Wound Classification

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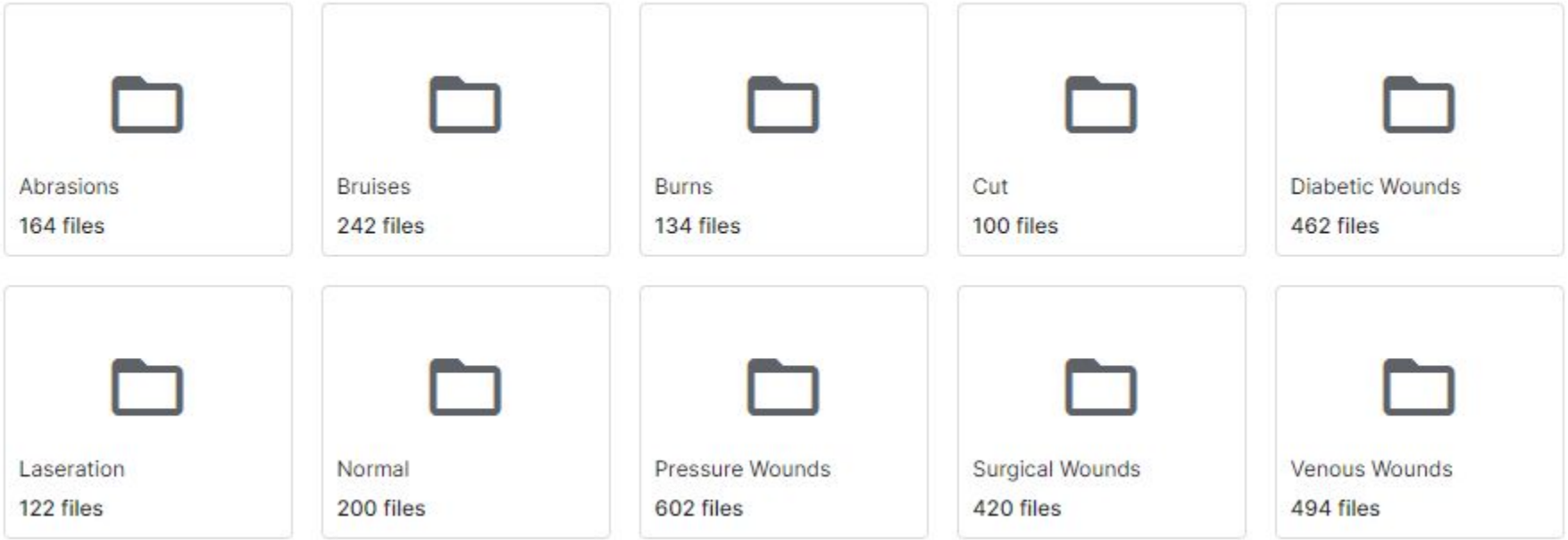
Dataset

- Kaggle - Collected and Categorized Wound Images Dataset: 10 classes; 2940 images



Data Augmentation

01

ReSize

Re-sized all images to (224, 224)

02

Horizontal & Vertical Flip

03

Rotation

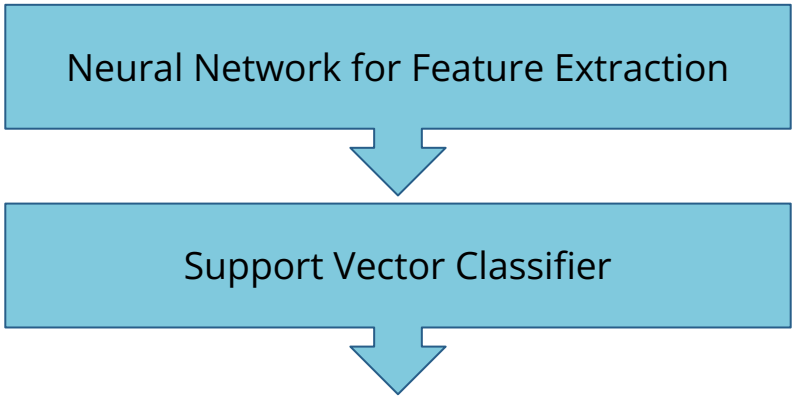
By 10

04

Normalize

Based on ResNet50 - [0.485, 0.456, 0.406], [0.229, 0.224, 0.225]

