

# Image Classification with Deep Learning

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IPEO Exercise 7

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In the next three exercises, we will focus on  
**Deep Learning with Pytorch**

IPEO exercise 6 Introduction to Pytorch with Logistic Regression  
IPEO exercise 7 **Image Classification with CNNs**

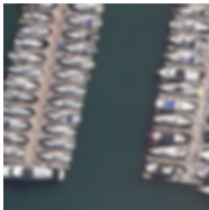
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**Deep Learning with Pytorch**

- IPEO exercise 6 Introduction to Pytorch with Logistic Regression
- IPEO exercise 7 **Image Classification with CNNs**
- IPEO exercise 8 Model Training and Regularization

## Outline

1. we will use the UCMerced Dataset
2. write a Pytorch Dataset Class
3. implement data augmentations  
(flipping, rotation, blurring, color jittering)
4. get familiar with CNN modules  
(convolution, ReLU, dropout, pooling)
5. build an AlexNet CNN
6. download a pre-trained model, and
7. evaluate its performance

idx 655, harbor

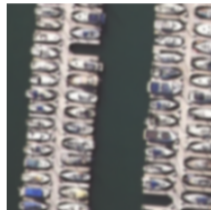


training samples

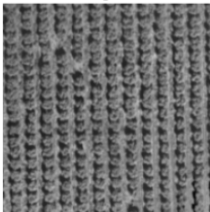
idx 1190, storagetanks



idx 643, harbor

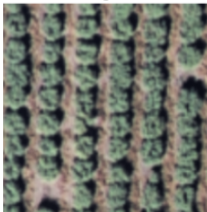


idx 21, agricultural

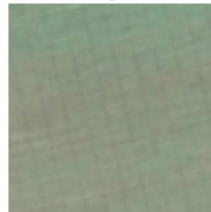


validation samples

idx 23, agricultural



idx 55, agricultural

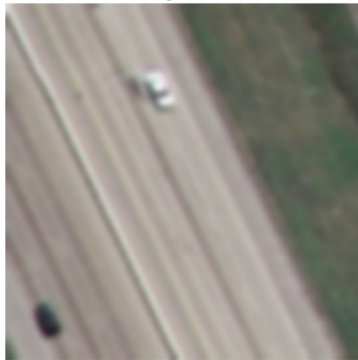


we implement to increase the variability in the training data

validation transform (no augmentation)



training transform



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validation transform (no augmentation)



training transform



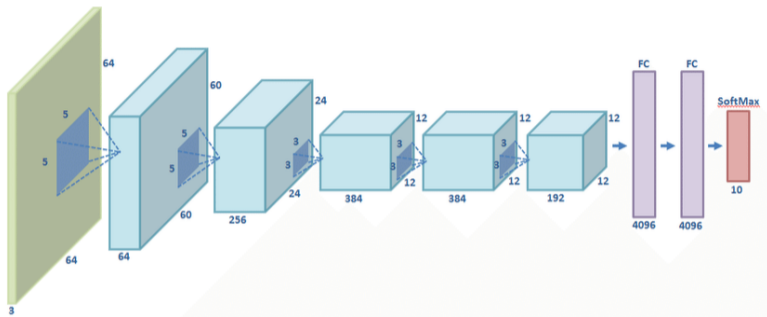
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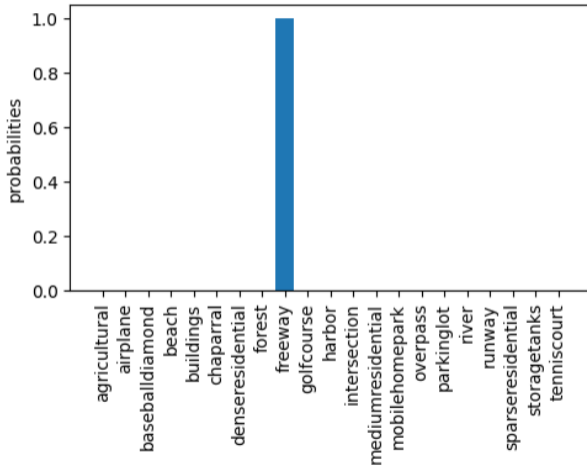




necessary modules/building blocks

- convolution
- rectified linear unit (relu)
- maxpooling
- dropout
- global average pooling
- linear layer

freeway



overpass

