

Wound Classification

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Dataset

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



Abrasions
164 files



Bruises
242 files



Burns
134 files



Cut
100 files



Diabetic Wounds
462 files



Laseration
122 files



Normal
200 files



Pressure Wounds
602 files



Surgical Wounds
420 files



Venous Wounds
494 files

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

Neural Network for Feature Extraction



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graph TD; A[Neural Network for Feature Extraction] --> B[Support Vector Classifier]; B --> C[Results: Accuracy - <40%];
```

The diagram illustrates a two-step process. The first step is a light blue rectangular box containing the text 'Neural Network for Feature Extraction'. A large, light blue downward-pointing arrow connects this box to a second, identical light blue rectangular box below it, which contains the text 'Support Vector Classifier'. Another large, light blue downward-pointing arrow connects the second box to the final result text at the bottom of the slide.

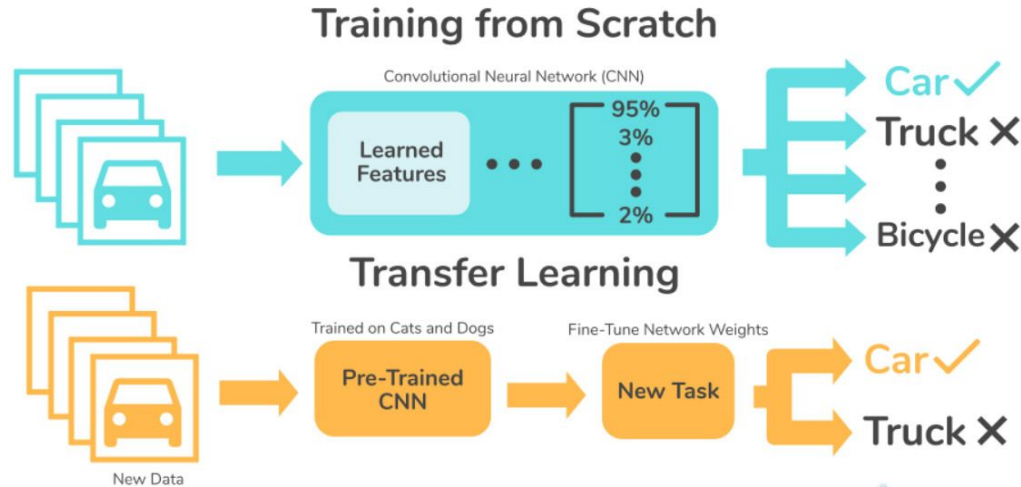
Support Vector Classifier

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

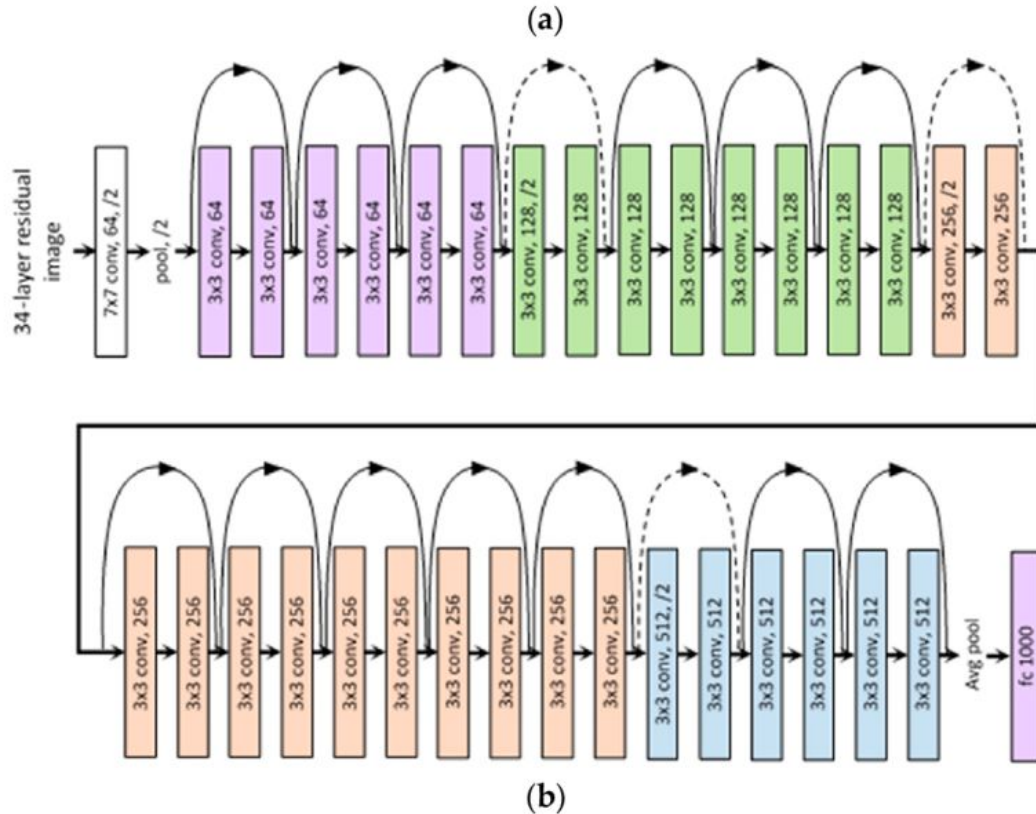
InceptionV3

04

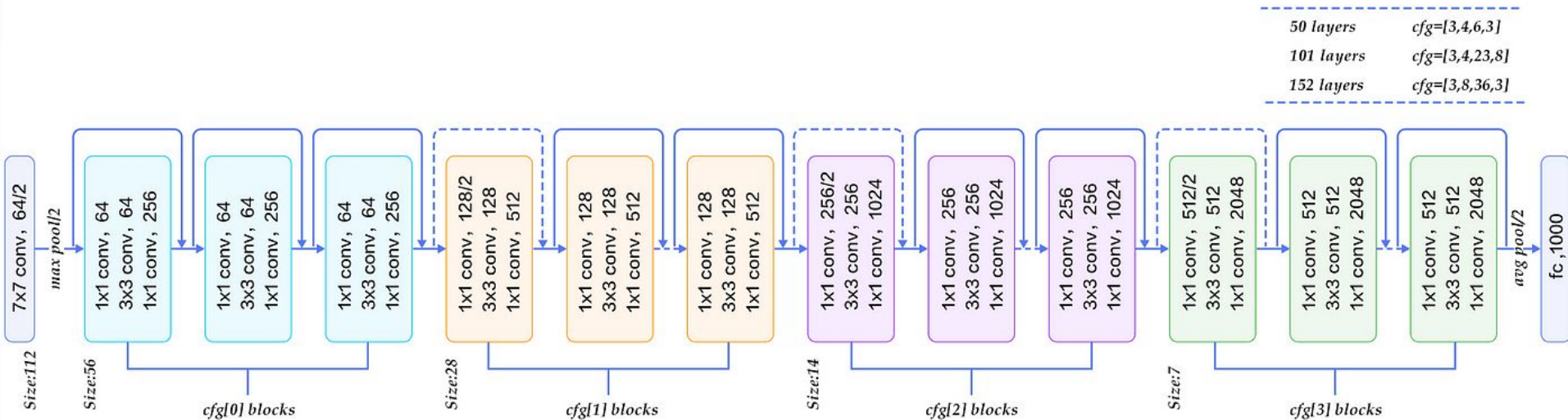
EfficientNet

Mean Model: ResNet34

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

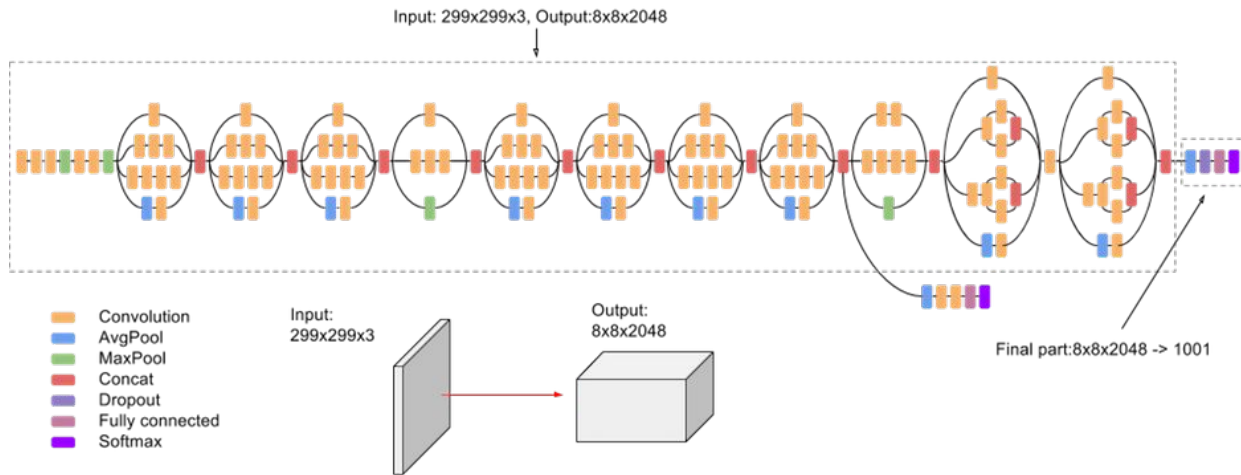


ResNet50



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

