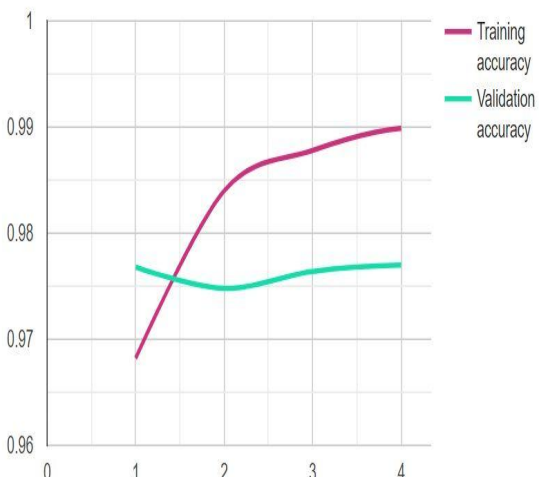


Project Development Phase Model Performance Test

Date	10 November 2022
Team ID	PNT2022TMID37900
Project Name	Project - Handwritten Digit Recognition
Maximum Marks	10 Marks

Model Performance Testing:

S.No.	Parameter	Values	Screenshot															
1.	Model Summary		<pre>print(model.summary())</pre> <div>Model: "sequential"</div> <table><thead><tr><th>Layer (type)</th><th>Output Shape</th><th>Param #</th></tr></thead><tbody><tr><td>conv2d (Conv2D)</td><td>(None, 26, 26, 32)</td><td>320</td></tr><tr><td>conv2d_1 (Conv2D)</td><td>(None, 24, 24, 64)</td><td>18496</td></tr><tr><td>flatten (Flatten)</td><td>(None, 36864)</td><td>0</td></tr><tr><td>dense (Dense)</td><td>(None, 10)</td><td>368650</td></tr></tbody></table> <div>Total params: 387,466 Trainable params: 387,466 Non-trainable params: 0</div> <div>None</div>	Layer (type)	Output Shape	Param #	conv2d (Conv2D)	(None, 26, 26, 32)	320	conv2d_1 (Conv2D)	(None, 24, 24, 64)	18496	flatten (Flatten)	(None, 36864)	0	dense (Dense)	(None, 10)	368650
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2.	Accuracy	<div>Training Accuracy - apprx: 98%</div> <div>Validation Accuracy- apprx: 97%</div>	<div>Training and Validation loss</div> <table><thead><tr><th>Epoch</th><th>Training loss</th><th>Validation loss</th></tr></thead><tbody><tr><td>1</td><td>0.11</td><td>0.075</td></tr><tr><td>2</td><td>0.055</td><td>0.10</td></tr><tr><td>3</td><td>0.045</td><td>0.095</td></tr><tr><td>4</td><td>0.035</td><td>0.11</td></tr></tbody></table>	Epoch	Training loss	Validation loss	1	0.11	0.075	2	0.055	0.10	3	0.045	0.095	4	0.035	0.11
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			<div>Training and Validation accuracy</div>  <table><caption>Training and Validation Accuracy Data</caption><tr><th>Epoch</th><th>Training Accuracy</th><th>Validation Accuracy</th></tr><tr><td>1</td><td>0.968</td><td>0.977</td></tr><tr><td>2</td><td>0.984</td><td>0.975</td></tr><tr><td>3</td><td>0.987</td><td>0.976</td></tr><tr><td>4</td><td>0.990</td><td>0.977</td></tr></table>	Epoch	Training Accuracy	Validation Accuracy	1	0.968	0.977	2	0.984	0.975	3	0.987	0.976	4	0.990	0.977																																																							
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3.	Confusion Matrix		<pre>[[8 0 0 0 0 0 1 0 0 0] [0 9 0 0 0 0 0 1 0 0] [0 0 9 0 0 0 0 0 0 0] [0 0 0 8 0 0 0 0 0 0] [0 0 0 0 9 0 0 0 0 0] [0 0 0 1 0 8 0 0 1 0] [0 0 0 0 0 0 8 0 0 0] [0 0 0 0 0 0 0 8 0 0] [0 0 0 0 0 1 0 0 8 0] [1 0 0 0 0 0 0 0 0 9]]</pre>																																																																						
4.	Classification Report		<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>0.89</td><td>0.89</td><td>9</td></tr><tr><td>1</td><td>1.00</td><td>0.90</td><td>0.95</td><td>10</td></tr><tr><td>2</td><td>1.00</td><td>1.00</td><td>1.00</td><td>9</td></tr><tr><td>3</td><td>0.89</td><td>1.00</td><td>0.94</td><td>8</td></tr><tr><td>4</td><td>1.00</td><td>1.00</td><td>1.00</td><td>9</td></tr><tr><td>5</td><td>0.89</td><td>0.80</td><td>0.84</td><td>10</td></tr><tr><td>6</td><td>0.89</td><td>1.00</td><td>0.94</td><td>8</td></tr><tr><td>7</td><td>0.89</td><td>1.00</td><td>0.94</td><td>8</td></tr><tr><td>8</td><td>0.89</td><td>0.89</td><td>0.89</td><td>9</td></tr><tr><td>9</td><td>1.00</td><td>0.90</td><td>0.95</td><td>10</td></tr><tr><td>accuracy</td><td></td><td></td><td>0.93</td><td>90</td></tr><tr><td>macro avg</td><td>0.93</td><td>0.94</td><td>0.93</td><td>90</td></tr><tr><td>weighted avg</td><td>0.94</td><td>0.93</td><td>0.93</td><td>90</td></tr></table>		precision	recall	f1-score	support	0	0.89	0.89	0.89	9	1	1.00	0.90	0.95	10	2	1.00	1.00	1.00	9	3	0.89	1.00	0.94	8	4	1.00	1.00	1.00	9	5	0.89	0.80	0.84	10	6	0.89	1.00	0.94	8	7	0.89	1.00	0.94	8	8	0.89	0.89	0.89	9	9	1.00	0.90	0.95	10	accuracy			0.93	90	macro avg	0.93	0.94	0.93	90	weighted avg	0.94	0.93	0.93	90
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