Report for assignment 3

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1) Overview and Problem Statement

In exercise 3, we worked with Intel Image classification which consists image data of Natural Scenes around the world. It contains around 25k images of size 150x150 distributed under 6 categories. Our goal is to use a ResNet architecture to solve an imagery classification problem.

2) Data Preparation

The process of aggregating and making the data ready for fitting into the models consists of following steps:

1. The data was available in two formats of train, test and prediction sets. 15% of train set is used as validation set. There were 6 different classes as target labels for the records. The size of each input image is 150* 150 pixels.
2. ToTensor and Normalization transformers are used for both train and test sets. Train set uses ColorJitter and RandomHorizontalFlip too.
3. Train, test, and validation datasets were passed into their own data loader.

3) Methodology

We started with a simple model(model_1) and achieved 90.56%. We used resnet101 as the pre-trained model.

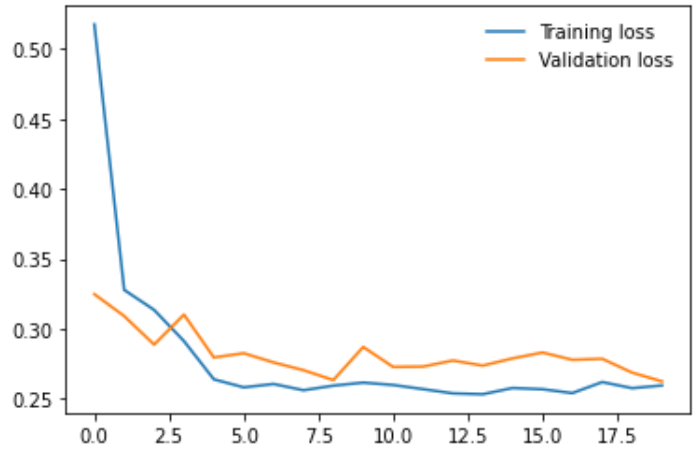
We tried other versions of resnet, resnext, vgg and densenet as well.

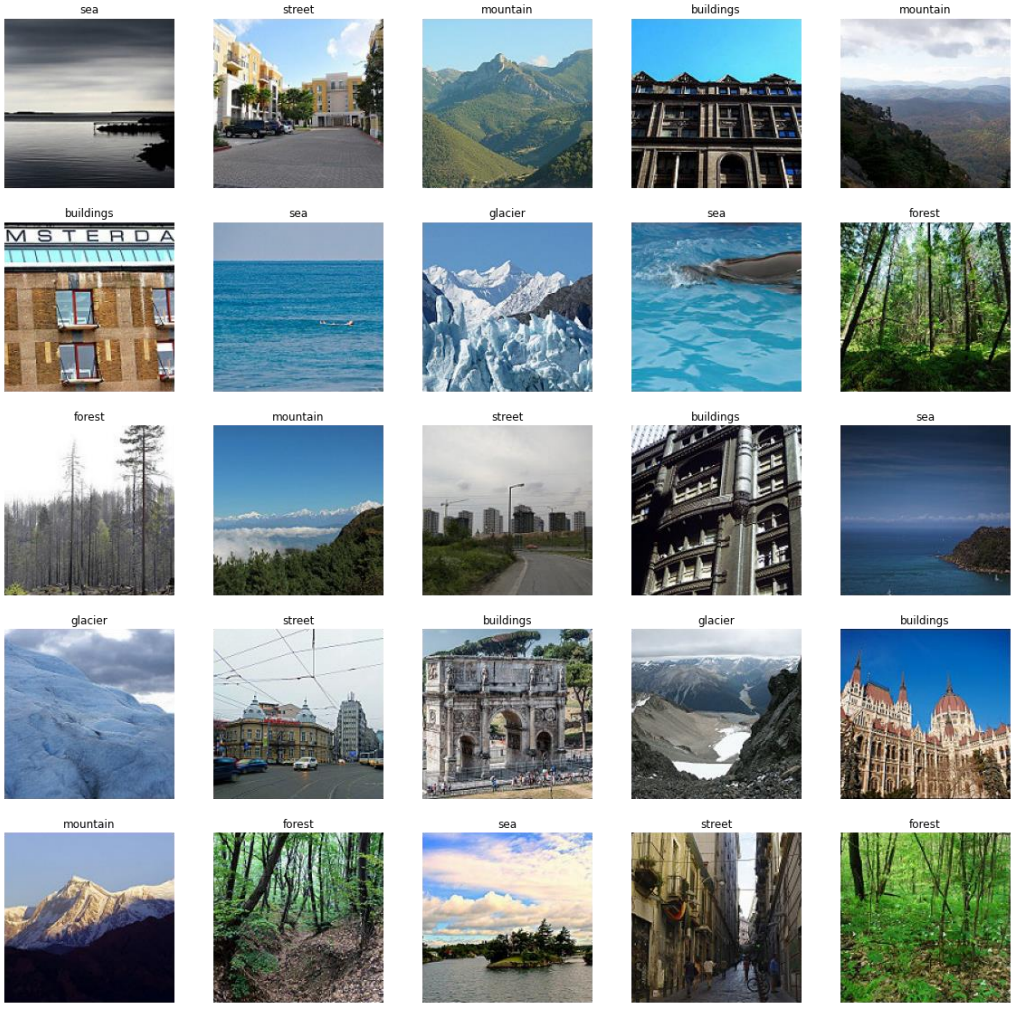
Here is a summary of the 8 models:

Base model	Layers	Accuracy
resnet101	Linear(num_ftrs, 6)	90.56%
resnet101	Dropout(p=0.2, inplace=True) Linear(num_ftrs, 6)	90.33%
resnet101	Linear(num_ftrs, 512) ReLU() Dropout(0.2) Linear(512, 6)	91.13%
resnet152	Linear(num_ftrs, 512) ReLU() Dropout(0.2) Linear(512, 256) ReLU() Linear(256, 6)	90.56%
resnext101_32x8d	Linear(num_ftrs, 512) ReLU() Dropout(0.2) Linear(512, 6)	91.26%
vgg19	Linear(num_ftrs, 512) ReLU() Dropout(0.2) Linear(512, 256) ReLU() Linear(256, 6)	90.7%
densenet161	Linear(num_ftrs, 512) ReLU() Dropout(0.2) Linear(512, 256) ReLU() Linear(256, 6)	91.56%
densenet161	Linear(num_ftrs, 1024) ReLU() Dropout(0.2) Linear(1024, 512) ReLU() Linear(512, 256) ReLU() Linear(256, 6)	91.5%

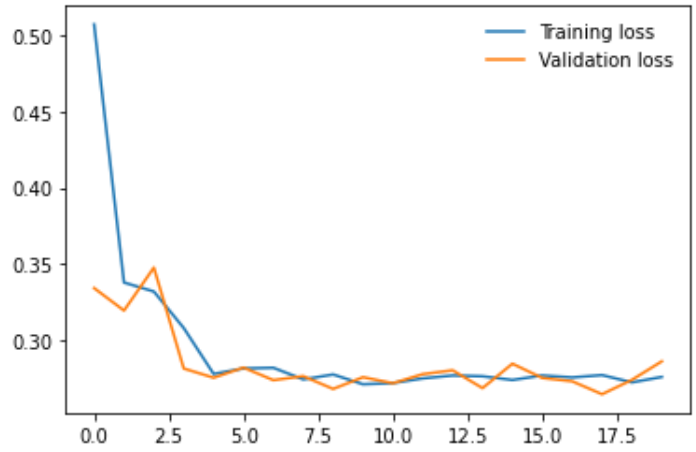
4) Result

A) 1st model





B) 2nd model


Training loss
Validation loss
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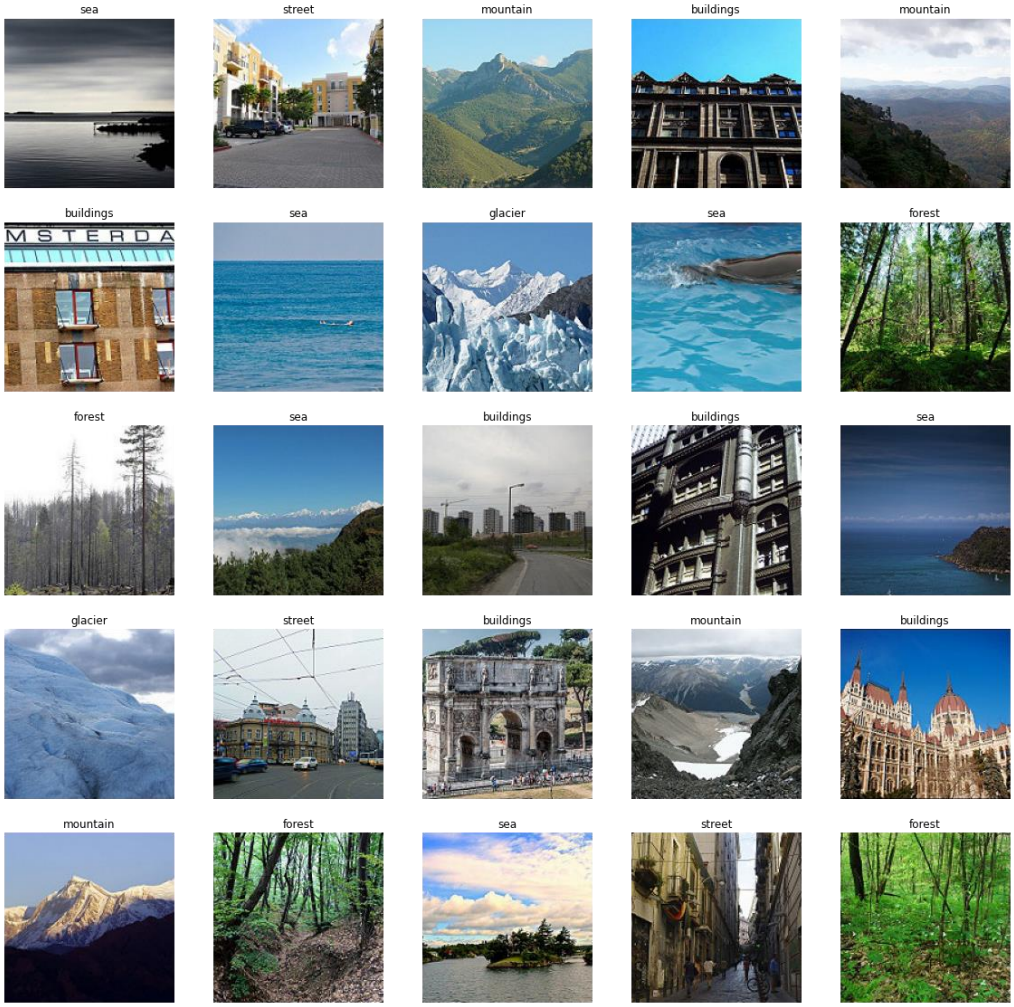
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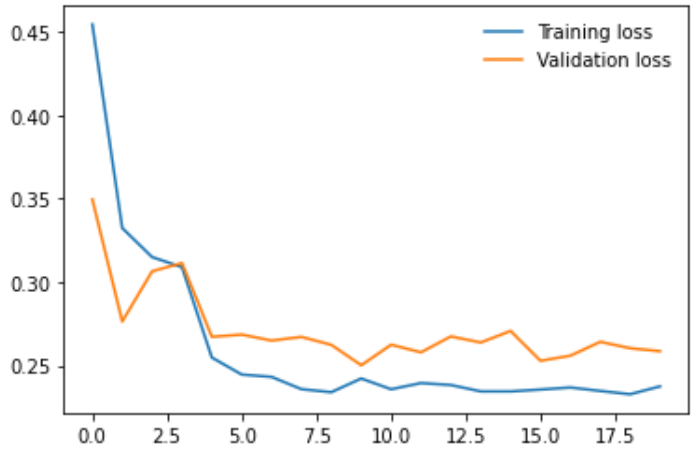
C) 3rd model


