CHAPTER 6

RESULTS

The output which we got after training and testing each of these models is as follows:

	precision	recall	f1-score	support
0	0.98	0.96	0.97	117
1	0.89	0.95	0.92	42
accuracy			0.96	159
macro avg	0.94	0.95	0.94	159
weighted avg	0.96	0.96	0.96	159

Figure 19. F1 score of Inception ResNet V2

Figure 19 shows the visualization of the results of the Inception ResNet V2 model in the form of an f1 score table

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	precision	recall	f1-score	support
0	0.93	0.97	0.95	117
1	0.89	0.81	0.85	42
accuracy			0.92	159
macro avg	0.91	0.89	0.90	159
weighted avg	0.92	0.92	0.92	159

Figure 20. F1 score of VGG16

Figure 20 shows the visualization of the results of the VGG16 model in the form of an f1 score table

	precision	recall	f1-score	support
0	0.97	0.97	0.97	117
1	0.91	0.93	0.92	42
accuracy			0.96	159
macro avg	0.94	0.95	0.94	159
weighted avg	0.96	0.96	0.96	159

Figure 21. F1 score of Inception V3

Figure 21 shows the visualization of the results of the Inception V3 model in the form of an f1 score table

	precision	recall	f1-score	support
0	0.96	0.97	0.97	117
1	0.93	0.88	0.90	42
accuracy			0.95	159
macro avg	0.94	0.93	0.93	159
weighted avg	0.95	0.95	0.95	159

Figure 22. F1 score of Xception model

Figure 22 shows the visualization of the results of the Xception model in the form of an f1 score table

Number of Training Samples	633
Number of Test Samples	159
Shape of Train X Shape of Train Y	(633, 128, 128, 3) (633, 2)
Shape of Test X Shape of Test Y	(159, 128, 128, 3) (159, 2)
Accuracy of Inception-ResNet V2	96%
Accuracy of VGG16	92%
Accuracy of Inception V3	96%
Accuracy of Xception	95%

Table 1. Performance of four different pretrained models (Inception-ResNet V2, VGG, Inception V3, Xception) on the test dataset

Table 1 compares the accuracy of the four different pre-trained models (Inception-ResNet V2, VGG, Inception V3, Xception) that have been used on the test dataset

Model Name	Fire images [0]	Non-Fire Images [1]
Inception-ResNet V2	98%	89%
VGG16	93%	89%
Inception V3	97%	91%
Xception	96%	93%

Table 2. Comparison of different pretrained models (Inception-ResNet V2, VGG16, Inception V3, Xception) on the basis of Precision

Table 2 compares the precision of the four different pre-trained models (Inception-ResNet V2, VGG, Inception V3, Xception) that have been used on the test dataset

Model Name	Fire images [0]	Non-Fire Images [1]
Inception-ResNet V2	96%	95%
VGG16	97%	81%
Inception V3	97%	92%
Xception	97%	88%

Table 3. Comparison of different pretrained models (Inception-ResNet V2, VGG16, Inception V3, Xception) on the basis of recall

Table 3 compares the recall of the four different pre-trained models (Inception-ResNet V2, VGG, Inception V3, Xception) that have been used on the test dataset

Model Name	Fire images [0]	Non-Fire Images [1]
Inception-ResNet V2	97%	92%
VGG16	95%	85%
Inception V3	97%	92%
Xception	97%	90%

Table 4. Comparison of different pretrained models (Inception-ResNet V2, VGG16, Inception V3, Xception) on the basis of F1 score

Table 4 compares the F1 score of the four different pre-trained models (Inception-ResNet V2, VGG, Inception V3, Xception) that have been used on the test dataset

