 0.9295 - loss: 0.1848 -

val\_accuracy: 0.9244 - val\_loss: 0.2122

Epoch 38/100

1872/1872 ————— 9s 5ms/step - accuracy: 0.9324 - loss: 0.1812 -

val\_accuracy: 0.9216 - val\_loss: 0.2167

Epoch 39/100

1872/1872 ————— 7s 4ms/step - accuracy: 0.9330 - loss: 0.1822 -

val\_accuracy: 0.9247 - val\_loss: 0.2084

Epoch 40/100

1872/1872 ————— 8s 4ms/step - accuracy: 0.9326 - loss: 0.1793 -

val\_accuracy: 0.9259 - val\_loss: 0.2128

Epoch 41/100

1872/1872 ————— 10s 5ms/step - accuracy: 0.9327 - loss: 0.1813 -

val\_accuracy: 0.9275 - val\_loss: 0.2088

Epoch 42/100

1872/1872 ————— 9s 5ms/step - accuracy: 0.9345 - loss: 0.1763 -

val\_accuracy: 0.9241 - val\_loss: 0.2111

Epoch 43/100

1872/1872 ————— 8s 4ms/step - accuracy: 0.9330 - loss: 0.1775 -

val\_accuracy: 0.9230 - val\_loss: 0.2156

Epoch 44/100

1872/1872 ————— 10s 5ms/step - accuracy: 0.9348 - loss: 0.1754 -

val\_accuracy: 0.9278 - val\_loss: 0.2060

Epoch 45/100

1872/1872 ————— 9s 5ms/step - accuracy: 0.9368 - loss: 0.1727 -

val\_accuracy: 0.9307 - val\_loss: 0.2034

Epoch 46/100

1872/1872 ————— 8s 4ms/step - accuracy: 0.9345 - loss: 0.1729 -

val\_accuracy: 0.9273 - val\_loss: 0.2091

Epoch 47/100

1872/1872 ————— 7s 4ms/step - accuracy: 0.9356 - loss: 0.1733 -

val\_accuracy: 0.9269 - val\_loss: 0.2103

Epoch 48/100

1872/1872 ————— 10s 5ms/step - accuracy: 0.9357 - loss: 0.1742 -

val\_accuracy: 0.9288 - val\_loss: 0.2054

Epoch 49/100

1872/1872 ————— 9s 5ms/step - accuracy: 0.9382 - loss: 0.1695 -

val\_accuracy: 0.9290 - val\_loss: 0.2058

Epoch 50/100

1872/1872 ————— 7s 4ms/step - accuracy: 0.9400 - loss: 0.1652 -

val\_accuracy: 0.9249 - val\_loss: 0.2126

Epoch 51/100

1872/1872 ————— 9s 5ms/step - accuracy: 0.9393 - loss: 0.1686 -

val\_accuracy: 0.9275 - val\_loss: 0.2116

Epoch 52/100

1872/1872 ————— 8s 4ms/step - accuracy: 0.9372 - loss: 0.1696 -

val\_accuracy: 0.9298 - val\_loss: 0.2051

Epoch 53/100

1872/1872 ————— 7s 4ms/step - accuracy: 0.9409 - loss: 0.1630 -

val\_accuracy: 0.9258 - val\_loss: 0.2134

Epoch 54/100

1872/1872 ————— 7s 4ms/step - accuracy: 0.9392 - loss: 0.1673 -

val\_accuracy: 0.9305 - val\_loss: 0.2057

Epoch 55/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9404 - loss: 0.1616 -  
val\_accuracy: 0.9318 - val\_loss: 0.2005

Epoch 56/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9422 - loss: 0.1603 -  
val\_accuracy: 0.9277 - val\_loss: 0.2045

Epoch 57/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9401 - loss: 0.1640 -  
val\_accuracy: 0.9305 - val\_loss: 0.2032

Epoch 58/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9383 - loss: 0.1658 -  
val\_accuracy: 0.9317 - val\_loss: 0.2019

Epoch 59/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9405 - loss: 0.1618 -  
val\_accuracy: 0.9317 - val\_loss: 0.2034

Epoch 60/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9434 - loss: 0.1561 -  
val\_accuracy: 0.9331 - val\_loss: 0.2018

Epoch 61/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9411 - loss: 0.1614 -  
val\_accuracy: 0.9335 - val\_loss: 0.2015

Epoch 62/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9425 - loss: 0.1574 -  
val\_accuracy: 0.9313 - val\_loss: 0.2003

Epoch 63/100  
1872/1872 ————— 7s 4ms/step - accuracy: 0.9425 - loss: 0.1578 -  
val\_accuracy: 0.9311 - val\_loss: 0.1996

Epoch 64/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9428 - loss: 0.1587 -  
val\_accuracy: 0.9327 - val\_loss: 0.2031

Epoch 65/100  
1872/1872 ————— 12s 6ms/step - accuracy: 0.9406 - loss: 0.1580 -  
val\_accuracy: 0.9322 - val\_loss: 0.2014

Epoch 66/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9425 - loss: 0.1604 -  
val\_accuracy: 0.9321 - val\_loss: 0.2011

Epoch 67/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9432 - loss: 0.1570 -  
val\_accuracy: 0.9319 - val\_loss: 0.2047

Epoch 68/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9443 - loss: 0.1553 -  
val\_accuracy: 0.9336 - val\_loss: 0.1979

Epoch 69/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9427 - loss: 0.1579 -  
val\_accuracy: 0.9333 - val\_loss: 0.2064