Training loss
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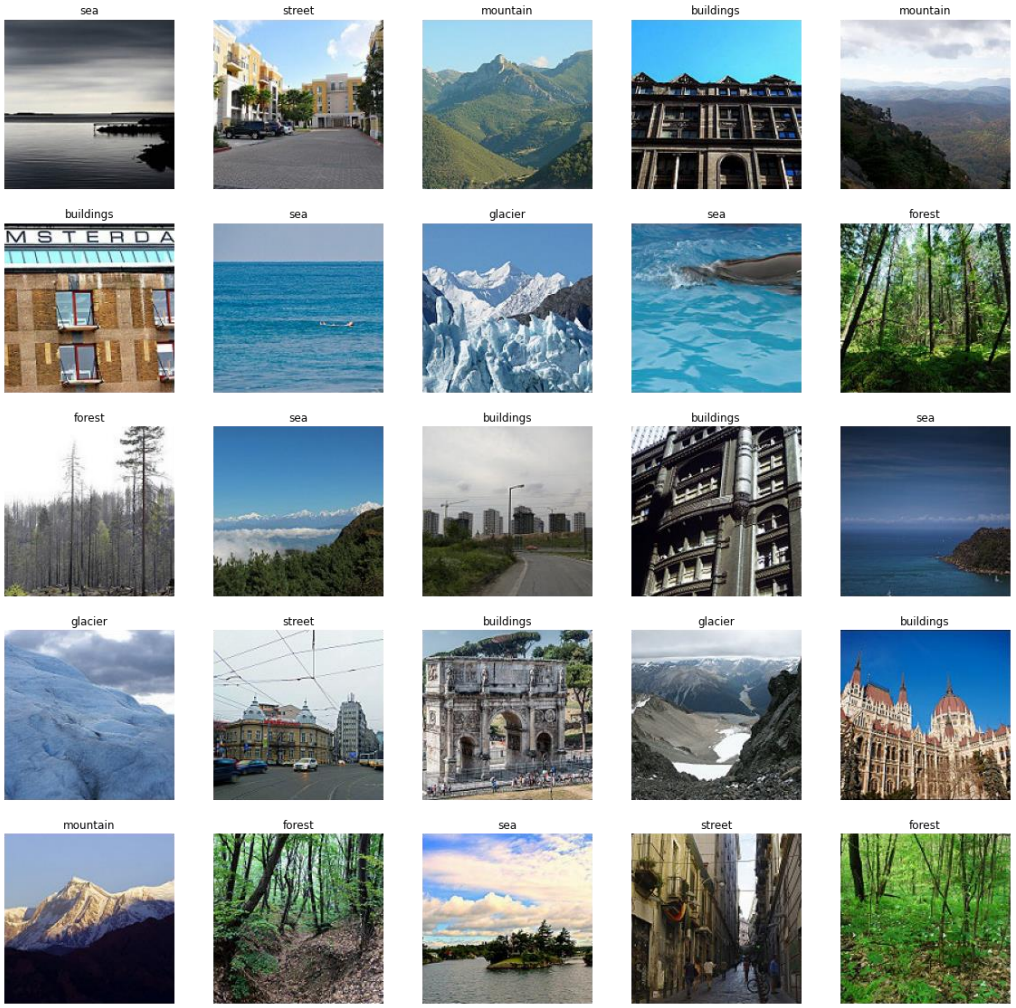
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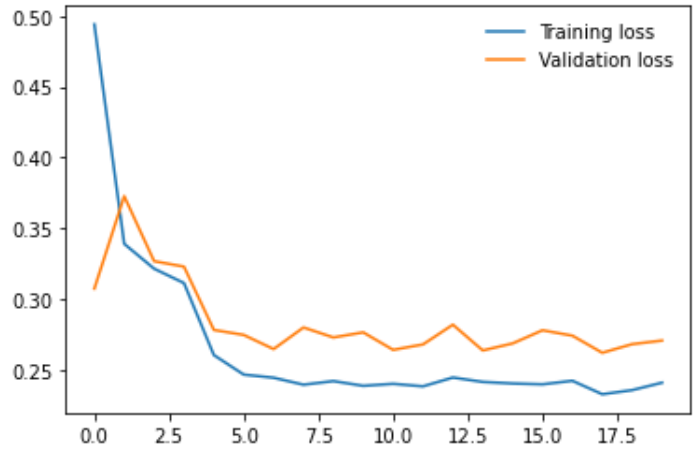
D) 4th model


Training loss
