

### 3.3. Detecting the presence of fire with CNN

Information about the presence of fire on the images can be reached with the CNN algorithm. In the training of the CNN model, 1141 images with a fire zone and 1900 images without a fire zone were used. The CNN model was trained with the transfer learning method using the weights of the previously trained Inception V3, SqueezeNet, VGG16 and VGG19 models. In this way, it is aimed to create a model that can classify more successfully. Tests of the trained models were carried out using the cross-validation method. In this way, classification reliability is increased.

Four different CNN models were compared to find the most successful CNN model. Confusion matrix showing the classification results made with the CNN model trained using

**Table 9.** Performance metrics of all models (%)

	Accuracy	Precision	Recall	F-1 score
<b>Inception V3</b>	98.8	98.8	98.8	98.8
<b>SqueezeNet</b>	97.0	97.0	97.0	97.0
<b>VGG16</b>	97.3	97.3	97.3	97.3
<b>VGG19</b>	96.8	96.8	96.8	96.8

When the performance metrics in Table 9 are examined, it is seen that the model with the highest classification success is the Inception V3 CNN model with 98.8% classification success. Parallel to the accuracy of the Inception V3 CNN model, the