

Loomis Crowd Flow Monitoring

Data Analysis

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Key terms definitions



Machine Learning



What is Machine Learning?

According to IBM, “Machine learning is a branch of artificial intelligence (AI) and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy.”

Why Machine Learning?

So we don't have to go through the images one by one – the computer does it for us!

Neural Network



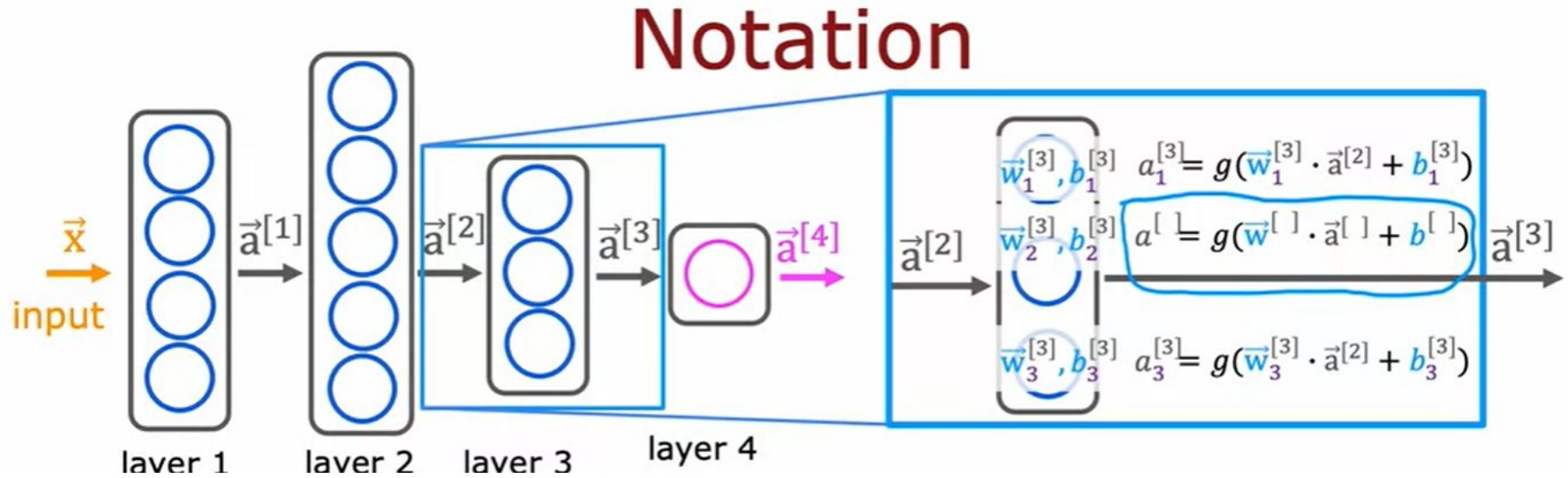
What is Neural Network?

“A subset of machine learning and are at the heart of deep learning algorithms. Their name and structure are inspired by the human brain, mimicking the way that biological neurons signal to one another.” - IBM

Why Neural Network?

It has the ability to process unstructured data, such as images. We'll use a model to identify the number of people in a given image and another model to built a function to predict the level of crowd at a given time.