Non-Deep Learning Approach

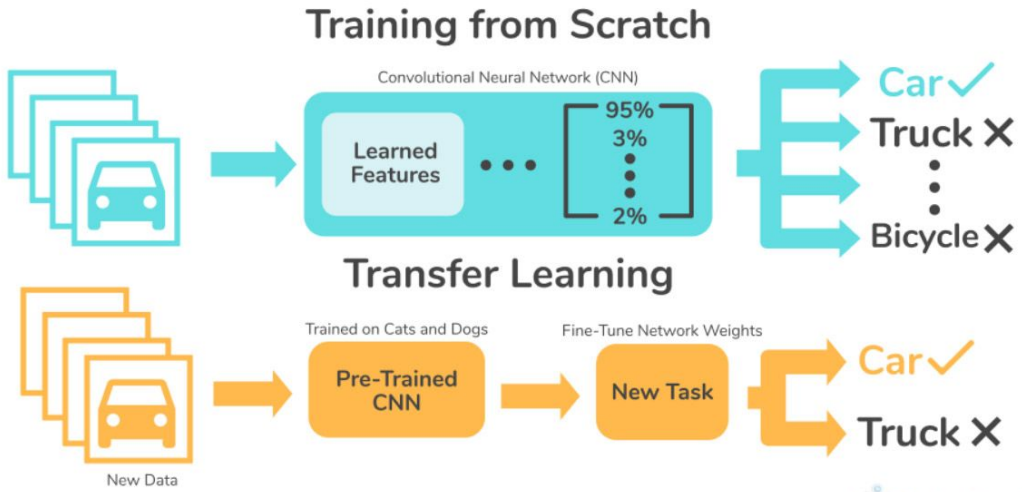


Results:
Accuracy -

<40%

Transfer Learning

It is a technique in machine learning (ML) in which knowledge learned from a task is re-used in order to boost performance on a related task