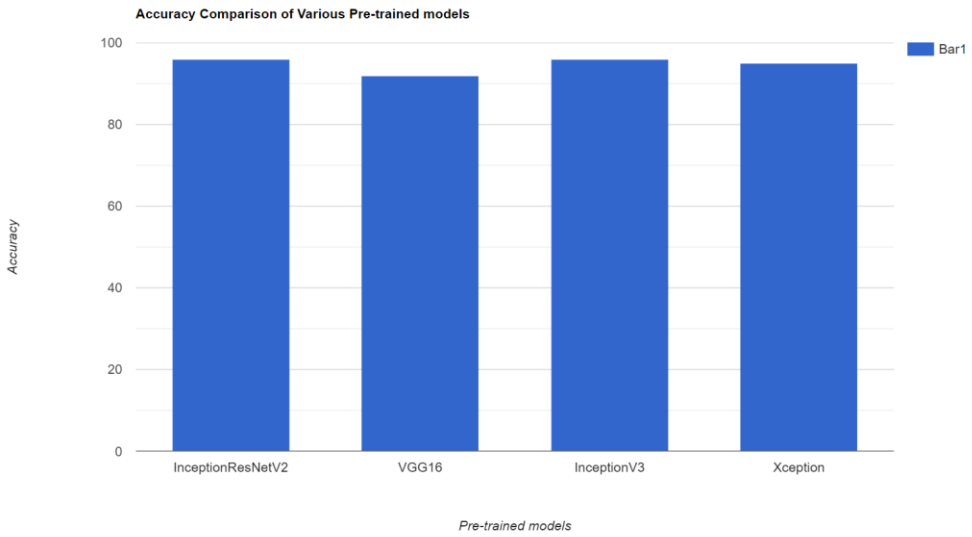

Figure 23. Accuracy comparison of the different pretrained models used (Inception-ResNet V2, VGG16, Inception V3, Xception)

Figure 23 compares the accuracy of the four different pre-trained models (Inception-ResNet V2, VGG, Inception V3, Xception) that have been used on the test dataset in the form of a bar graph

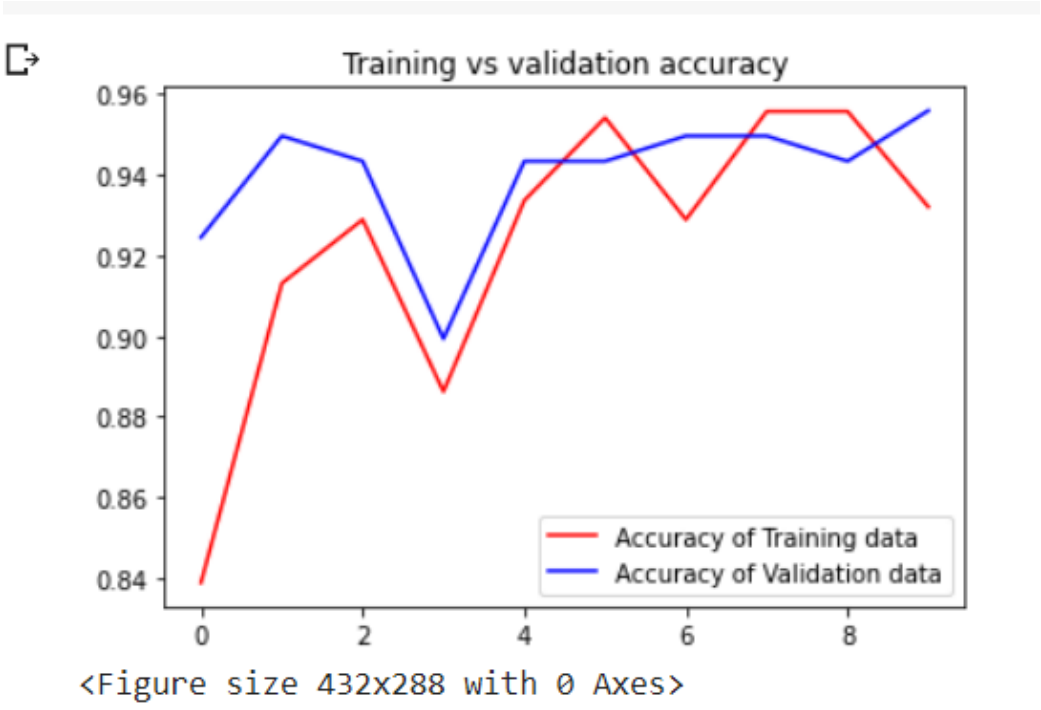

Figure 24. History Graph of Inception ResNet V2

Figure 24 compares the training and validation accuracy values of Inception ResNet V2 model in the form of a history graph

