

ETHAN BEVAN, Dept of Computer Science, Mathematics, and Engineering, Shepherd University, Shepherdstown, WV, 25414, and JASON MILLER, Dept of Computer Science, Mathematics, and Engineering, Shepherd University, Shepherdstown, WV, 25414. Facial Emotion Recognition using an Artificial Neural Network.

Facial recognition using artificial neural networks is a biometric technology currently being used in fields such as cybersecurity and criminal investigation. We sought to automatically distinguish between an image of a happy human face and an image of a sad human face with predictions that are better than random guesses. We trained a machine learning model (VGG16, a type of convolutional neural network) on a public image dataset of 12,000 human faces. The resulting model predicted the emotion label 93% of time when shown a test set of 200 images that the model had never seen during training. The results show that the VGG16 convolutional neural network learned features from our data that produced an output which was sufficient to train the additional layers of the model to perform our task at 93% accuracy. We suspect this is because VGG16 was already familiar with features that it learned from ImageNet (a separate dataset of over 2 million images). It is currently unknown whether our model can predict labels for new images outside of the FER13 dataset, but preliminary tests show promising results. Our model was trained using a cloud computing service and a relatively small amount of data, indicating that these kinds of results are easily obtainable by all.