Experiment 1

NN Gray Scale 1st Architecture

input layer

hidden layer with 128 neurons

hidden layer with 64 neurons

relu activation function for hidden layers

output layer with softmax activation function

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Class | Precision | Recall | F1-Score | Support |
| 0 | 0.58 | 0.87 | 0.69 | 38 |
| 1 | 0.83 | 0.83 | 0.83 | 48 |
| 2 | 0.90 | 0.76 | 0.82 | 46 |
| 3 | 0.73 | 0.94 | 0.83 | 35 |
| 4 | 0.63 | 0.68 | 0.65 | 40 |
| 5 | 1.00 | 0.70 | 0.82 | 50 |
| 6 | 0.69 | 0.78 | 0.74 | 32 |
| 7 | 0.67 | 0.62 | 0.64 | 39 |
| 8 | 0.88 | 0.47 | 0.61 | 45 |
| 9 | 0.66 | 0.82 | 0.73 | 40 |

Accuracy of NN model : 0.74

Accuracy of the validation : 0.7

Experiment 2

NN Gray Scale 2nd Architecture

input layer

hidden layer with 128 neurons

hidden layer with 64 neurons

hidden layer with 32 neurons

relu activation function for hidden layers

output layer with softmax activation function

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Class | Precision | Recall | F1-Score | Support |
| 0 | 1.00 | 0.62 | 0.77 |  |
| 1 |  |  |  | 40 |
| 2 | 0.75 |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |
| 7 |  |  |  |  |
| 8 |  |  |  |  |
| 9 |  |  |  |  |

Accuracy of NN model : 0.73

Accuracy of the validation : 0.78 Liberation Serif

Experiment 3

CNN MODEL RGB

input layer

convolutional layer

max pooling layer

dropout 0.2 --20% of neurons are being dropped

flatten

relu layer

output softmax activation function

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Class | Precision | Recall | F1-Score | Support |
| 0 | 0.94 | 0.89 | 0.92 | 38 |
| 1 | 0.96 | 0.94 | 0.95 | 48 |
| 2 | 0.87 | 0.87 | 0.87 | 46 |
| 3 | 0.94 | 0.91 | 0.93 | 35 |
| 4 | 0.78 | 0.68 | 0.82 | 40 |
| 5 | 0.98 | 0.94 | 0.96 | 50 |
| 6 | 0.71 | 0.78 | 0.75 | 32 |
| 7 | 0.86 | 0.77 | 0.81 | 39 |
| 8 | 0.83 | 0.87 | 0.85 | 45 |
| 9 | 0.90 | 0.90 | 0.90 | 40 |

Accuracy of CNN model : 0.88

Accuracy of the validation : 0.95

Experiment 4

SVM MODEL RGB

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Class | Precision | Recall | F1-Score | Support |
| 0 | 0.94 | 0.89 | 0.92 | 38 |
| 1 | 0.96 | 0.94 | 0.95 | 48 |
| 2 | 0.87 | 0.87 | 0.87 | 46 |
| 3 | 0.94 | 0.91 | 0.93 | 35 |
| 4 | 0.78 | 0.68 | 0.82 | 40 |
| 5 | 0.98 | 0.94 | 0.96 | 50 |
| 6 | 0.71 | 0.78 | 0.75 | 32 |
| 7 | 0.86 | 0.77 | 0.81 | 39 |
| 8 | 0.83 | 0.87 | 0.85 | 45 |
| 9 | 0.90 | 0.90 | 0.90 | 40 |

Accuracy of SVM classifier : 0.88

Accuracy of the validation : 0.95

|  |  |  |
| --- | --- | --- |
|  | NN | SVM |
| Accuracy |  |  |
| Time |  |  |