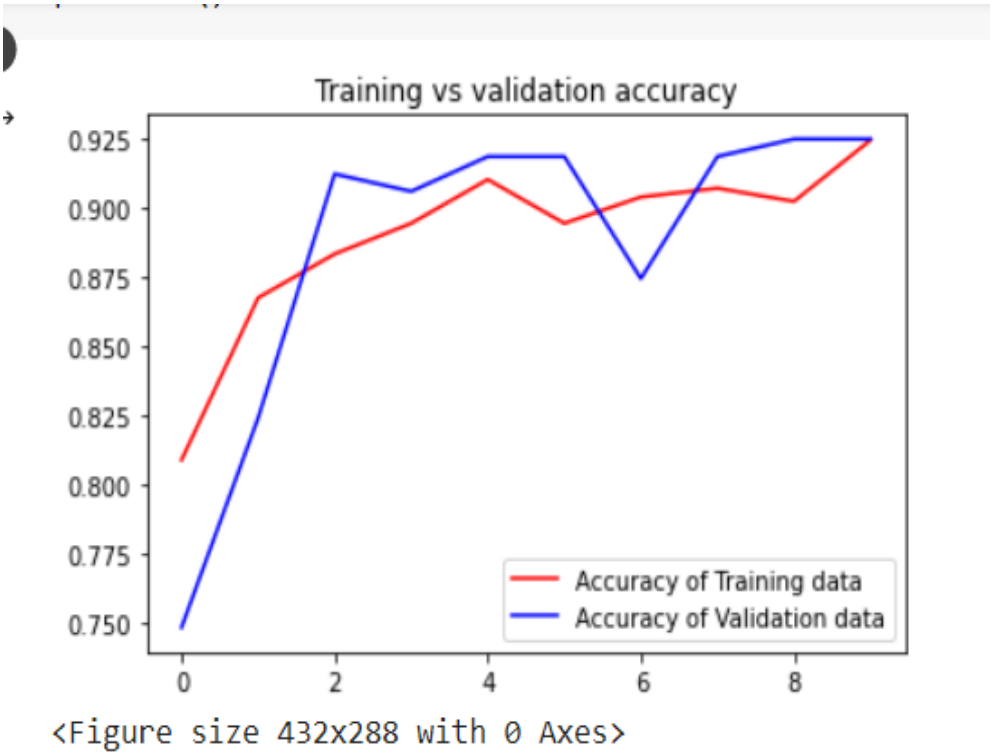

Figure 25. History Graph of VGG16

Figure 25 compares the training and validation accuracy values of VGG 16 model in the form of a history graph

