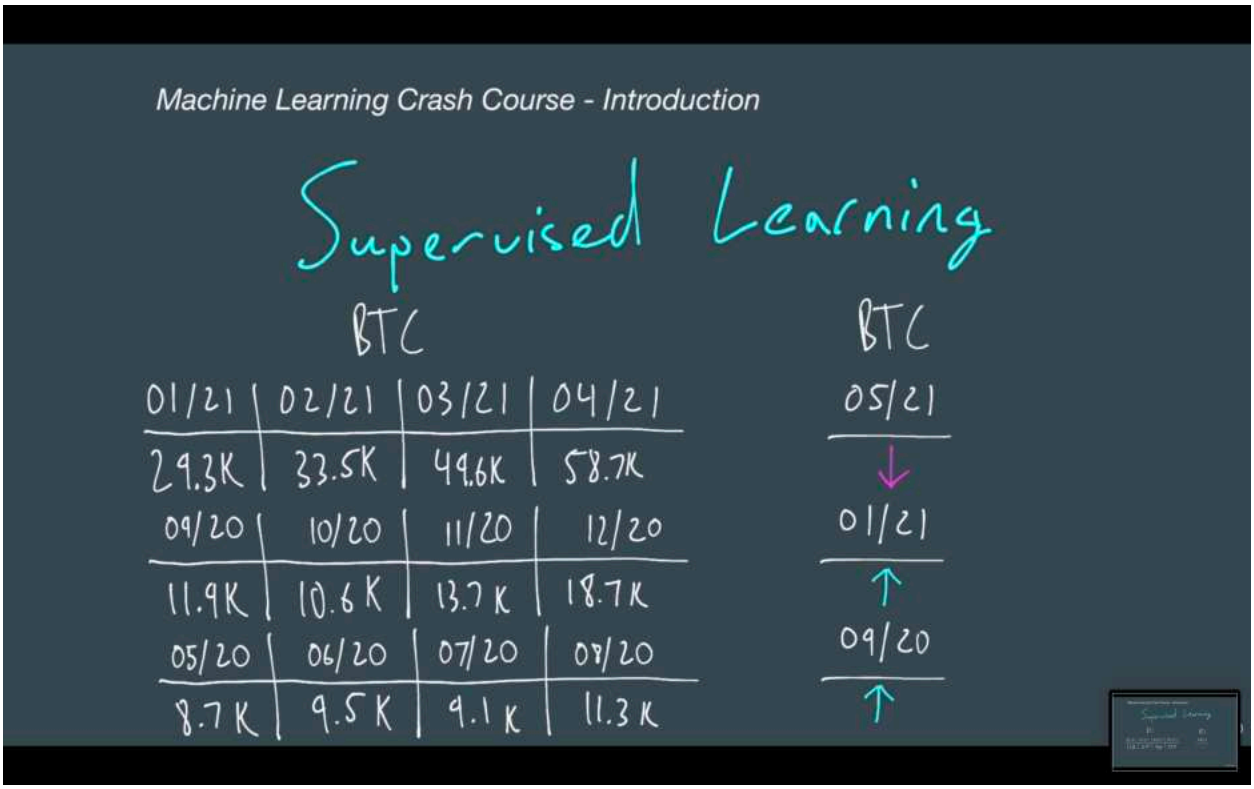
Introduction

Hello everybody. This is the Machine Learning Crash Course - Introduction. In the crash course, we'll be going over supervised learning, deep learning, unsupervised learning, recommendations, and finally ranking.

Now, generally for **supervised learning**, we're going to require two things. One the **data and two the labels.**

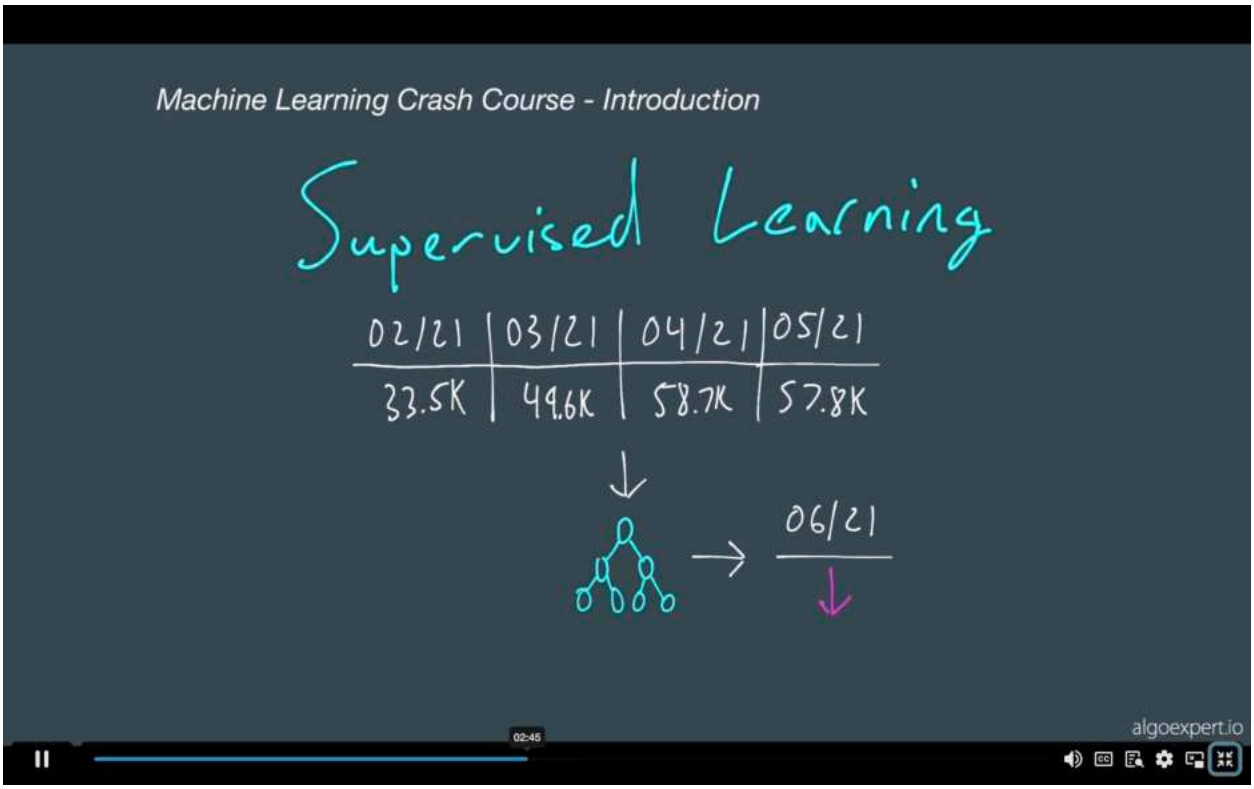
An example of the data that we could look at could be the **bitcoin price** here across time. So, for instance, the first day of January of 2021. The price of bitcoin was 29,300. The following month, it was 33,500. And then in April we saw it hit $58,700. Now, a label that could be associated with this data here could be an indicator either **up or down**, based on how the price moved after the last date that we have in our data. So, here in April, we have that the price was 58,000. And the following month, the first day of May of 21, the price was lower than the price reported in April.