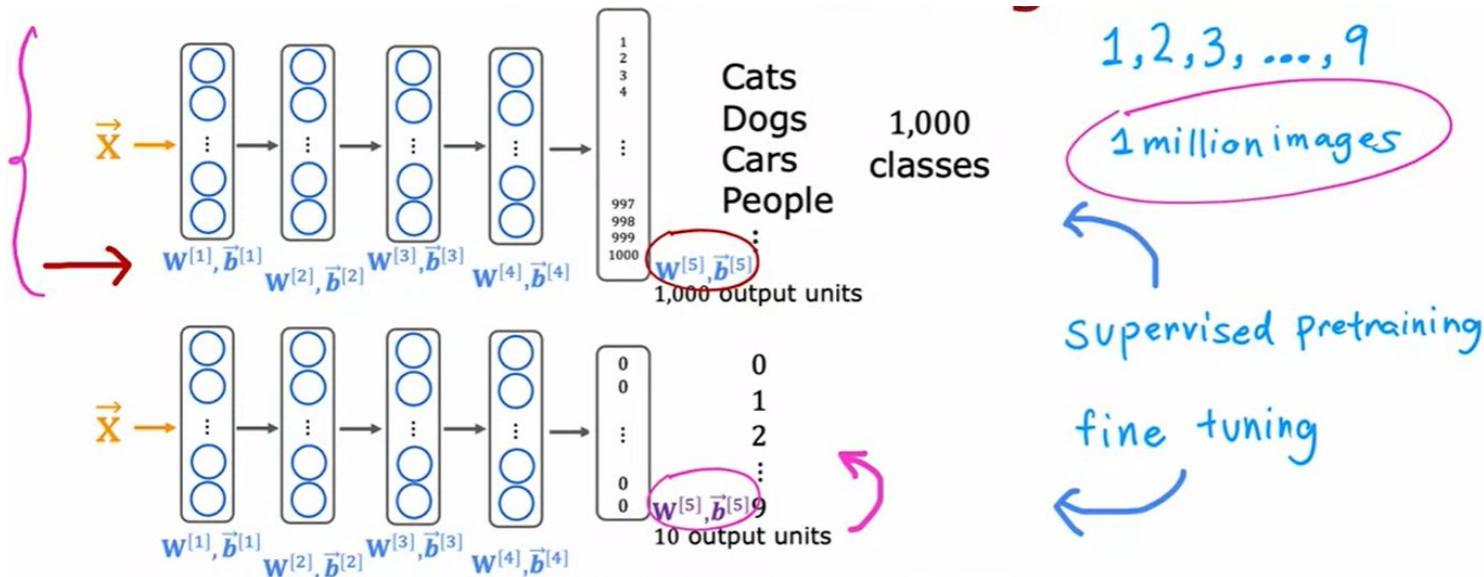
How it works



Courtesy of Coursera



For our purpose... transfer learning



Option 1: only train output layers parameters.



Option 2: train all parameters.

Courtesy of Coursera

Our eyes are on...



TensorFlow > Learn > For Mobile & Edge > Models

Was this helpful?  

Object Detection with TensorFlow Lite Model Maker



Run in Google Colab



View source on GitHub



Download notebook

The model will be trained with our own data and data from



Open Images Dataset V7 and Extensions

15,851,536 boxes on 600 classes

2,785,498 instance segmentations on 350 classes

3,284,280 relationship annotations on 1,466 relationships

675,155 localized narratives

66,391,027 point-level annotations on 5,827 classes

61,404,966 image-level labels on 20,638 classes

Extension: 478,000 crowdsourced images with 6,000+ classes



Example photos used to train model

Very Simple



Very Difficult



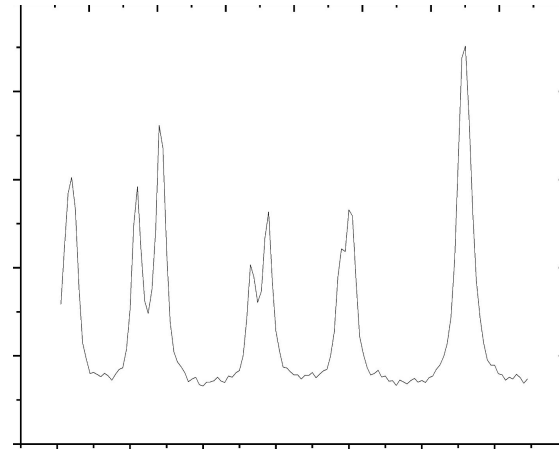


Another place to apply data analysis

To turn our data into useful prediction, we will plot the crowd flow against time. We expect the result to resemble a dirac comb, with spikes around hour:50 to (hour + 1):00, when people are getting out of class and/or walking to their next class.

We can use Origin for this part of the project –

It's a free data analysis software for Uofl students!



Mock graph



Sources

IBM

<https://www.ibm.com/topics/machine-learning>

<https://www.ibm.com/topics/neural-networks>

Coursera

<https://www.coursera.org/learn/advanced-learning-algorithms/home/week/1>

Tensorflow model

https://www.tensorflow.org/lite/models/modify/model_maker/object_detection



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