Validation loss
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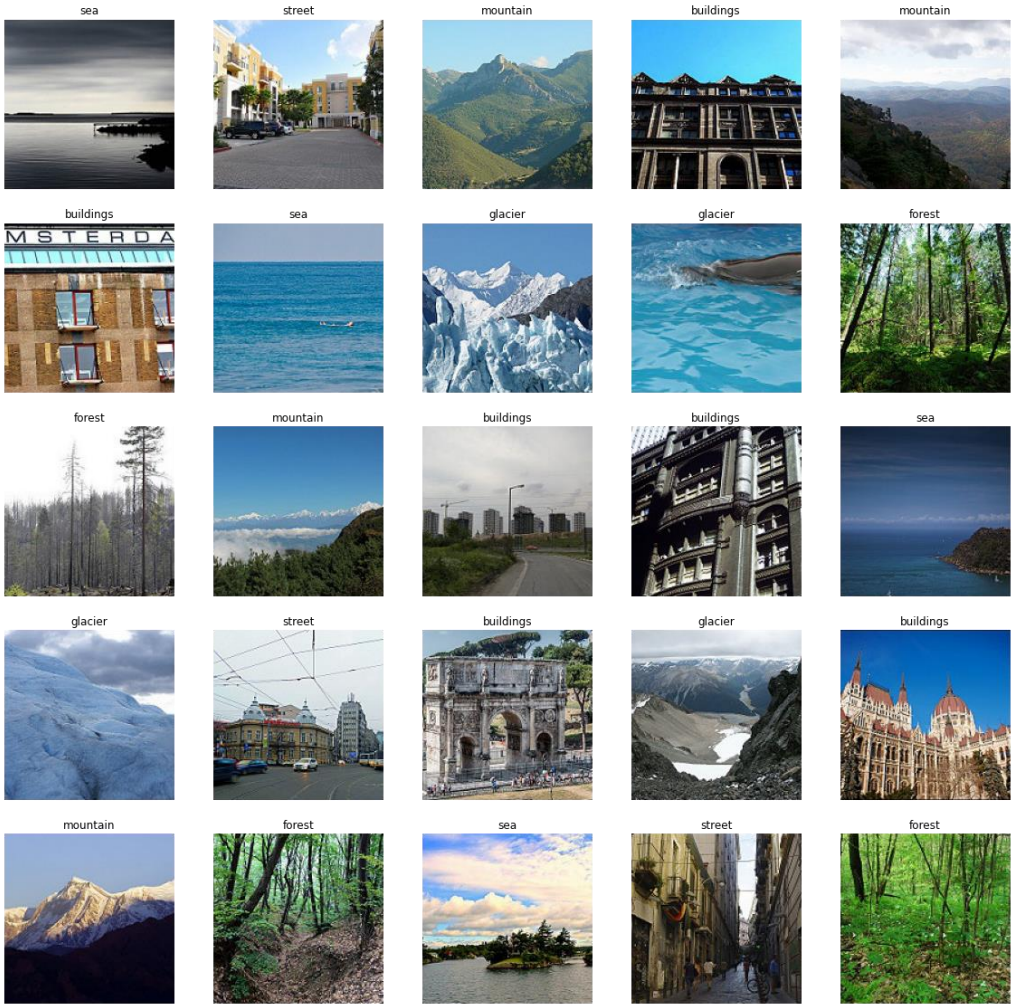
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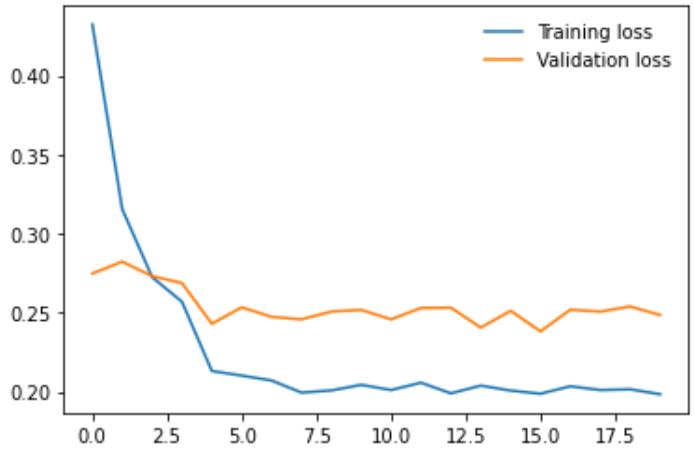
E) 5th model


