

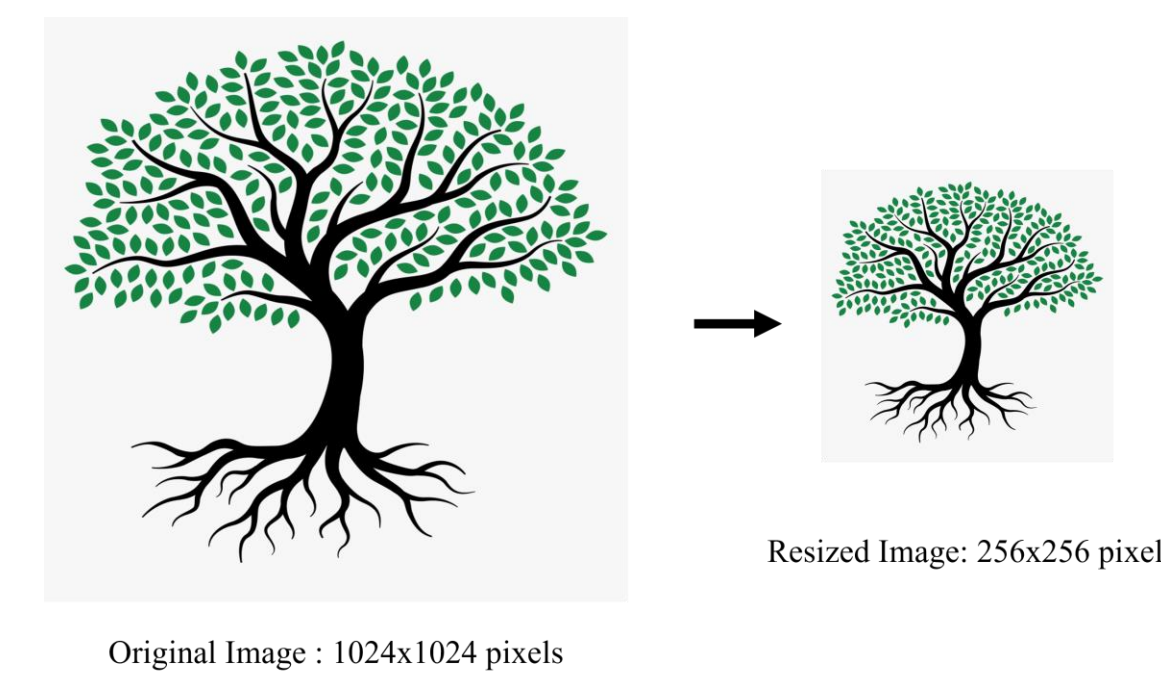
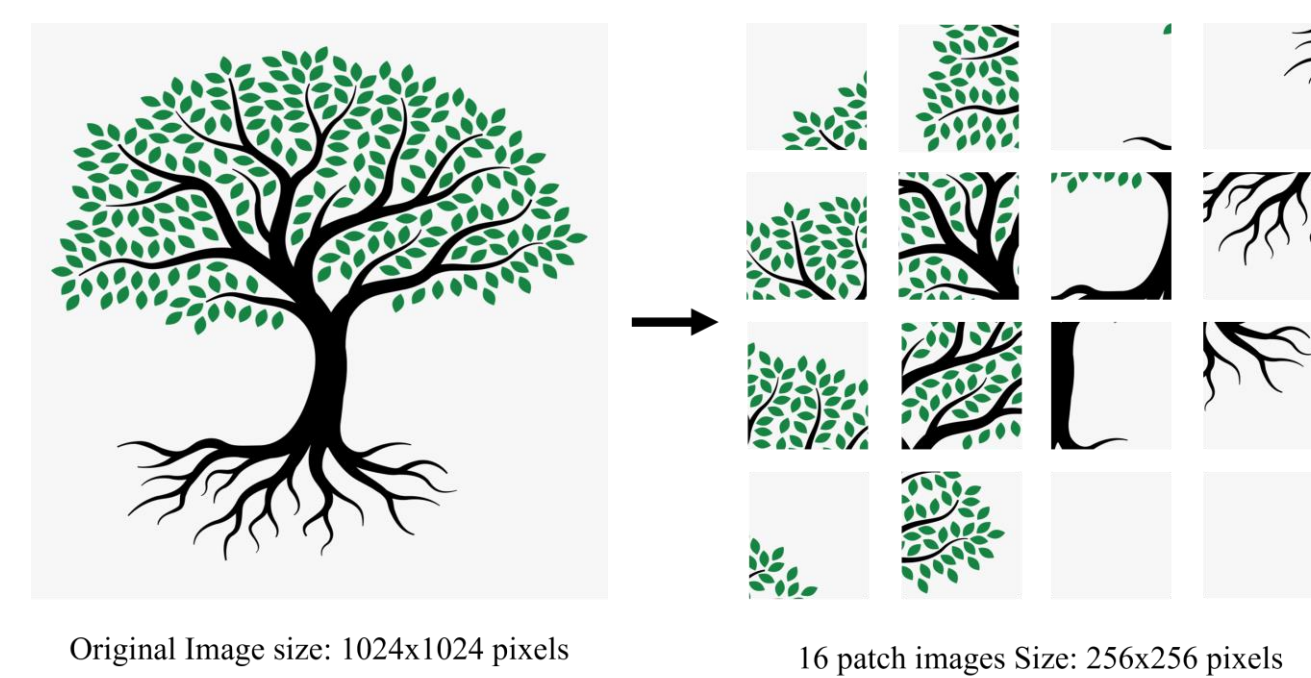
Analysis of Large-Scale Diabetic Retinopathy Using Deep Convolutional Neural Network