Inception V3



- 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.

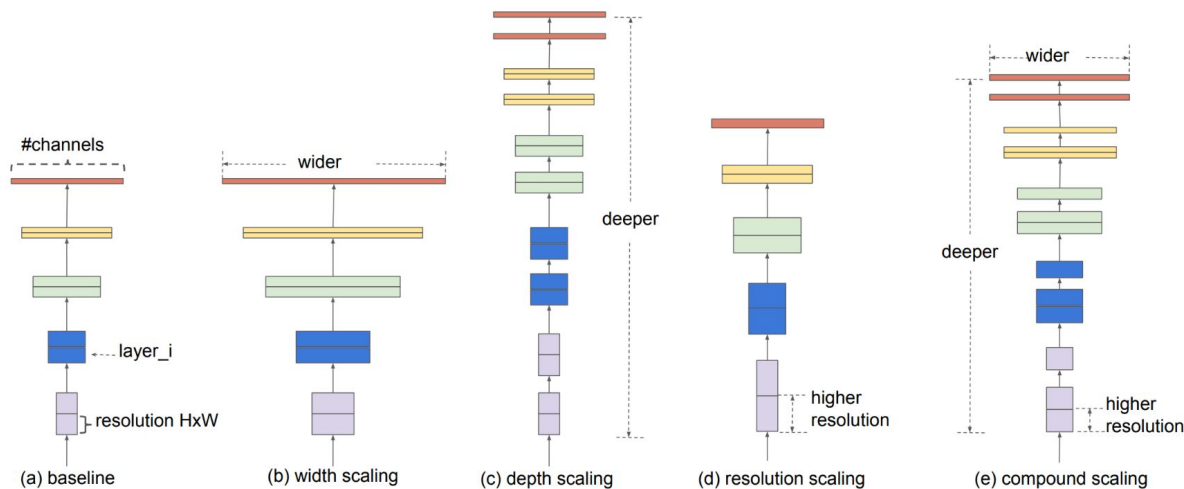


Figure 2. Model Scaling. (a) is a baseline network example; (b)-(d) are conventional scaling that only increases one dimension of network width, depth, or resolution. (e) is our proposed compound scaling method that uniformly scales all three dimensions with a fixed ratio.



Hyperparameter Tuning

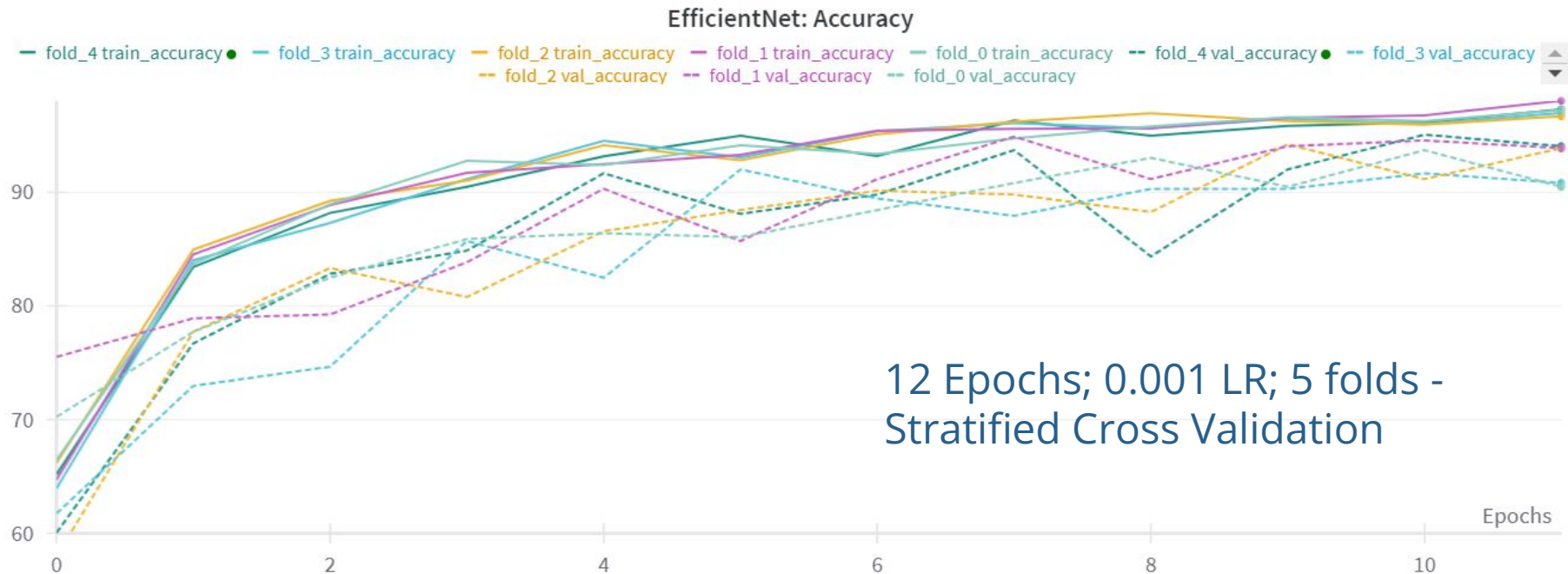
- Learning Rate - 0.003 & 0.001