Model Architectures

01
ResNet34

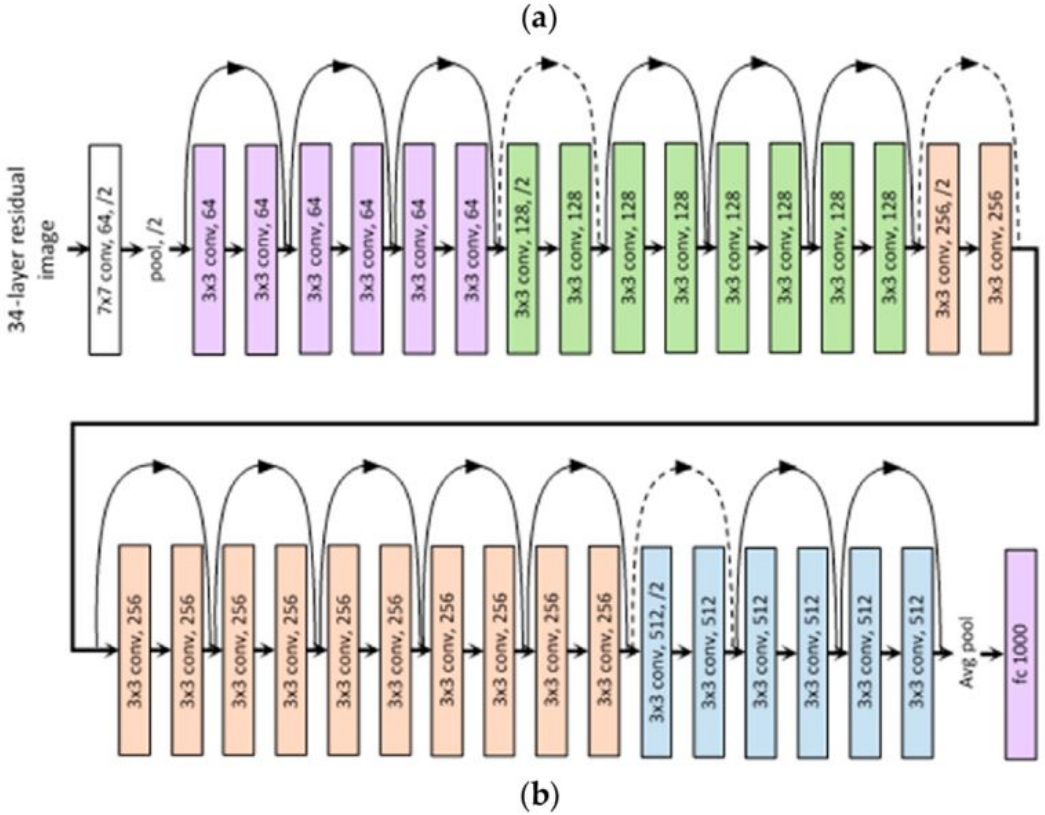
02
ResNet50

03
InceptionV3

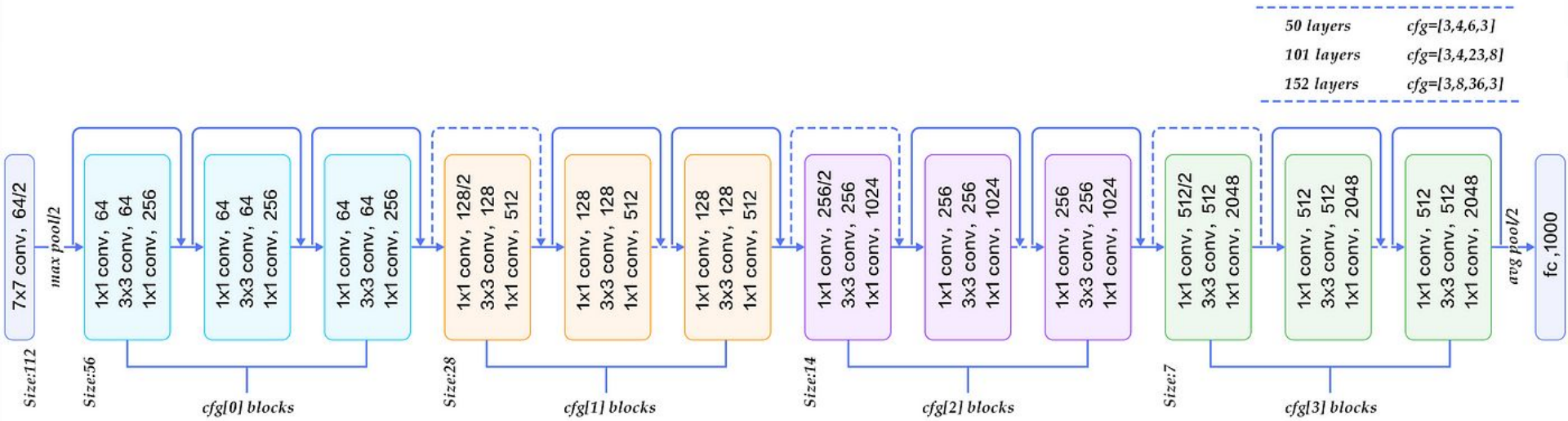
04
EfficientNet

Mean Model: ResNet34

- Froze the feature extractor layers
- Updated FC for 10 classes.

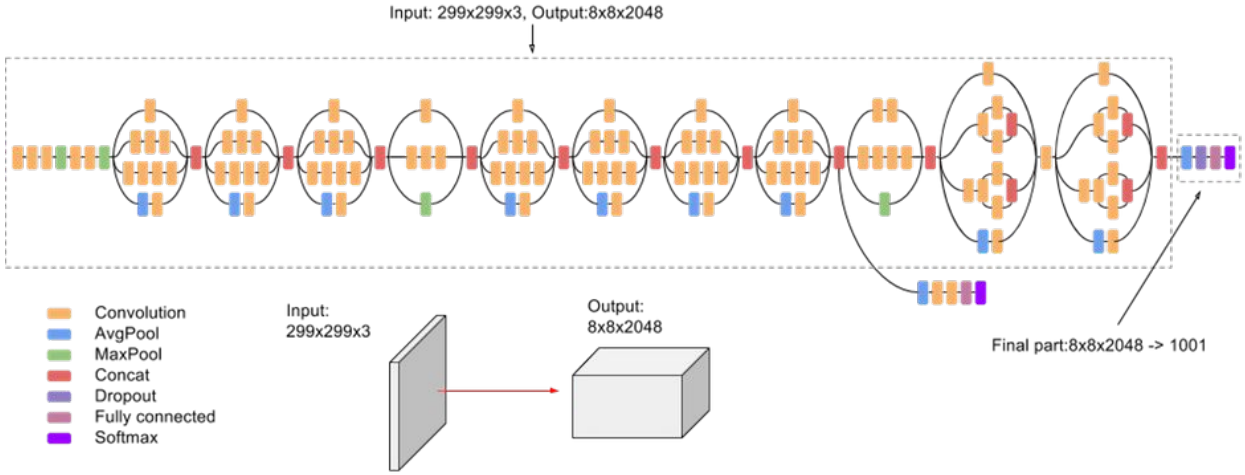


ResNet50



- Froze the feature extractor layers
- Updated FC for 10 classes.