Training loss
Validation loss
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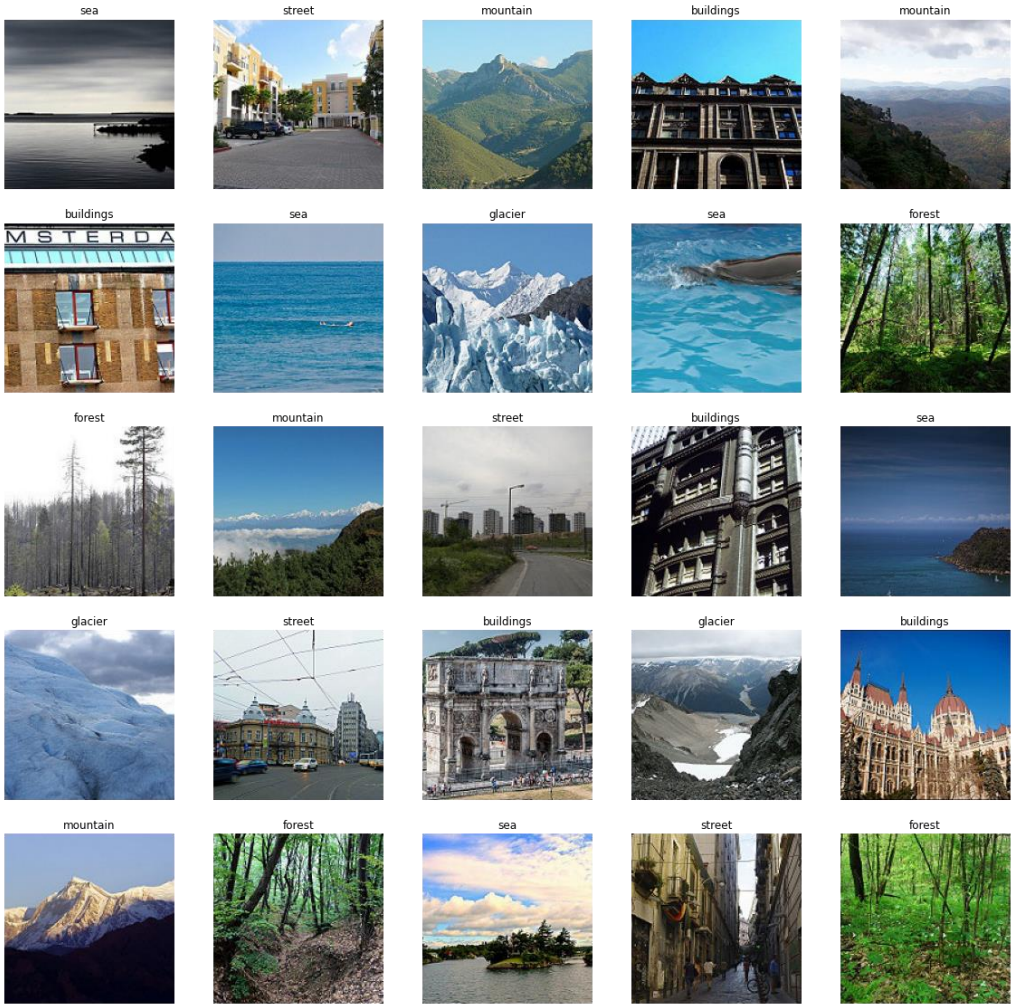
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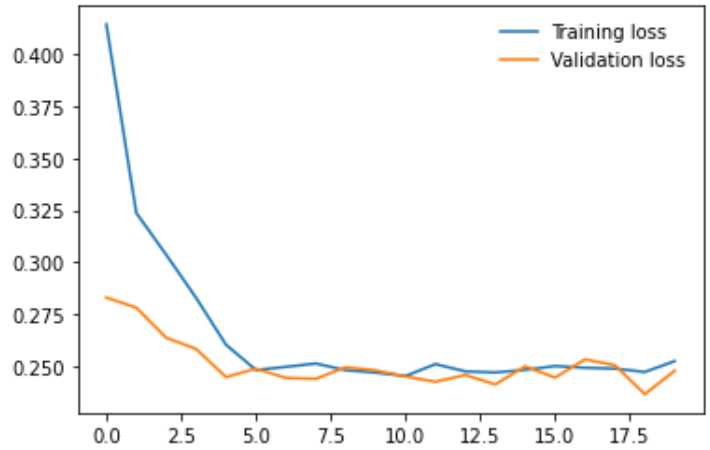
F) 6th model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Validation loss
