One Day Hackathon: Intel Image Classification

TOC

Overview

Project objective

Custom model

Transfer learning with EfficientNetV2L

Project objective

To create a convolutional neural network classifier that can differentiate between buildings, forests, oceans, mountains, streets, & glaciers

Overview

Data Collection

- 14,000 images in Train
- 3,000 images in Test*
- 7,000 images in Prediction**

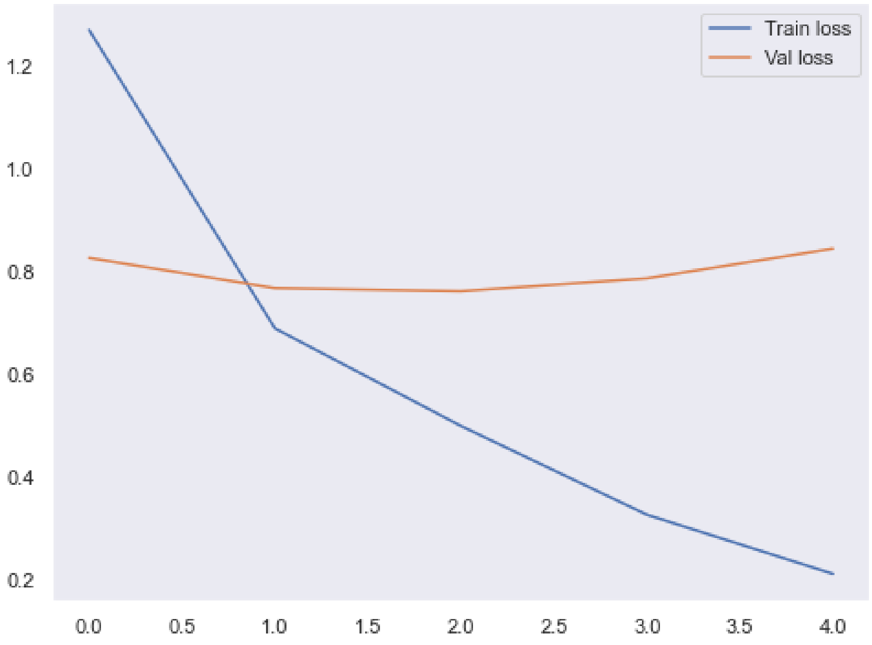
Data Cleaning / EDA

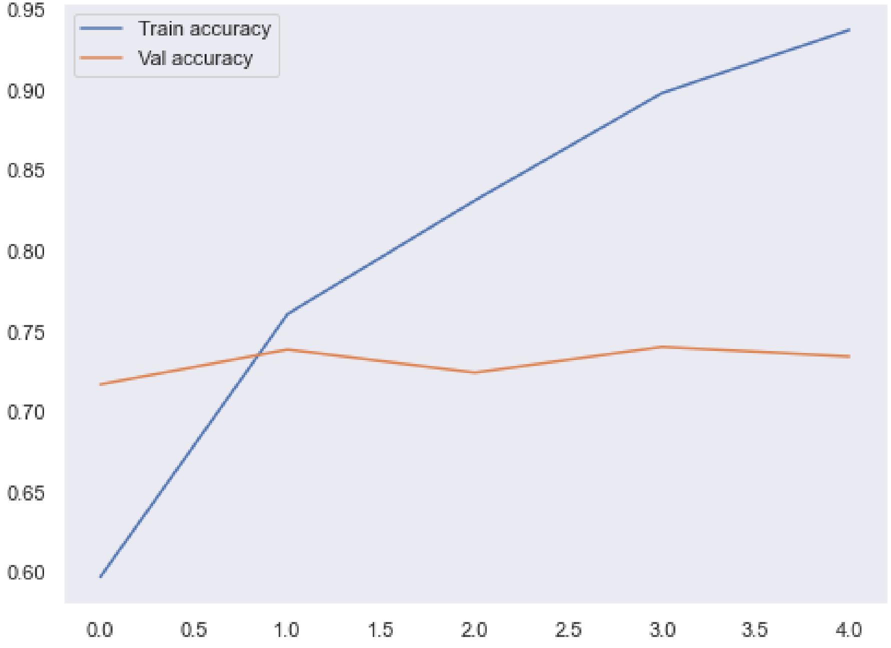
- Dataset was clean, dealing only with images that were already sorted