InceptionV3



- Same processing & architecture changes
- Performed poorly - Hence, dropped it.

EfficientNet

It is a convolutional neural network architecture and scaling method that uniformly scales all dimensions of depth/width/resolution using a compound coefficient.

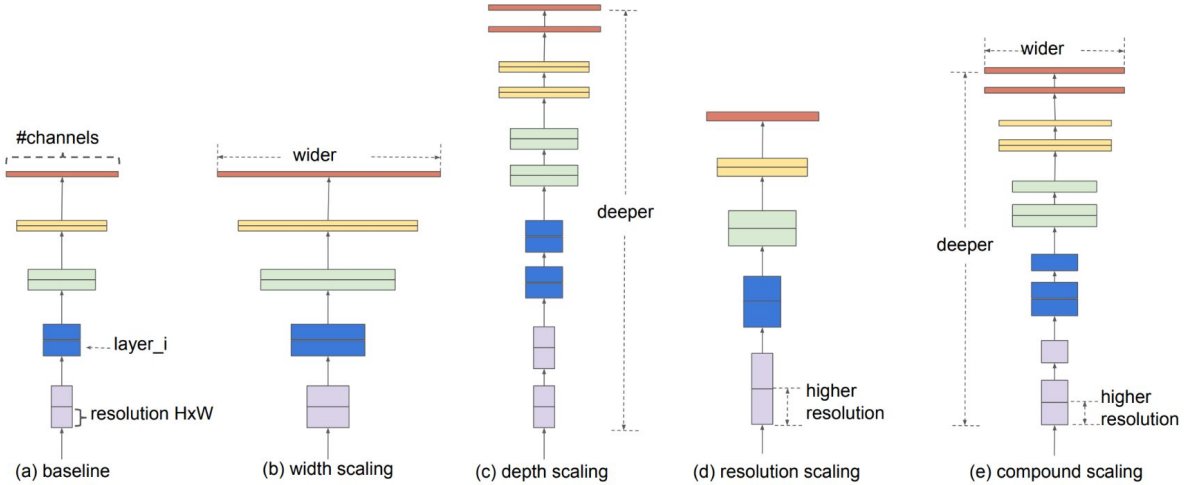
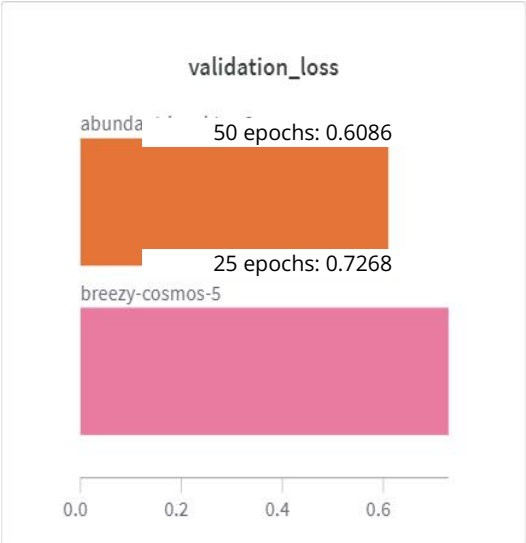


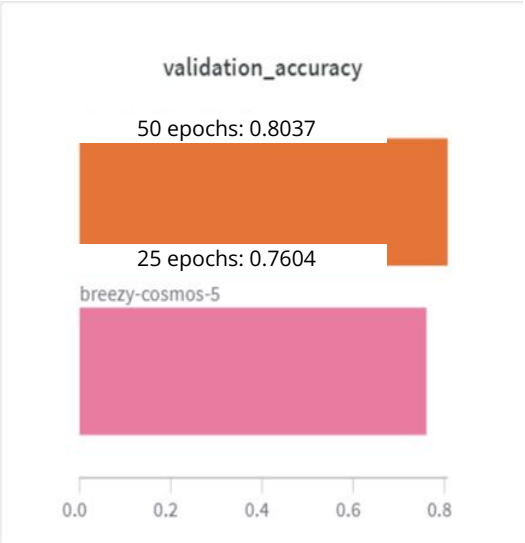
Figure 2. **Model Scaling.** (a) is a baseline network example; (b)-(d) are conventional scaling that only increases one dimension of network width, depth, or resolution. (e) is our proposed compound scaling method that uniformly scales all three dimensions with a fixed ratio.