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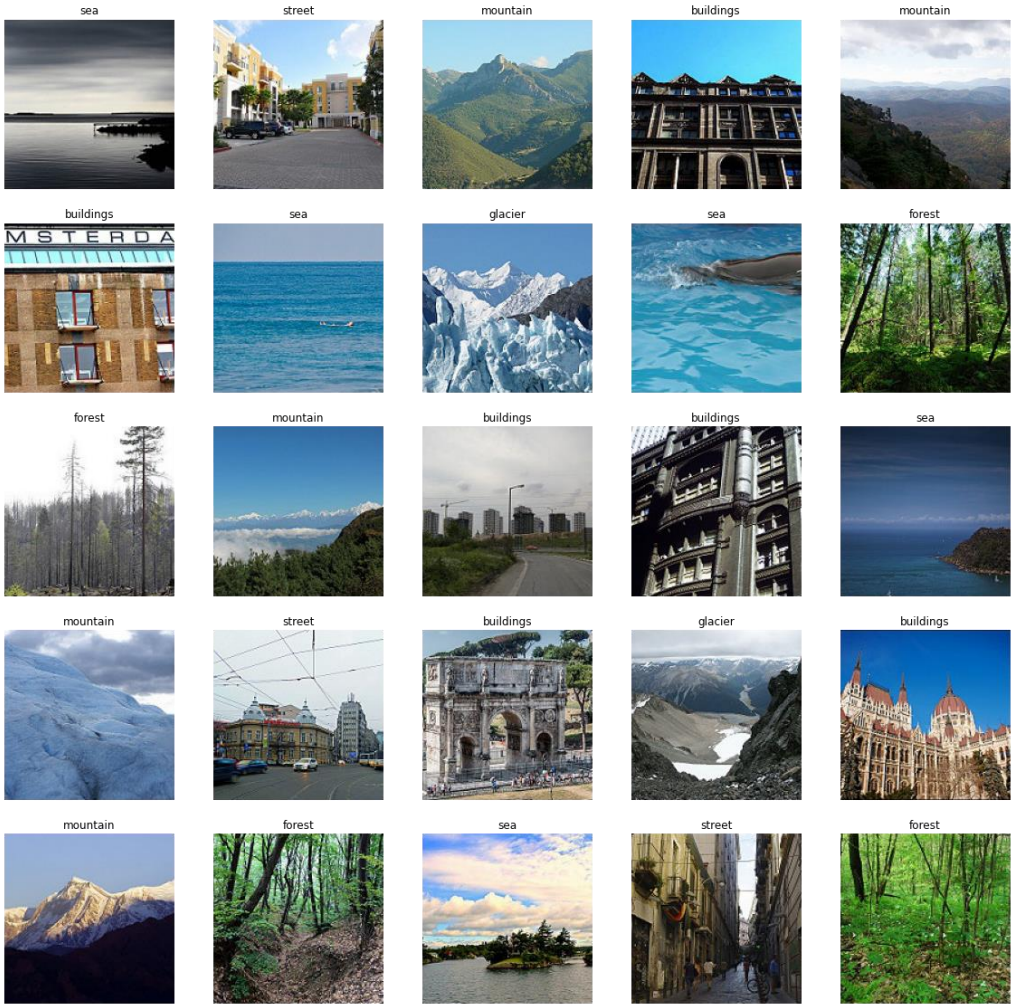
0.375
0.350
0.325
0.300
0.275
0.250
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5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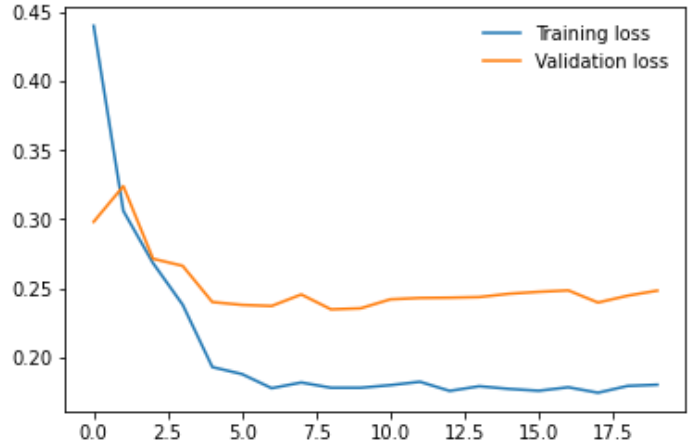
G) 7th model


