

ABSTRACT

Convolutional neural networks (CNNs) are powerful tools in general image classification. Our project adapts the general image classification capabilities of CNNs to medical imagery, creating networks that can identify the presence and type of pneumonia in the chest x-rays of a patient. We accomplish this using transfer learning to adapt general image classification models to this specific task.

METHODS

Using three of the most accurate CNNs for generalized image classification tasks, we retrained the final dense layers in each of the networks using transfer learning to classify images of chest x-rays that are clear, or have one of two types of pneumonia, a type of lung infection.

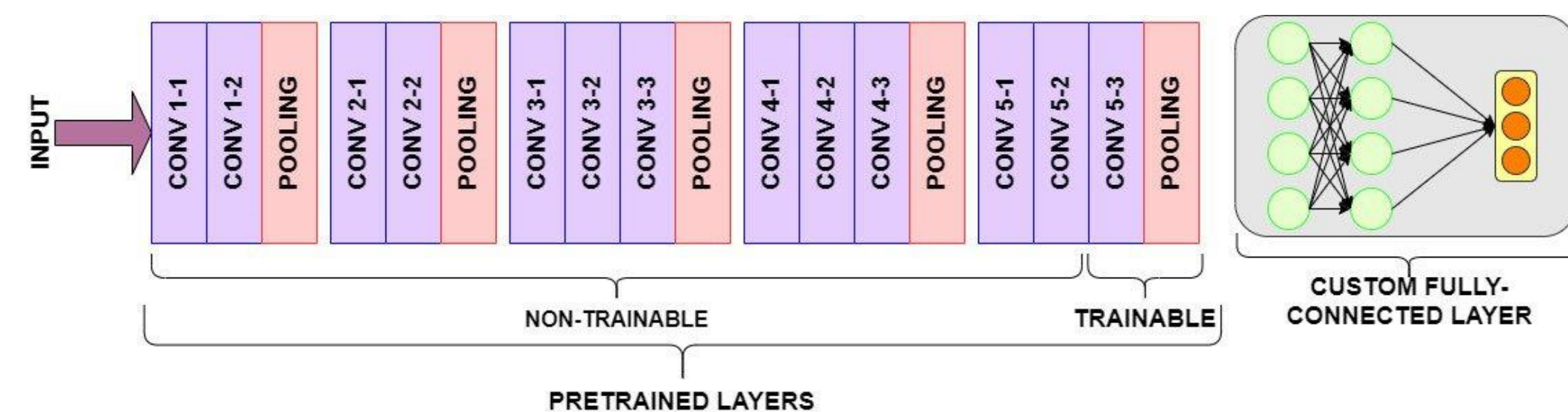


Fig.1 The VGG16 CNN for image classification after being modified with new dense layers at the end for transfer learning (McDermott, 2023)

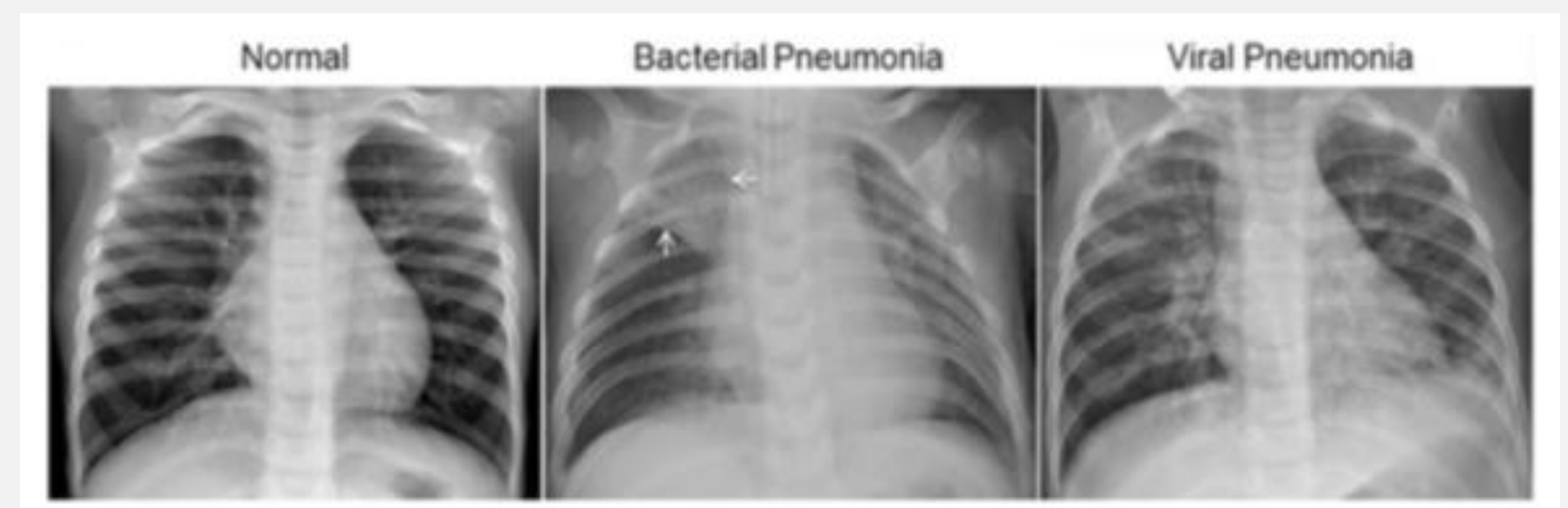
RESULTS

The networks had the following accuracies:

1. ResNet 152 v2 – **94.77%**
2. DenseNet – **93.86%**
3. VGG16 – **80.45%**

ResNet 152 v2, the best performing image classification network, achieved performance comparable to human professionals at just over 5% error!

Adapting general image classification neural networks through transfer learning to identify the presence and type of pneumonia in chest x-rays



← *Read the full paper here!*