Hyperparameter Tuning

- Learning Rate - 0.003 & 0.001
- Batch size - 32
- Epochs - 10 to 50
- Regularization Techniques:
  - Adam Optimizer
  - One-Cycle Policy
  - Batch Normalization (built into resnet)

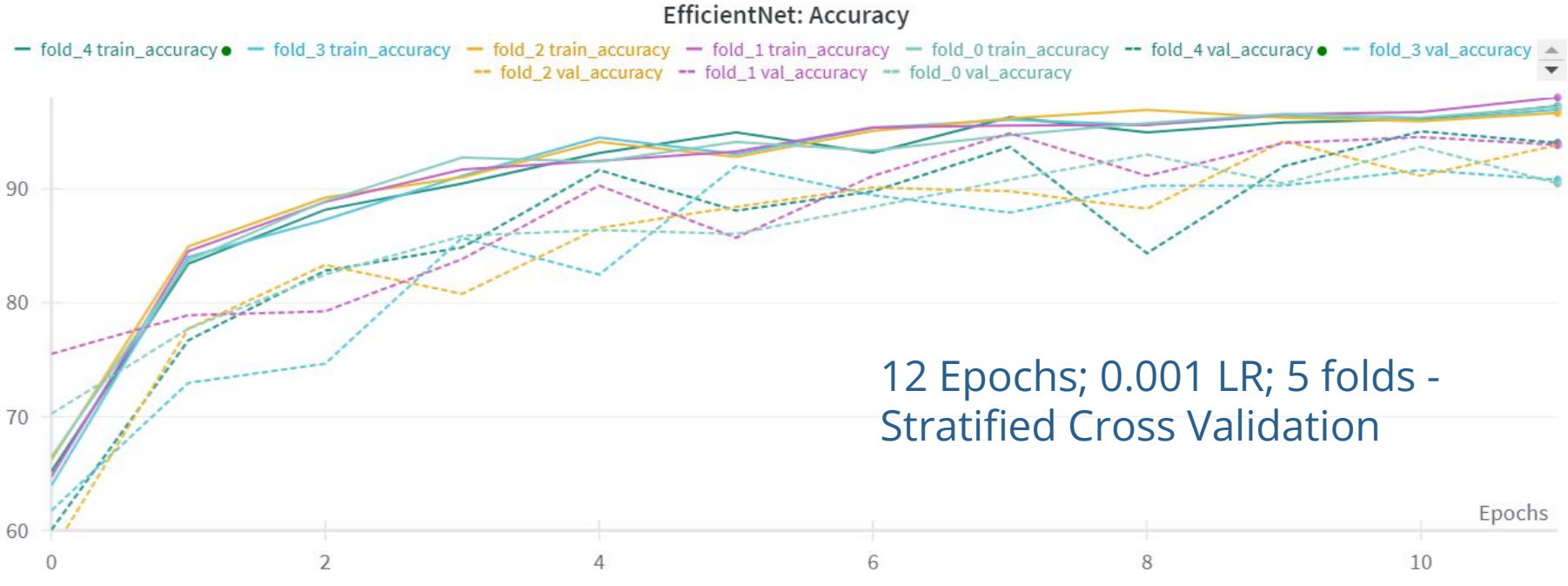
ResNet50 Results





Adam Optimizer, 0.001 LR & 32 batch size

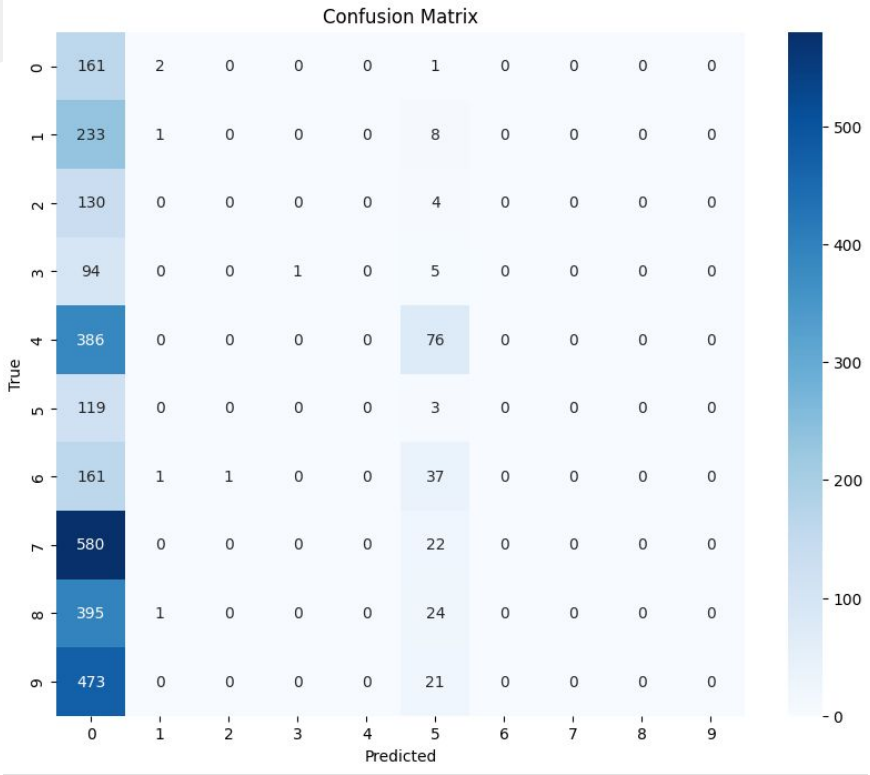
EfficientNet Results



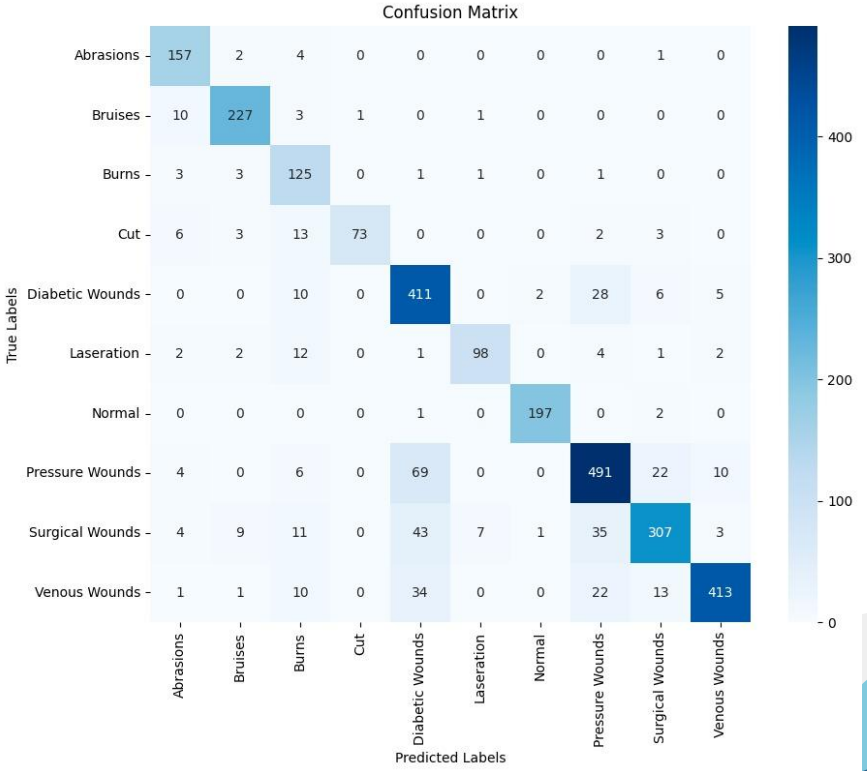
12 Epochs; 0.001 LR; 5 folds - Stratified Cross Validation

Results

EfficientNet



ResNet50



Results

ResNet50

	Class	Recall	Precision
0	Abrasions	0.957317	0.839572
1	Bruises	0.938017	0.919028
2	Burns	0.932836	0.644330
3	Cut	0.730000	0.986486
4	Diabetic Wounds	0.889610	0.733929
5	Laseration	0.803279	0.915888
6	Normal	0.985000	0.985000
7	Pressure Wounds	0.815615	0.842196
8	Surgical Wounds	0.730952	0.864789
9	Venous Wounds	0.836032	0.953811

Label: Burns, Predicted: Burns

Label: Abrasions, Predicted: Abrasions

Label: Venous Wounds, Predicted: Venous Wounds

Label: Abrasions, Predicted: Abrasions

Results

Demo

Thank you!