Training loss
Validation loss
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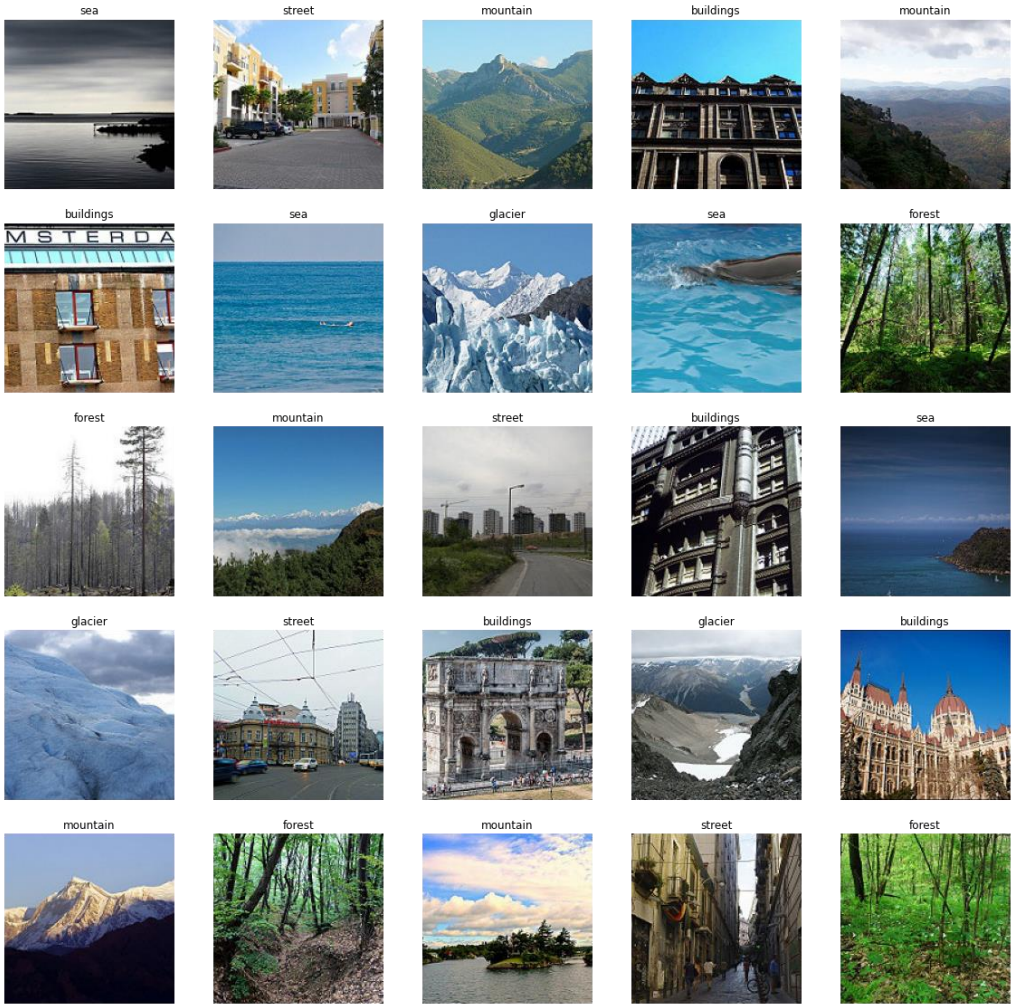
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