

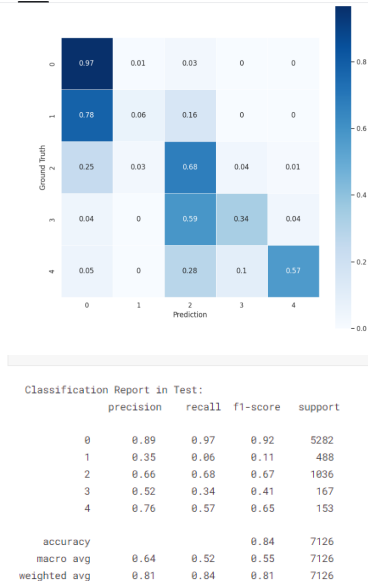
Performance & Final Submission Phase

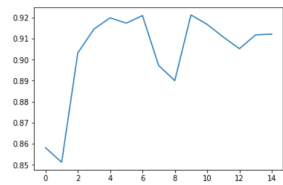
Model Performance Test

Date	22 November 2023
Team ID	PNT2023TMID592236
Project Name	Project - Deep Learning Fundus Image Analysis For Early Detection of Diabetic Retinopathy.
Maximum Marks	10 Marks

Model Performance Testing:

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Values	Screenshot																																																																																	
1.		Classification Model: Confusion Matrix - , Accuray Score- & Classification Report -	 <p>Confusion Matrix:</p> <table><tr><th></th><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><th>0</th><td>0.97</td><td>0.01</td><td>0.03</td><td>0</td><td>0</td></tr><tr><th>1</th><td>0.78</td><td>0.06</td><td>0.16</td><td>0</td><td>0</td></tr><tr><th>2</th><td>0.25</td><td>0.03</td><td>0.68</td><td>0.04</td><td>0.01</td></tr><tr><th>3</th><td>0.04</td><td>0</td><td>0.59</td><td>0.34</td><td>0.04</td></tr><tr><th>4</th><td>0.05</td><td>0</td><td>0.28</td><td>0.1</td><td>0.57</td></tr></table> <p>Classification Report in Test:</p> <table><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr><tr><td>0</td><td>0.89</td><td>0.97</td><td>0.92</td><td>5282</td></tr><tr><td>1</td><td>0.35</td><td>0.06</td><td>0.11</td><td>488</td></tr><tr><td>2</td><td>0.66</td><td>0.68</td><td>0.67</td><td>1836</td></tr><tr><td>3</td><td>0.52</td><td>0.34</td><td>0.41</td><td>167</td></tr><tr><td>4</td><td>0.76</td><td>0.57</td><td>0.65</td><td>153</td></tr><tr><td>accuracy</td><td></td><td></td><td>0.84</td><td>7126</td></tr><tr><td>macro avg</td><td>0.64</td><td>0.52</td><td>0.55</td><td>7126</td></tr><tr><td>weighted avg</td><td>0.81</td><td>0.84</td><td>0.81</td><td>7126</td></tr></table>		0	1	2	3	4	0	0.97	0.01	0.03	0	0	1	0.78	0.06	0.16	0	0	2	0.25	0.03	0.68	0.04	0.01	3	0.04	0	0.59	0.34	0.04	4	0.05	0	0.28	0.1	0.57		precision	recall	f1-score	support	0	0.89	0.97	0.92	5282	1	0.35	0.06	0.11	488	2	0.66	0.68	0.67	1836	3	0.52	0.34	0.41	167	4	0.76	0.57	0.65	153	accuracy			0.84	7126	macro avg	0.64	0.52	0.55	7126	weighted avg	0.81	0.84	0.81	7126
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1.	Tune the Model	Hyperparameter Tuning - Validation Method -	<pre>98/97 [=====] - 34s 349ms/step - loss: 0.0876 - acc: 0.9668 - val_loss: 0.0917 - val_acc: 0.9647 val_kappa: 0.9168 Epoch 12/15 98/97 [=====] - 34s 345ms/step - loss: 0.0838 - acc: 0.9668 - val_loss: 0.1000 - val_acc: 0.9622 val_kappa: 0.9108 Epoch 13/15 98/97 [=====] - 34s 351ms/step - loss: 0.0779 - acc: 0.9699 - val_loss: 0.1067 - val_acc: 0.9636 val_kappa: 0.9852 Epoch 14/15 98/97 [=====] - 34s 348ms/step - loss: 0.0727 - acc: 0.9723 - val_loss: 0.1007 - val_acc: 0.9644 val_kappa: 0.9118 Epoch 15/15 98/97 [=====] - 34s 350ms/step - loss: 0.0671 - acc: 0.9747 - val_loss: 0.1035 - val_acc: 0.9636 val_kappa: 0.9122</pre> <pre>In [21]: kappa_metrics = Metrics() history = model.fit_generator(data_generator, steps_per_epoch=x_train.shape[0] // BATCH_SIZE, epochs=15, validation_data=(x_val, y_val), callbacks=[kappa_metrics])</pre>																																
			<pre>In [23]: plt.plot(kappa_metrics.val_kappas)</pre> <pre>Out[23]: [<matplotlib.lines.Line2D at 0x7f93ec68b208>]</pre>  <table><caption>Validation Kappa Values by Epoch</caption><tr><th>Epoch</th><th>Validation Kappa</th></tr><tr><td>0</td><td>0.86</td></tr><tr><td>1</td><td>0.85</td></tr><tr><td>2</td><td>0.90</td></tr><tr><td>3</td><td>0.91</td></tr><tr><td>4</td><td>0.91</td></tr><tr><td>5</td><td>0.91</td></tr><tr><td>6</td><td>0.91</td></tr><tr><td>7</td><td>0.90</td></tr><tr><td>8</td><td>0.89</td></tr><tr><td>9</td><td>0.91</td></tr><tr><td>10</td><td>0.91</td></tr><tr><td>11</td><td>0.90</td></tr><tr><td>12</td><td>0.90</td></tr><tr><td>13</td><td>0.91</td></tr><tr><td>14</td><td>0.91</td></tr></table>	Epoch	Validation Kappa	0	0.86	1	0.85	2	0.90	3	0.91	4	0.91	5	0.91	6	0.91	7	0.90	8	0.89	9	0.91	10	0.91	11	0.90	12	0.90	13	0.91	14	0.91
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