M M Shaifur Rahman
Advisor: Dr. Tarek M Taha

Research Objective: Large-Scale Image Training With Deep Convolutional Neural Network

Abstract

- Large-scale megapixel images are challenging to process with classical deep-learning architectures due to the memory and computational requirements.
- We developed a novel approach to training and inference in higher-resolution input images (e.g., 1024 x 1024 pixels) with Deep Convolutional Neural Network.
- The results demonstrate significant improvements in accuracy over existing deep learning methods.



Current Approach: (a) Image Patching Image

(b) Down-sampling

Methodology

- Our proposed architecture uses a Learnable-Image-Resizer with a state-of-the-art DCNN Network.

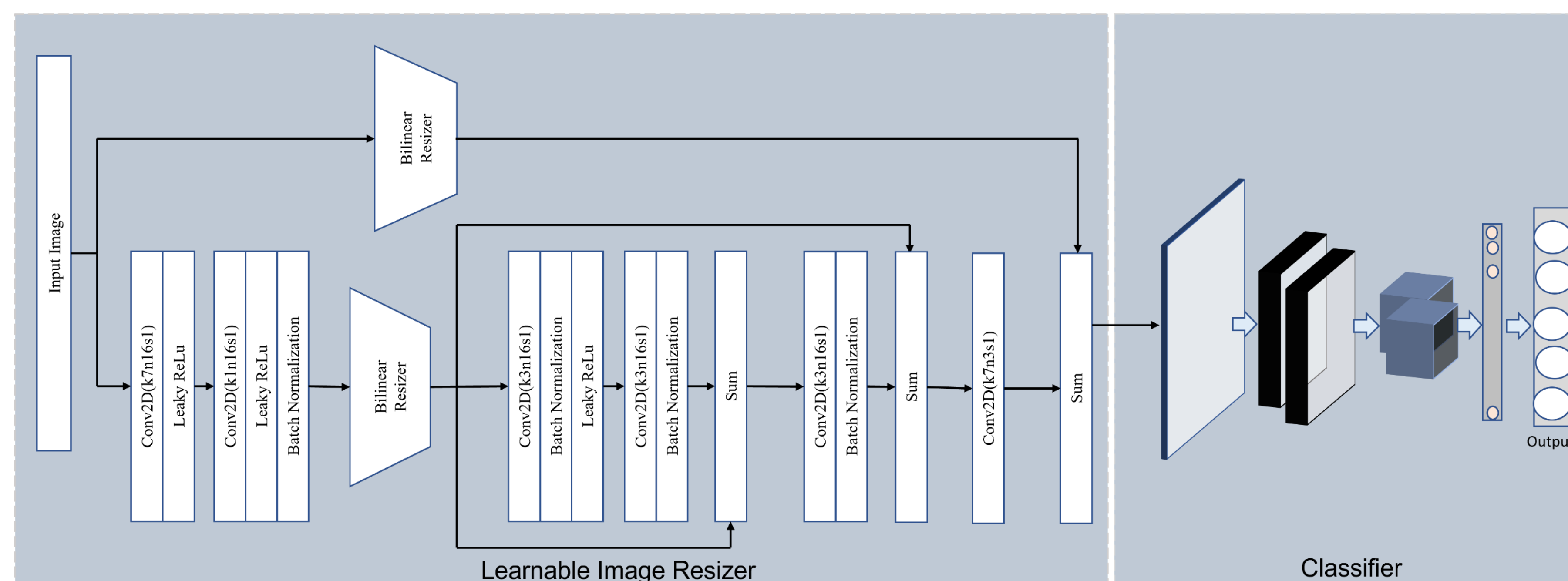


Figure 1: Our End-to-end proposed architecture Deep Convolutional Neural Network

Results

- Accuracy increase for using Large-Scale Images in training.