Epoch 70/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9426 - loss: 0.1579 -  
val\_accuracy: 0.9333 - val\_loss: 0.1977

Epoch 71/100  
1872/1872 ————— 9s 5ms/step - accuracy: 0.9440 - loss: 0.1551 -  
val\_accuracy: 0.9311 - val\_loss: 0.2083

Epoch 72/100  
1872/1872 ————— 12s 6ms/step - accuracy: 0.9431 - loss: 0.1537 -  
val\_accuracy: 0.9357 - val\_loss: 0.1957

Epoch 73/100  
1872/1872 ————— 9s 5ms/step - accuracy: 0.9441 - loss: 0.1545 -  
val\_accuracy: 0.9337 - val\_loss: 0.1963

Epoch 74/100

1872/1872 ————— 9s 5ms/step - accuracy: 0.9469 - loss: 0.1482 -  
val\_accuracy: 0.9335 - val\_loss: 0.1949  
Epoch 75/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9436 - loss: 0.1527 -  
val\_accuracy: 0.9331 - val\_loss: 0.1986  
Epoch 76/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9465 - loss: 0.1476 -  
val\_accuracy: 0.9330 - val\_loss: 0.1991  
Epoch 77/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9448 - loss: 0.1510 -  
val\_accuracy: 0.9325 - val\_loss: 0.2024  
Epoch 78/100  
1872/1872 ————— 12s 6ms/step - accuracy: 0.9446 - loss: 0.1530 -  
val\_accuracy: 0.9347 - val\_loss: 0.1973  
Epoch 79/100  
1872/1872 ————— 12s 6ms/step - accuracy: 0.9450 - loss: 0.1541 -  
val\_accuracy: 0.9357 - val\_loss: 0.1917  
Epoch 80/100  
1872/1872 ————— 12s 6ms/step - accuracy: 0.9439 - loss: 0.1536 -  
val\_accuracy: 0.9336 - val\_loss: 0.2040  
Epoch 81/100  
1872/1872 ————— 13s 7ms/step - accuracy: 0.9448 - loss: 0.1509 -  
val\_accuracy: 0.9335 - val\_loss: 0.1966  
Epoch 82/100  
1872/1872 ————— 13s 7ms/step - accuracy: 0.9453 - loss: 0.1481 -  
val\_accuracy: 0.9378 - val\_loss: 0.1887  
Epoch 83/100  
1872/1872 ————— 13s 7ms/step - accuracy: 0.9470 - loss: 0.1474 -  
val\_accuracy: 0.9350 - val\_loss: 0.1968  
Epoch 84/100  
1872/1872 ————— 12s 6ms/step - accuracy: 0.9467 - loss: 0.1474 -  
val\_accuracy: 0.9357 - val\_loss: 0.2025  
Epoch 85/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9484 - loss: 0.1462 -  
val\_accuracy: 0.9365 - val\_loss: 0.1932  
Epoch 86/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9464 - loss: 0.1466 -  
val\_accuracy: 0.9343 - val\_loss: 0.1958  
Epoch 87/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9471 - loss: 0.1450 -  
val\_accuracy: 0.9364 - val\_loss: 0.1945  
Epoch 88/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9457 - loss: 0.1467 -  
val\_accuracy: 0.9377 - val\_loss: 0.1947  
Epoch 89/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9486 - loss: 0.1439 -  
val\_accuracy: 0.9366 - val\_loss: 0.1957  
Epoch 90/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9468 - loss: 0.1456 -  
val\_accuracy: 0.9363 - val\_loss: 0.2079  
Epoch 91/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9462 - loss: 0.1460 -  
val\_accuracy: 0.9354 - val\_loss: 0.2022  
Epoch 92/100  
1872/1872 ————— 9s 5ms/step - accuracy: 0.9491 - loss: 0.1426 -  
val\_accuracy: 0.9366 - val\_loss: 0.1938  
Epoch 93/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9478 - loss: 0.1431 -

val\_accuracy: 0.9344 - val\_loss: 0.2023  
Epoch 94/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9473 - loss: 0.1429 -  
val\_accuracy: 0.9360 - val\_loss: 0.1944  
Epoch 95/100  
1872/1872 ————— 10s 5ms/step - accuracy: 0.9480 - loss: 0.1422 -  
val\_accuracy: 0.9382 - val\_loss: 0.1960  
Epoch 96/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9486 - loss: 0.1437 -  
val\_accuracy: 0.9376 - val\_loss: 0.1920  
Epoch 97/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9491 - loss: 0.1399 -  
val\_accuracy: 0.9399 - val\_loss: 0.1882  
Epoch 98/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9481 - loss: 0.1431 -  
val\_accuracy: 0.9384 - val\_loss: 0.1959  
Epoch 99/100  
1872/1872 ————— 8s 4ms/step - accuracy: 0.9482 - loss: 0.1426 -  
val\_accuracy: 0.9388 - val\_loss: 0.1898  
Epoch 100/100  
1872/1872 ————— 11s 6ms/step - accuracy: 0.9502 - loss: 0.1370 -  
val\_accuracy: 0.9379 - val\_loss: 0.1878  
624/624 ————— 2s 3ms/step - accuracy: 0.9374 - loss: 0.1866  
The Value of the Loss Function 0.1878451555967331  
The Value of the Accuracy Function 0.9379289746284485  
624/624 ————— 2s 3ms/step  
[[ True]  
 [ True]  
 [ True]  
...  
 [ True]  
 [False]  
 [ True]]  
Accuracy: 93.79  
Precision: 90.35  
Recall: 98.19  
F1 Score: 94.11

Process finished with exit code 0