Rows in medications: 9566

Rows in observations: 12352

Rows in patients: 12352

Rows in allergies: 1528

Rows in conditions: 12165

Rows in immunizations: 10376

Rows in final merged dataset: 12352

A comparison of blue and white bars

Description automatically generated

Epoch 1/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **51s** 63ms/step - accuracy: 0.7028 - loss: 4.6589 - val\_accuracy: 0.7373 - val\_loss: 1.9908

Epoch 2/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 59ms/step - accuracy: 0.8012 - loss: 2.1211 - val\_accuracy: 0.8253 - val\_loss: 1.8569

Epoch 3/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 59ms/step - accuracy: 0.8240 - loss: 1.9300 - val\_accuracy: 0.8438 - val\_loss: 2.0839

Epoch 4/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 59ms/step - accuracy: 0.8362 - loss: 2.1205 - val\_accuracy: 0.9174 - val\_loss: 1.9516

Epoch 5/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 60ms/step - accuracy: 0.8575 - loss: 1.9272 - val\_accuracy: 0.9271 - val\_loss: 1.5639

Epoch 6/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 59ms/step - accuracy: 0.8601 - loss: 1.7718 - val\_accuracy: 0.8613 - val\_loss: 1.7273

Epoch 7/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **46s** 63ms/step - accuracy: 0.8627 - loss: 1.6573 - val\_accuracy: 0.9336 - val\_loss: 1.5632

Epoch 8/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **45s** 61ms/step - accuracy: 0.8698 - loss: 1.5462 - val\_accuracy: 0.9120 - val\_loss: 1.4532

Epoch 9/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 60ms/step - accuracy: 0.8836 - loss: 1.4168 - val\_accuracy: 0.9381 - val\_loss: 1.2465

Epoch 10/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 59ms/step - accuracy: 0.8715 - loss: 1.4147 - val\_accuracy: 0.9234 - val\_loss: 1.2951

Epoch 11/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **43s** 58ms/step - accuracy: 0.8754 - loss: 1.3658 - val\_accuracy: 0.9381 - val\_loss: 1.2445

Epoch 12/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **43s** 58ms/step - accuracy: 0.8791 - loss: 1.3110 - val\_accuracy: 0.9449 - val\_loss: 1.1030

Epoch 13/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 59ms/step - accuracy: 0.8812 - loss: 1.2665 - val\_accuracy: 0.9361 - val\_loss: 1.1073

Epoch 14/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **43s** 58ms/step - accuracy: 0.8797 - loss: 1.2540 - val\_accuracy: 0.9443 - val\_loss: 1.0732

Epoch 15/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **43s** 59ms/step - accuracy: 0.8793 - loss: 1.1632 - val\_accuracy: 0.9507 - val\_loss: 1.0071

Epoch 16/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **43s** 58ms/step - accuracy: 0.8776 - loss: 1.1984 - val\_accuracy: 0.9453 - val\_loss: 1.0667

Epoch 17/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **43s** 58ms/step - accuracy: 0.8851 - loss: 1.2106 - val\_accuracy: 0.9427 - val\_loss: 0.9913

Epoch 18/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 60ms/step - accuracy: 0.8827 - loss: 1.1291 - val\_accuracy: 0.9443 - val\_loss: 1.0127

Epoch 19/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **45s** 62ms/step - accuracy: 0.8819 - loss: 1.1000 - val\_accuracy: 0.9478 - val\_loss: 1.0987

Epoch 20/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **46s** 62ms/step - accuracy: 0.8840 - loss: 1.1118 - val\_accuracy: 0.9225 - val\_loss: 1.0179

Epoch 21/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **45s** 61ms/step - accuracy: 0.8865 - loss: 1.0896 - val\_accuracy: 0.9444 - val\_loss: 0.9040

Epoch 22/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **45s** 62ms/step - accuracy: 0.8829 - loss: 1.0868 - val\_accuracy: 0.9422 - val\_loss: 0.9084

Epoch 23/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **45s** 60ms/step - accuracy: 0.8840 - loss: 1.0705 - val\_accuracy: 0.9082 - val\_loss: 1.0800

Epoch 24/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **48s** 65ms/step - accuracy: 0.8801 - loss: 1.1263 - val\_accuracy: 0.9472 - val\_loss: 0.8912

Epoch 25/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 60ms/step - accuracy: 0.8787 - loss: 1.0565 - val\_accuracy: 0.9412 - val\_loss: 0.9157

Epoch 26/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 59ms/step - accuracy: 0.8901 - loss: 1.0041 - val\_accuracy: 0.9483 - val\_loss: 0.8782

Epoch 27/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 60ms/step - accuracy: 0.8843 - loss: 1.0763 - val\_accuracy: 0.9407 - val\_loss: 0.8478

Epoch 28/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **84s** 63ms/step - accuracy: 0.8768 - loss: 1.0322 - val\_accuracy: 0.9415 - val\_loss: 0.8273

Epoch 29/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **45s** 62ms/step - accuracy: 0.8877 - loss: 0.9480 - val\_accuracy: 0.9461 - val\_loss: 0.8445

Epoch 30/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **47s** 64ms/step - accuracy: 0.8838 - loss: 1.0057 - val\_accuracy: 0.8753 - val\_loss: 0.9872