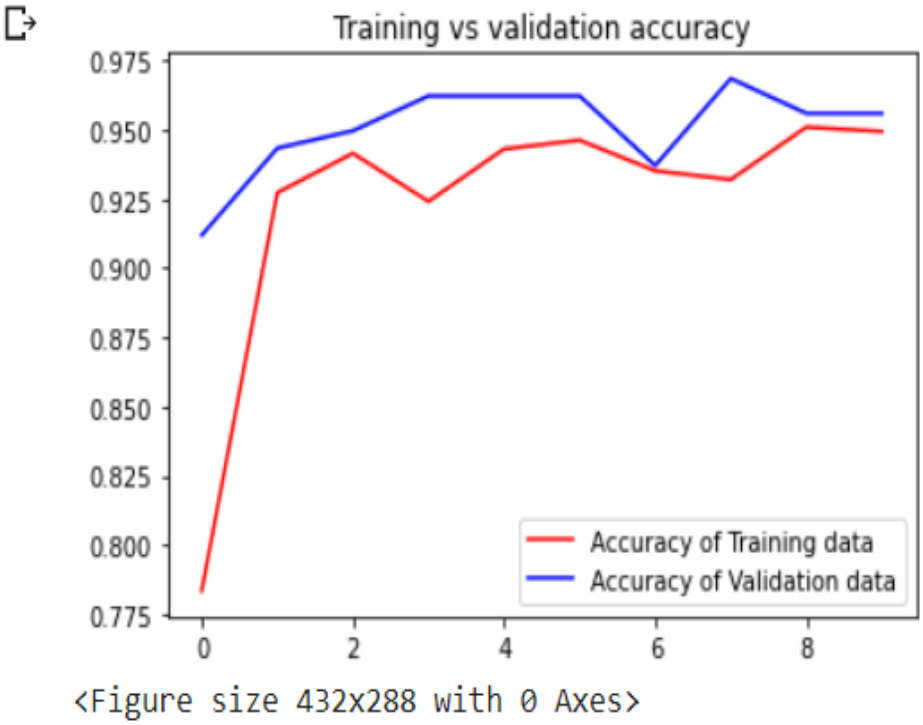

Figure 26: History Graph of Inception V3

Figure 26 compares the training and validation accuracy values of Inception V3 model in the form of a history graph

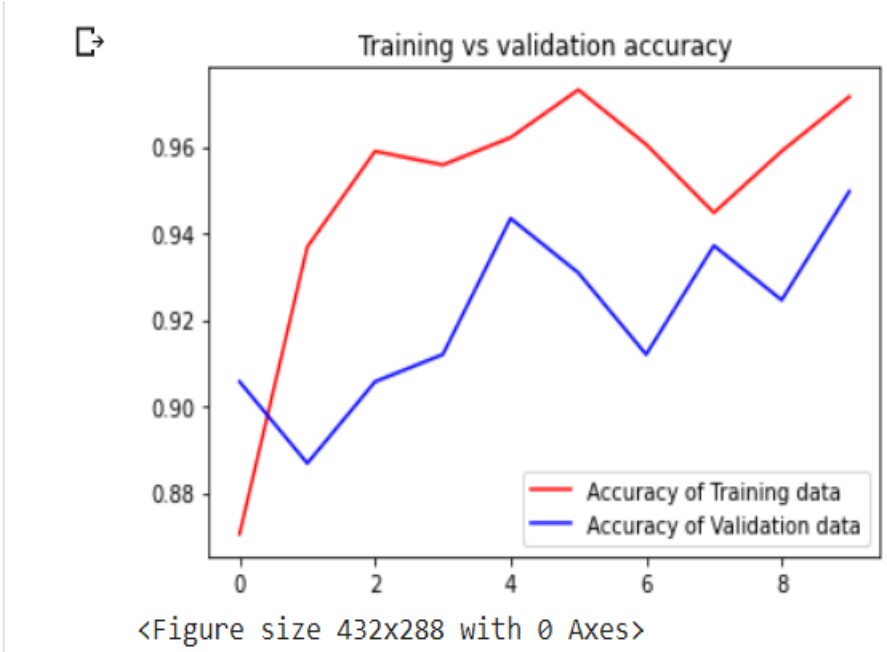

Figure 27. History Graph of Xception Model

Figure 27 compares the training and validation accuracy values of Xception model in the form of a history graph

In this study, we wish to compare four different types of pre-trained models which use Convolutional Neural Network as its basis for extraction of features for the particular use case which we have selected, that is, forest fires. The f1 score tables and the history graph charts suggest that the Inception-Resnet V2 and Inception V3 models have out matched other pre trained models in terms of overall performance and accuracy of around 96%.