Modeling and Interpretation

- Convolutional Neural Network
- Had most difficulty classifying Buildings against Streets, And Glaciers against Mountains
- 90%_ val_accuracy score

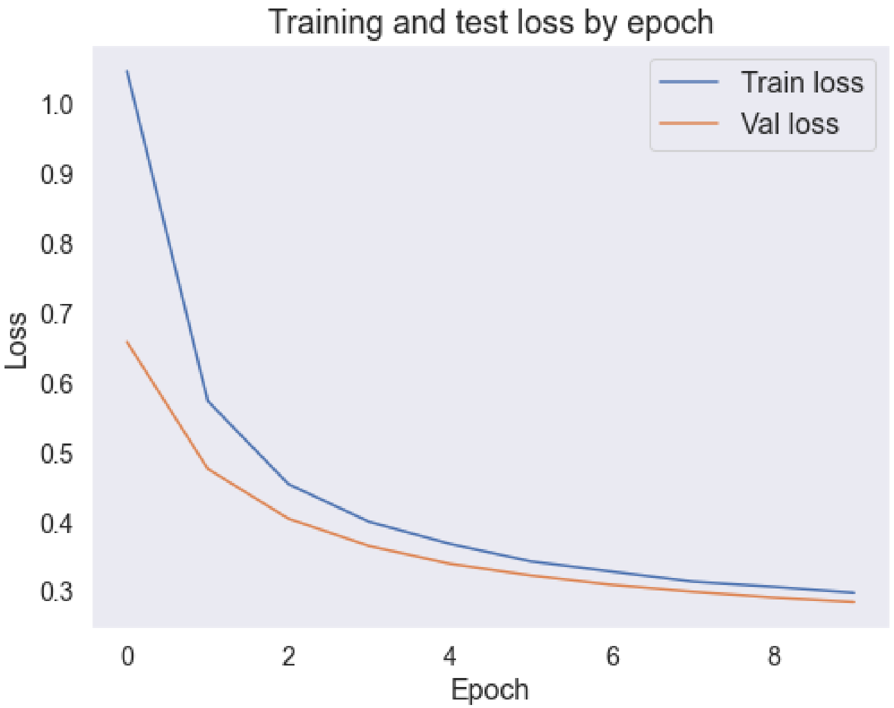
Our custom model performed at 74% accuracy