Epoch 31/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **44s** 60ms/step - accuracy: 0.8871 - loss: 0.9692 - val\_accuracy: 0.9466 - val\_loss: 0.8207

Epoch 32/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **43s** 58ms/step - accuracy: 0.8824 - loss: 0.9699 - val\_accuracy: 0.9453 - val\_loss: 0.8535

Epoch 33/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **45s** 62ms/step - accuracy: 0.8824 - loss: 0.9770 - val\_accuracy: 0.9426 - val\_loss: 0.8840

Epoch 34/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **45s** 62ms/step - accuracy: 0.8874 - loss: 0.9712 - val\_accuracy: 0.9550 - val\_loss: 0.7667

Epoch 35/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **45s** 61ms/step - accuracy: 0.8882 - loss: 0.9446 - val\_accuracy: 0.9404 - val\_loss: 0.8000

Epoch 36/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **46s** 63ms/step - accuracy: 0.8895 - loss: 0.9235 - val\_accuracy: 0.9256 - val\_loss: 0.8489

Epoch 37/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **45s** 61ms/step - accuracy: 0.8856 - loss: 0.9344 - val\_accuracy: 0.9337 - val\_loss: 0.8167

Epoch 38/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **48s** 66ms/step - accuracy: 0.8835 - loss: 0.9516 - val\_accuracy: 0.9256 - val\_loss: 0.8616

Epoch 39/50

**736/736** ━━━━━━━━━━━━━━━━━━━━ **48s** 65ms/step - accuracy: 0.8863 - loss: 0.9436 - val\_accuracy: 0.9444 - val\_loss: 0.8265

**230/230** ━━━━━━━━━━━━━━━━━━━━ **3s** 12ms/step - accuracy: 0.9516 - loss: 0.7732

Test Loss: 0.7754974961280823, Test Accuracy: 0.9528276324272156

**230/230** ━━━━━━━━━━━━━━━━━━━━ **3s** 11ms/step

Classification Report:

precision recall f1-score support

0 1.00 1.00 1.00 1816

1 0.98 0.97 0.98 1822

2 0.91 0.91 0.91 1863

3 0.92 0.93 0.93 1855

accuracy 0.95 7356

macro avg 0.95 0.95 0.95 7356

weighted avg 0.95 0.95 0.95 7356

A blue squares with numbers and a blue square

Description automatically generated with medium confidence

**78/78** ━━━━━━━━━━━━━━━━━━━━ **1s** 11ms/step - accuracy: 0.8991 - loss: 0.8577

Original Test Loss: 0.8747003078460693, Original Test Accuracy: 0.8915418982505798

**78/78** ━━━━━━━━━━━━━━━━━━━━ **1s** 8ms/step

Original Test Set Classification Report:

precision recall f1-score support

0 0.33 1.00 0.50 2

1 0.93 0.95 0.94 459

2 0.96 0.90 0.93 1836

3 0.43 0.67 0.52 174

accuracy 0.89 2471

macro avg 0.66 0.88 0.72 2471

weighted avg 0.91 0.89 0.90 2471

A graph with a blue square

Description automatically generated

Feature Importance (from first layer weights):

MARITAL\_patients: 0.07918629795312881

DESCRIPTION\_10 ML Pamidronate Disodium 3 MG/ML Injection\_medications: 0.05397285893559456

DESCRIPTION\_1 ML Enoxaparin sodium 150 MG/ML Prefilled Syringe\_medications: 0.053672078996896744

DESCRIPTION\_1 ML DOCEtaxel 20 MG/ML Injection\_medications: 0.05366888269782066

DESCRIPTION\_10 ML Fentanyl 0.05 MG/ML Injection\_medications: 0.05275239422917366

DESCRIPTION\_100 ML zoledronic acid 0.04 MG/ML Injection\_medications: 0.05222861096262932

DESCRIPTION\_1 ML Epinephrine 1 MG/ML Injection\_medications: 0.04939165711402893

DESCRIPTION\_1 ML Vasopressin (USP) 20 UNT/ML Injection\_medications: 0.04534606635570526

DESCRIPTION\_1 ML heparin sodium porcine 5000 UNT/ML Injection\_medications: 0.03914901614189148

DESCRIPTION\_10 ML Furosemide 10 MG/ML Injection\_medications: 0.03627293184399605

Top Features Correlated with Labels:

SARS-CoV-2 RNA Pnl Resp NAA+probe\_observations: 0.4893819912709172

Left ventricular Ejection fraction\_observations: 0.31841088853322363

AGE\_patients: 0.27902730510413226

Adenovirus A+B+C+D+E DNA [Presence] in Respiratory specimen by NAA with probe detection\_observations: 0.27615427695811195

Human metapneumovirus RNA [Presence] in Respiratory specimen by NAA with probe detection\_observations: 0.27615427695811195

DESCRIPTION\_24 HR metoprolol succinate 100 MG Extended Release Oral Tablet [Toprol]\_medications: 0.2749757779693182

DESCRIPTION\_Furosemide 40 MG Oral Tablet\_medications: 0.27475597898779336

Alanine aminotransferase [Enzymatic activity/volume] in Serum or Plasma\_observations: 0.27140568041979063

REASONDESCRIPTION\_Chronic congestive heart failure (disorder)\_medications: 0.2699041369248789

Chloride\_observations: 0.25981415651676953