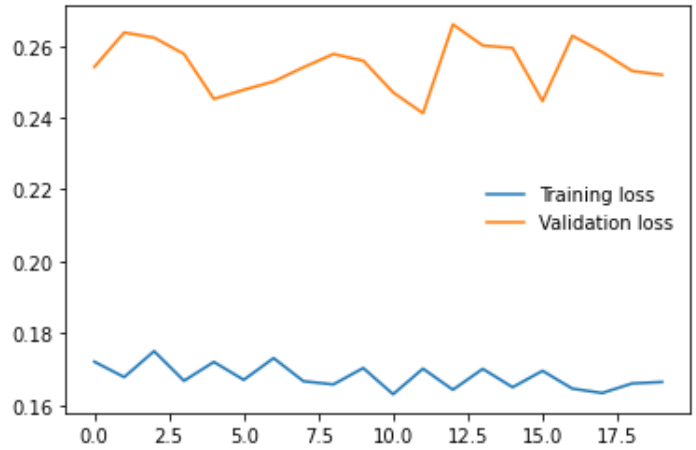
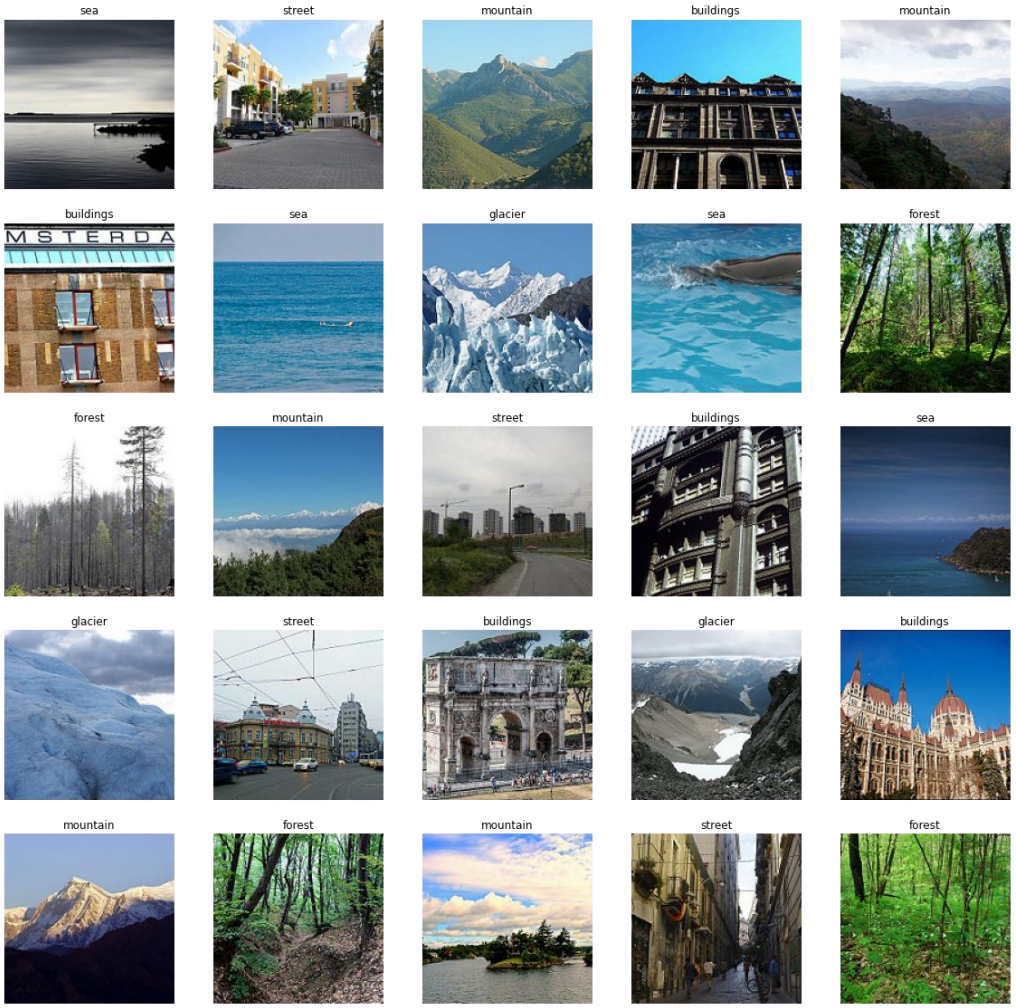
H) 8th model





✓ Model 7 was better among all the 8 models and reached 91.56% accuracy.