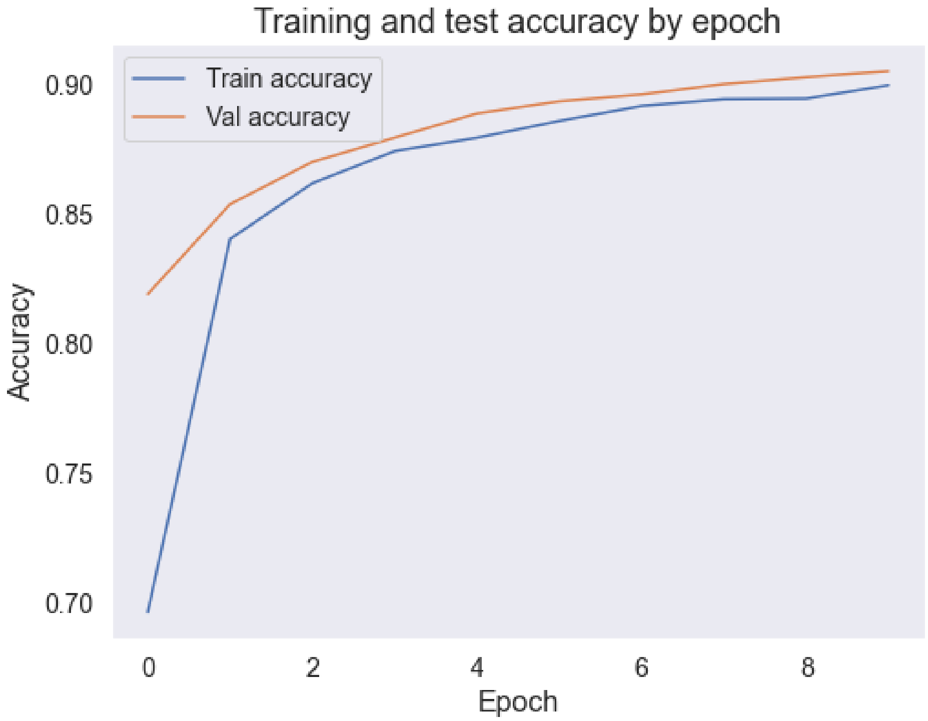


Baseline score for a 6 category classification problem with equal class representation is 16.6%

