SUPPLEMENTARY MATERIALS

VGG16 was used for transfer learning of the binary classification model. The VGG16 architecture (Fig. 3) consisted of 13 convolutional layers, 5 maximum pooling layers, 3 fully-connected layers, and finally, a 1000-way softmax classifier. Max-pooling was performed over a 2 x 2 pixel window, with a 2 stride. As the original VGG16 model was a 1000 classification for public datasets on Imagenet, it was not suitable for our binary task. We used transfer learning to replace the fully connected layer of VGG16 and added a 3-layer structure, which was a hidden layer of 20588 x 4096. This was followed by the RELU layer and the output layer of 4096 x n. We also set a 50% probability of random inactivation. The convolutional layer of the model was responsible for extracting the features of the image. Therefore, we needed to migrate the learned convolution layer weights of the pre-trained model to help us extract the features. However, the weight of this part remained unchanged during the training process. We froze all the weights of the convolutional layer of the model, and only trained the fully connected modified layer. The major function of the fully connected layer was to combine the features extracted by the convolutional layer, in order to obtain the category to which the image belonged.