- Batch size - 32
- Epochs - 10 to 50
- Regularization Techniques:
 - Adam Optimizer
 - One-Cycle Policy
 - Batch Normalization (built into resnet)

ResNet50 Results



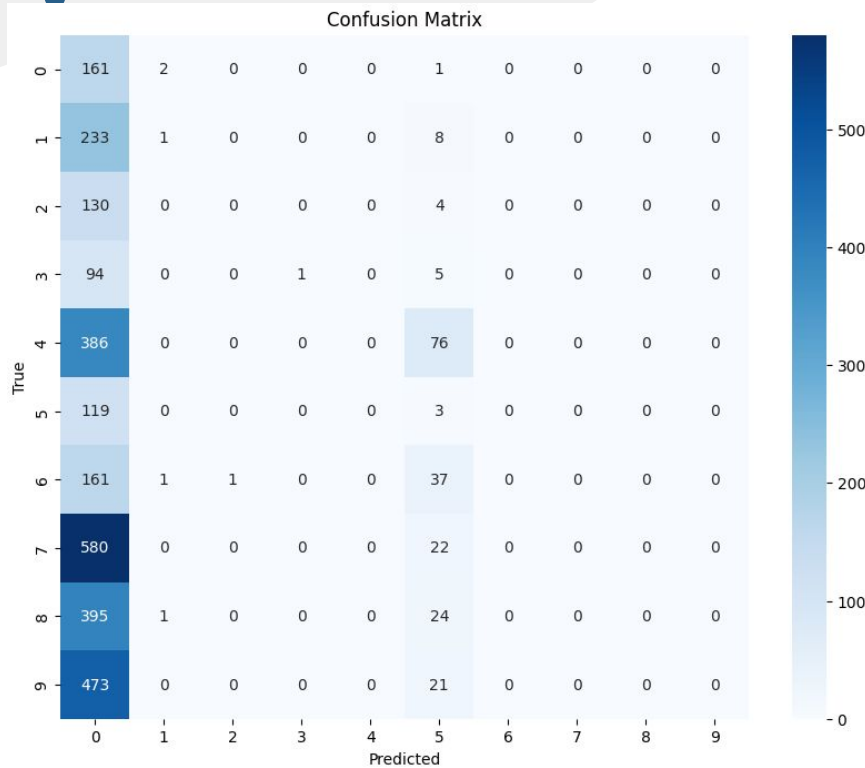
Adam Optimizer, 0.001
LR & 32 batch size

EfficientNet Results

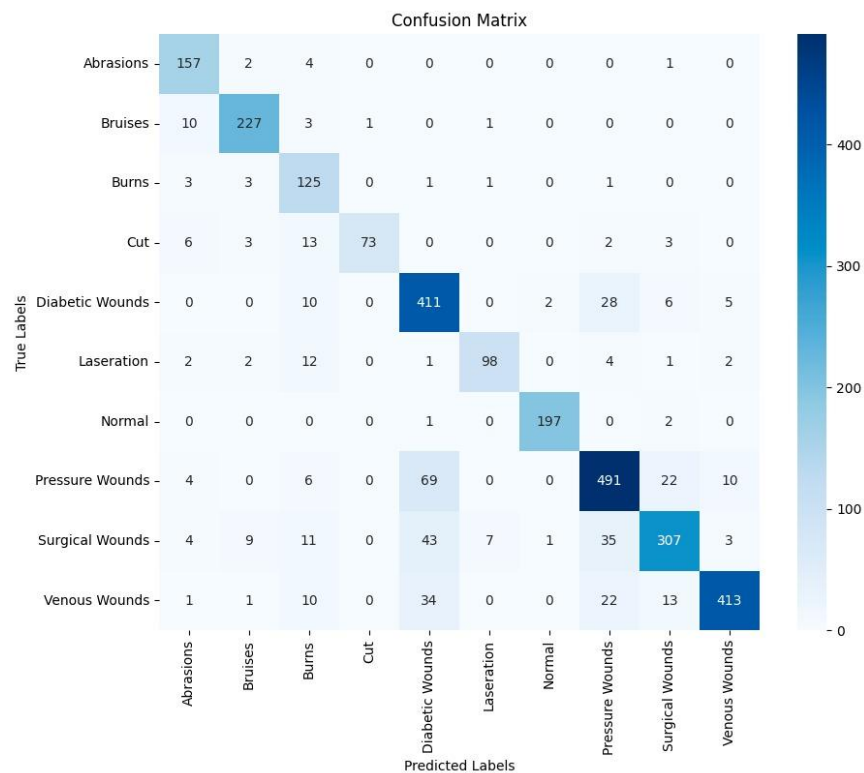


Results

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

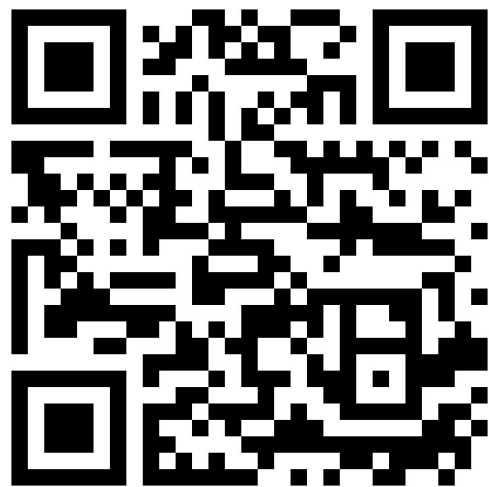


Label: Abrasions, Predicted: Abrasions



Results

Demo





Thank you!