Top 1 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 64, 'dense\_layers': 2, 'dense\_units': 128, 'dropout': 0.1, 'epochs': 50, 'batch\_size': 64, 'learning\_rate': 0.001, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.7113, Precision: 0.9437, Recall: 0.9481, F1 Score: 0.9459

Top 2 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 64, 'dense\_layers': 2, 'dense\_units': 128, 'dropout': 0.1, 'epochs': 50, 'batch\_size': 64, 'learning\_rate': 0.002, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6796, Precision: 0.9189, Recall: 0.9623, F1 Score: 0.9401

Top 3 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 32, 'dense\_layers': 2, 'dense\_units': 128, 'dropout': 0.1, 'epochs': 50, 'batch\_size': 64, 'learning\_rate': 0.002, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6866, Precision: 0.9227, Recall: 0.9575, F1 Score: 0.9398

Top 4 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 64, 'dense\_layers': 2, 'dense\_units': 128, 'dropout': 0.1, 'epochs': 50, 'batch\_size': 32, 'learning\_rate': 0.002, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6056, Precision: 0.9387, Recall: 0.9387, F1 Score: 0.9387

Top 5 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 32, 'dense\_layers': 2, 'dense\_units': 128, 'dropout': 0.2, 'epochs': 50, 'batch\_size': 32, 'learning\_rate': 0.001, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6514, Precision: 0.9075, Recall: 0.9717, F1 Score: 0.9385

Top 6 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 64, 'dense\_layers': 1, 'dense\_units': 64, 'dropout': 0.3, 'epochs': 50, 'batch\_size': 32, 'learning\_rate': 0.001, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6901, Precision: 0.9429, Recall: 0.9340, F1 Score: 0.9384

Top 7 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 32, 'dense\_layers': 1, 'dense\_units': 128, 'dropout': 0.3, 'epochs': 50, 'batch\_size': 64, 'learning\_rate': 0.001, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6655, Precision: 0.9148, Recall: 0.9623, F1 Score: 0.9379

Top 8 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 32, 'dense\_layers': 2, 'dense\_units': 64, 'dropout': 0.2, 'epochs': 50, 'batch\_size': 64, 'learning\_rate': 0.002, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.7113, Precision: 0.9515, Recall: 0.9245, F1 Score: 0.9378

Top 9 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 32, 'dense\_layers': 2, 'dense\_units': 128, 'dropout': 0.3, 'epochs': 50, 'batch\_size': 32, 'learning\_rate': 0.001, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6690, Precision: 0.9186, Recall: 0.9575, F1 Score: 0.9376

Top 10 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 32, 'dense\_layers': 2, 'dense\_units': 128, 'dropout': 0.3, 'epochs': 50, 'batch\_size': 64, 'learning\_rate': 0.002, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6514, Precision: 0.9186, Recall: 0.9575, F1 Score: 0.9376

Top 11 Configuration:

Config Details: {'conv\_layers': 1, 'filters': 32, 'dense\_layers': 2, 'dense\_units': 64, 'dropout': 0.1, 'epochs': 50, 'batch\_size': 64, 'learning\_rate': 0.001, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6937, Precision: 0.9224, Recall: 0.9528, F1 Score: 0.9374

Top 12 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 64, 'dense\_layers': 2, 'dense\_units': 64, 'dropout': 0.1, 'epochs': 50, 'batch\_size': 32, 'learning\_rate': 0.001, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6866, Precision: 0.9224, Recall: 0.9528, F1 Score: 0.9374

Top 13 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 32, 'dense\_layers': 2, 'dense\_units': 64, 'dropout': 0.1, 'epochs': 50, 'batch\_size': 32, 'learning\_rate': 0.001, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6585, Precision: 0.9263, Recall: 0.9481, F1 Score: 0.9371

Top 14 Configuration:

Config Details: {'conv\_layers': 1, 'filters': 64, 'dense\_layers': 1, 'dense\_units': 64, 'dropout': 0.2, 'epochs': 50, 'batch\_size': 32, 'learning\_rate': 0.002, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6197, Precision: 0.9000, Recall: 0.9764, F1 Score: 0.9367

Top 15 Configuration:

Config Details: {'conv\_layers': 2, 'filters': 32, 'dense\_layers': 1, 'dense\_units': 128, 'dropout': 0.1, 'epochs': 50, 'batch\_size': 32, 'learning\_rate': 0.001, 'activation': 'relu', 'optimizer': 'adam'}

Test Accuracy: 0.6901, Precision: 0.9426, Recall: 0.9292, F1 Score: 0.9359

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **conv\_layers** | **filters** | **dense\_layers** | **dense\_units** | **dropout** | **epochs** | **batch\_size** | **learning\_rate** | **activation** | **optimizer** | **Test Accuracy** | **Precision** | **Recall** | **F1 Score** |
| 2 | 64 | 2 | 128 | 0.1 | 50 | 64 | 0.001 | relu | adam | 0.7113 | 0.9437 | 0.9481 | 0.9459 |
| 2 | 64 | 2 | 128 | 0.1 | 50 | 64 | 0.002 | relu | adam | 0.6796 | 0.9189 | 0.9623 | 0.9401 |
| 2 | 32 | 2 | 128 | 0.1 | 50 | 64 | 0.002 | relu | adam | 0.6866 | 0.9227 | 0.9575 | 0.9398 |
| 2 | 64 | 2 | 128 | 0.1 | 50 | 32 | 0.002 | relu | adam | 0.6056 | 0.9387 | 0.9387 | 0.9387 |
| 2 | 32 | 2 | 128 | 0.2 | 50 | 32 | 0.001 | relu | adam | 0.6514 | 0.9075 | 0.9717 | 0.9385 |
| 2 | 64 | 1 | 64 | 0.3 | 50 | 32 | 0.001 | relu | adam | 0.6901 | 0.9429 | 0.934 | 0.9384 |
| 2 | 32 | 1 | 128 | 0.3 | 50 | 64 | 0.001 | relu | adam | 0.6655 | 0.9148 | 0.9623 | 0.9379 |
| 2 | 32 | 2 | 64 | 0.2 | 50 | 64 | 0.002 | relu | adam | 0.7113 | 0.9515 | 0.9245 | 0.9378 |
| 2 | 32 | 2 | 128 | 0.3 | 50 | 32 | 0.001 | relu | adam | 0.669 | 0.9186 | 0.9575 | 0.9376 |
| 2 | 32 | 2 | 128 | 0.3 | 50 | 64 | 0.002 | relu | adam | 0.6514 | 0.9186 | 0.9575 | 0.9376 |
| 1 | 32 | 2 | 64 | 0.1 | 50 | 64 | 0.001 | relu | adam | 0.6937 | 0.9224 | 0.9528 | 0.9374 |
| 2 | 64 | 2 | 64 | 0.1 | 50 | 32 | 0.001 | relu | adam | 0.6866 | 0.9224 | 0.9528 | 0.9374 |
| 2 | 32 | 2 | 64 | 0.1 | 50 | 32 | 0.001 | relu | adam | 0.6585 | 0.9263 | 0.9481 | 0.9371 |
| 1 | 64 | 1 | 64 | 0.2 | 50 | 32 | 0.002 | relu | adam | 0.6197 | 0.9 | 0.9764 | 0.9367 |
| 2 | 32 | 1 | 128 | 0.1 | 50 | 32 | 0.001 | relu | adam | 0.6901 | 0.9426 | 0.9292 | 0.9359 |