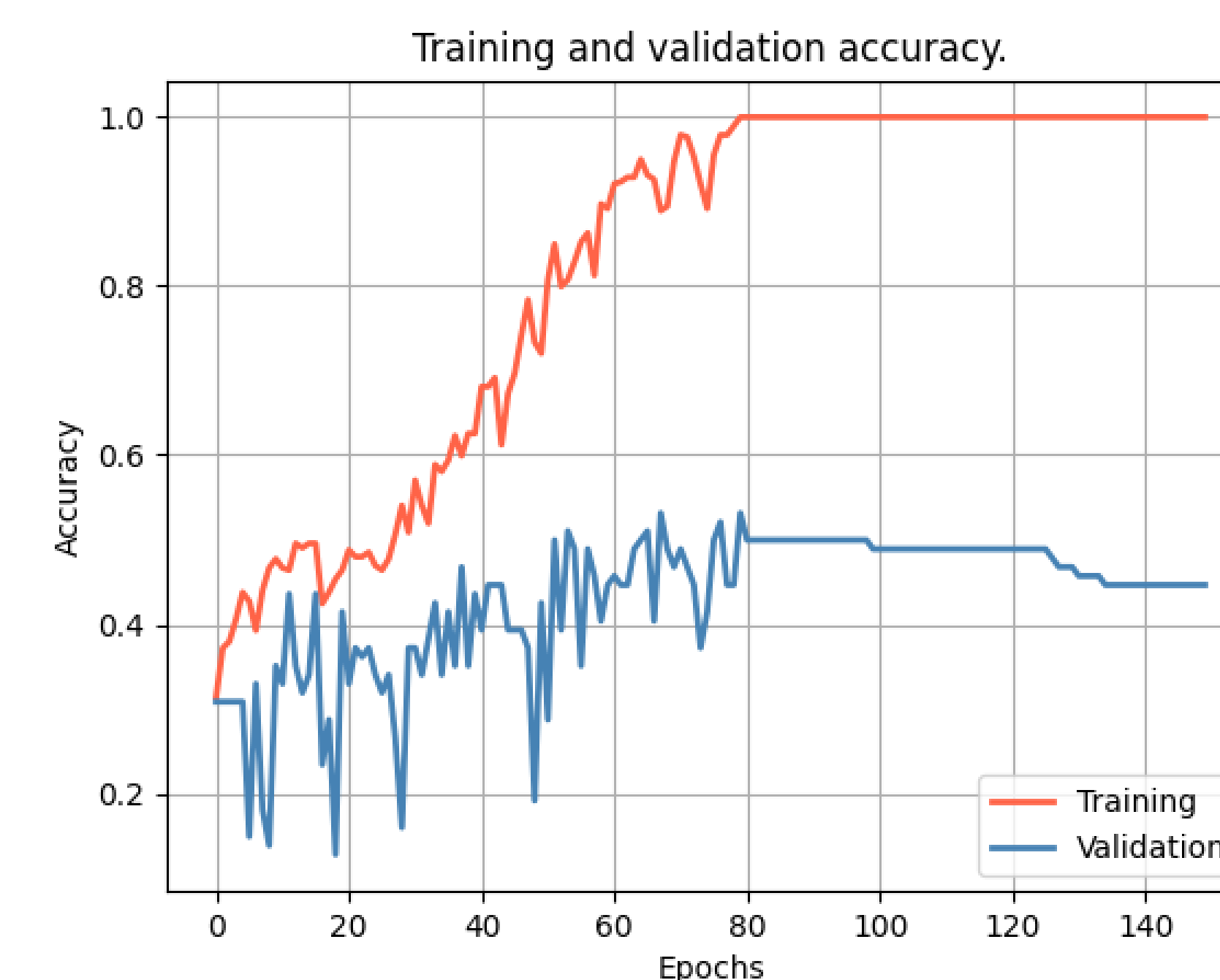


Figure 2: 512x512 pixels images and ResNet50 DCNN

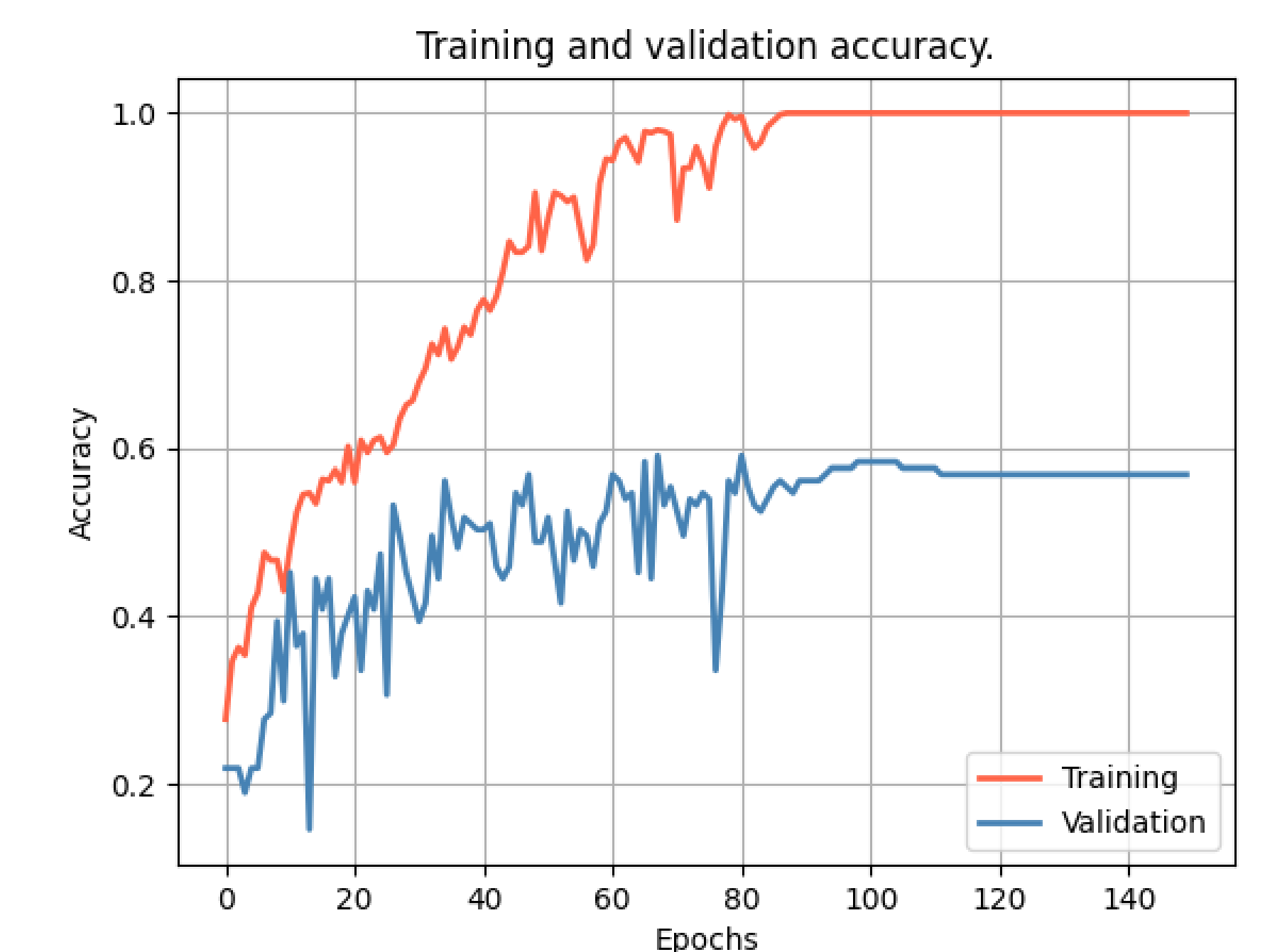


Figure 3: 1024x1024 pixels images and ResNet50 DCNN

Conclusion

- First-ever Network to train with Large-Scale Diabetic Retinopathy Images.
- Our end-to-end architecture outperforms existing results for diabetic retinopathy.

Future Work

- The proposed model needs to be tested for generalization ability.
- Transfer Learning, Batch-by-Batch learning approach needs to be observed for network performance improvement.
- Other large-scale imaging modalities, such as remote sensing and histopathological image analysis, need to be explored.