Transfer learning achieved 90%+ accuracy



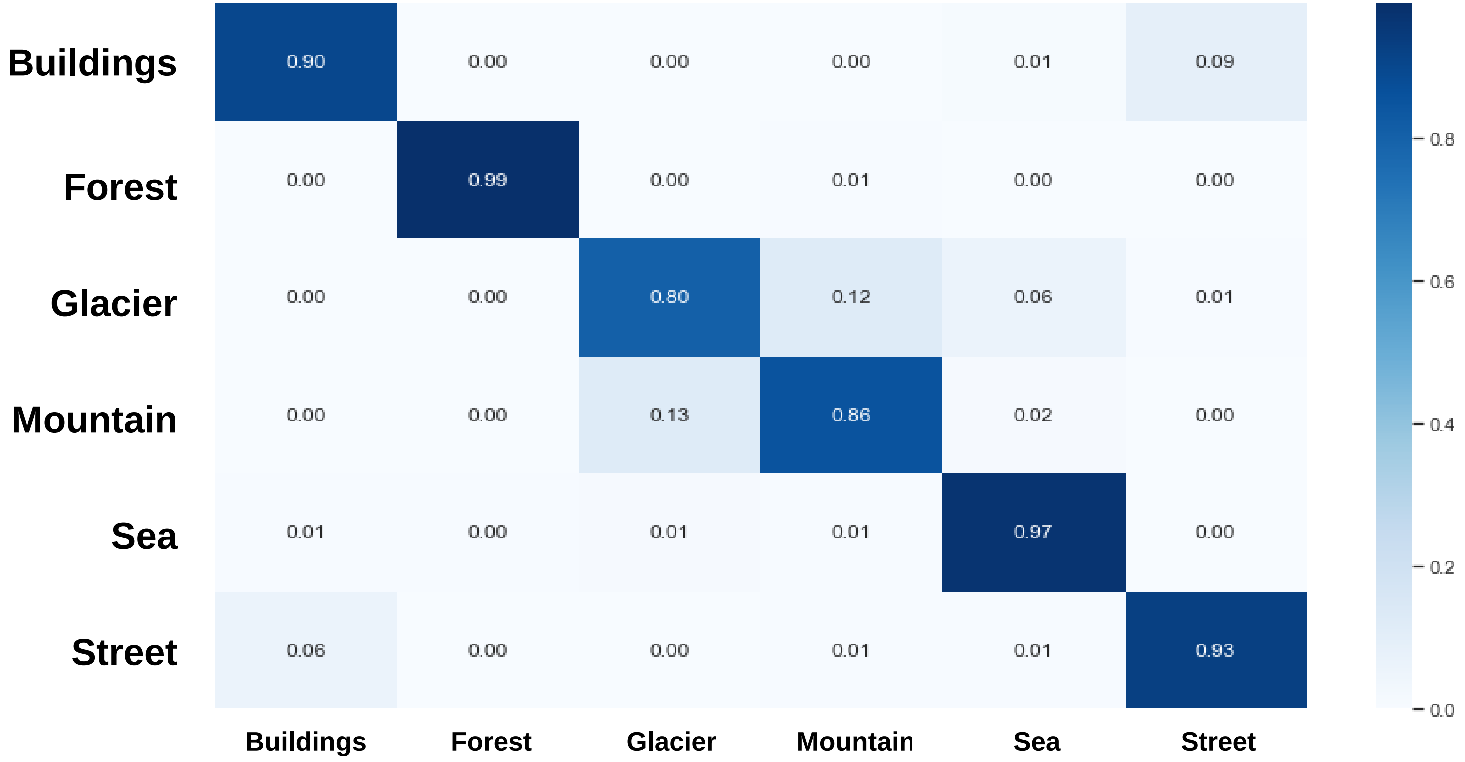
Training and test loss by epoch



Training and test accuracy by epoch

Could have achieved marginally higher accuracy on test data with more training epochs, given more time

Model best identifies forests, worst at glaciers

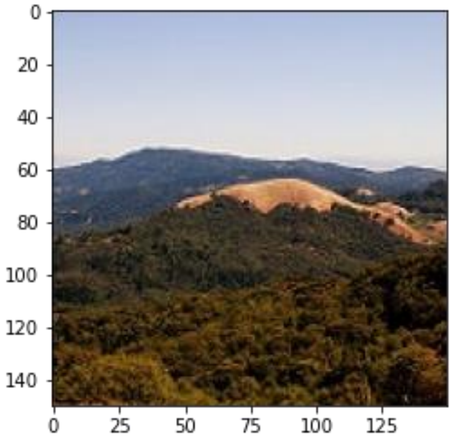


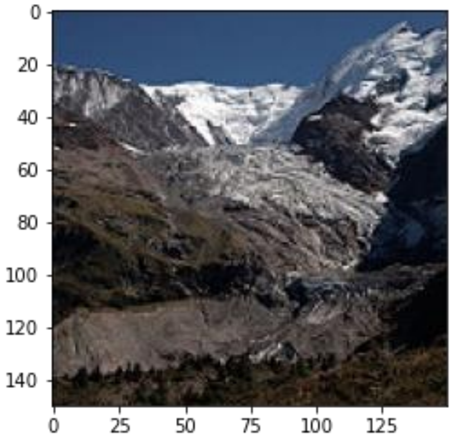
	Buildings	Forest	Glacier	Mountain	Sea	Street
Buildings	0.90	0.00	0.00	0.00	0.01	0.09
Forest	0.00	0.99	0.00	0.01	0.00	0.00
Glacier	0.00	0.00	0.80	0.12	0.06	0.01
Mountain	0.00	0.00	0.13	0.86	0.02	0.00
Sea	0.01	0.00	0.01	0.01	0.97	0.00
Street	0.06	0.00	0.00	0.01	0.01	0.93

To emphasize how good 90% accuracy is on this task, let's play a game...

Let’s play a game:
Which is which?

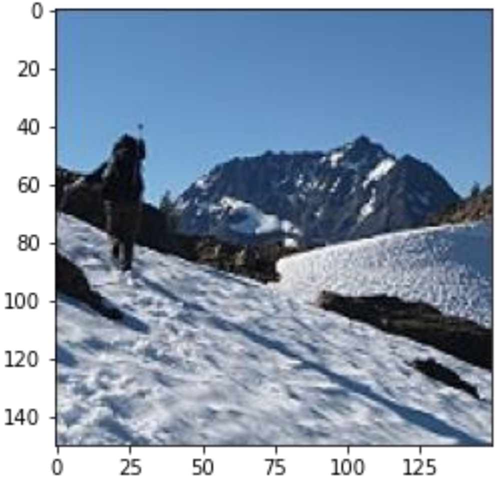
Mountain or glacier?

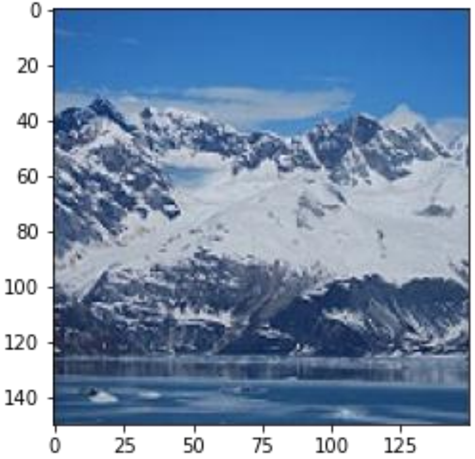




Left is mountain! And Right is glacier!

That was easy? Ok, how about these two?

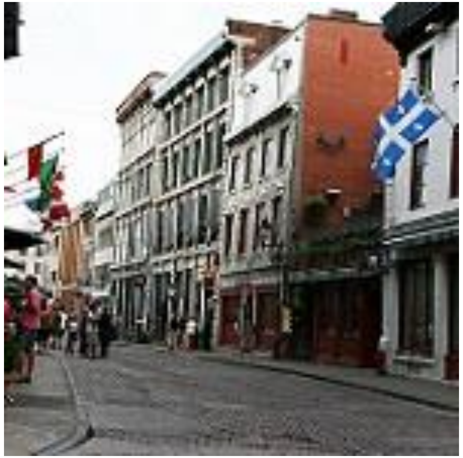


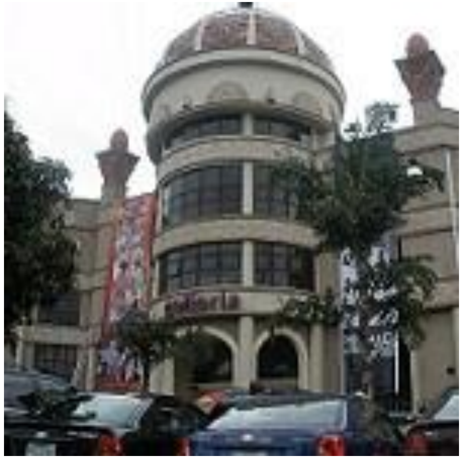


Left is mountain! And right is glacier

Let’s play a game: Which is which?

Building or street?

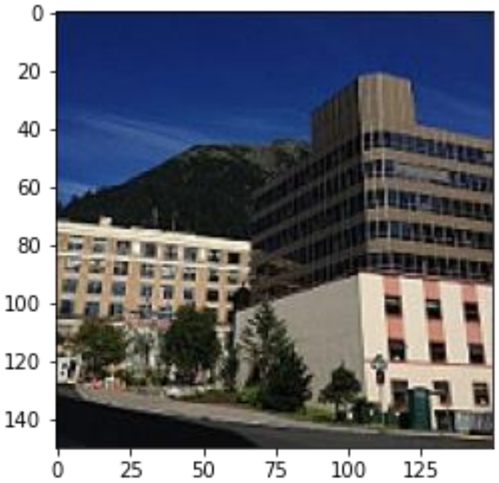


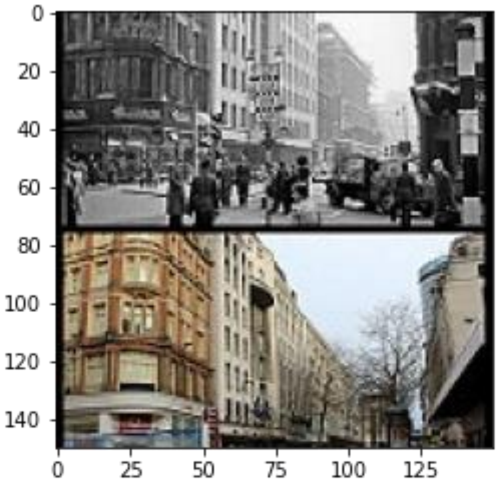


Street is on left Building is on right

Let’s play a game: Which is which?

Building or street?





Building is on left and Street is on right!

Conclusion

Image classification is a powerful tool that requires complex architecture, extremely deep models with very large numbers of parameters, and huge datasets for effective training - but with transfer learning, you can look like a pro with just a few tweaks and custom layers!

Thank you.