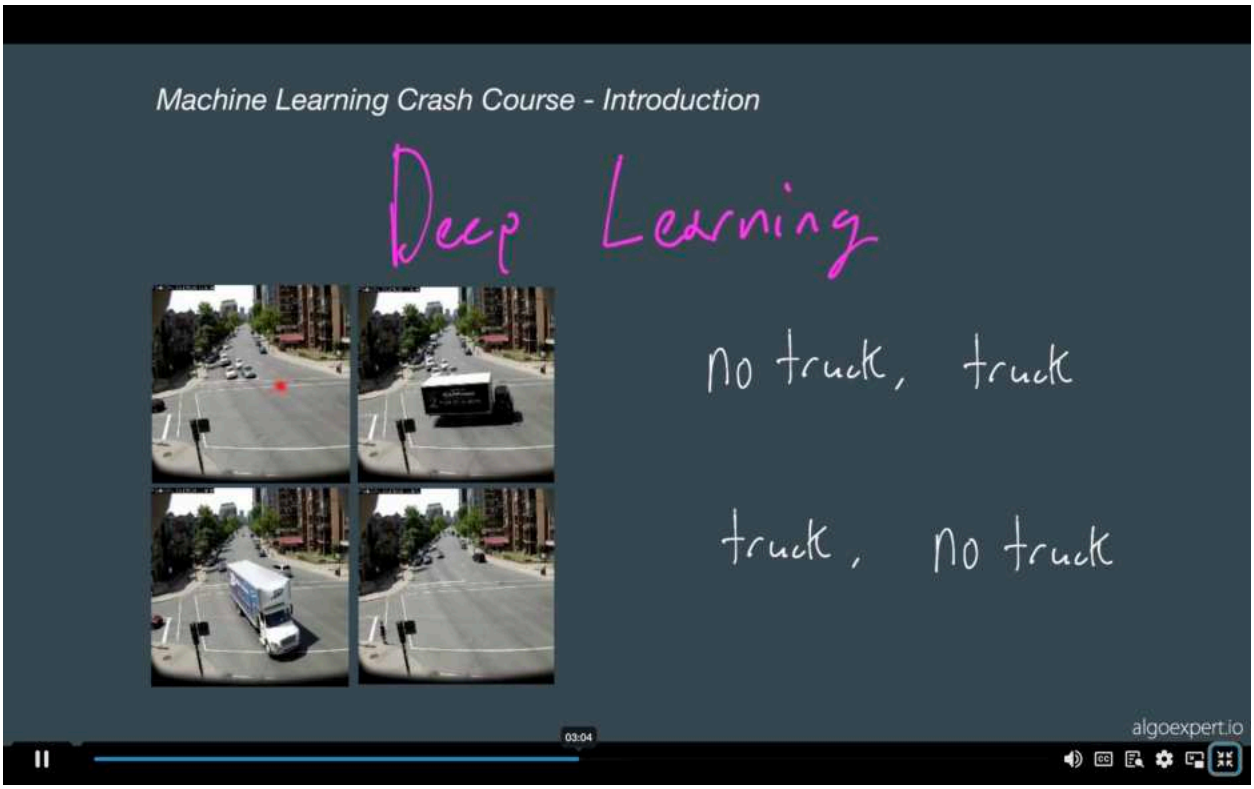
So, what would we do with this? Well, this generally alone may not be very helpful but what we can do is get many of these and associate many labels with them. And for instance here, we looked at our original data where we just had January through April of 2021. And of course the label associated with that data. And here we have another example that starts off in September and ends in December. Here, the label which is the following month after the last reported price state, the price of bitcoin actually went up. The same thing happened here for September in 2020 which is the label preceding the last date recorded from the range of May to August of 2020.

So, now that we have more instances of our data and label pairs, what can we actually do with this? **What we can do is build a supervised learning model.** So, in this case, we would take our first data and label pair, and we would build a part of the model. Then the next pair of data and labels would be brought in to build on top of that model a little bit more. The same pattern would follow with all of the other data that we have available. Eventually once this model is built and we've iterated through our data, then we can put in some data that we haven't trained this model on. And we can get a prediction for what the model thinks will happen, given this data.

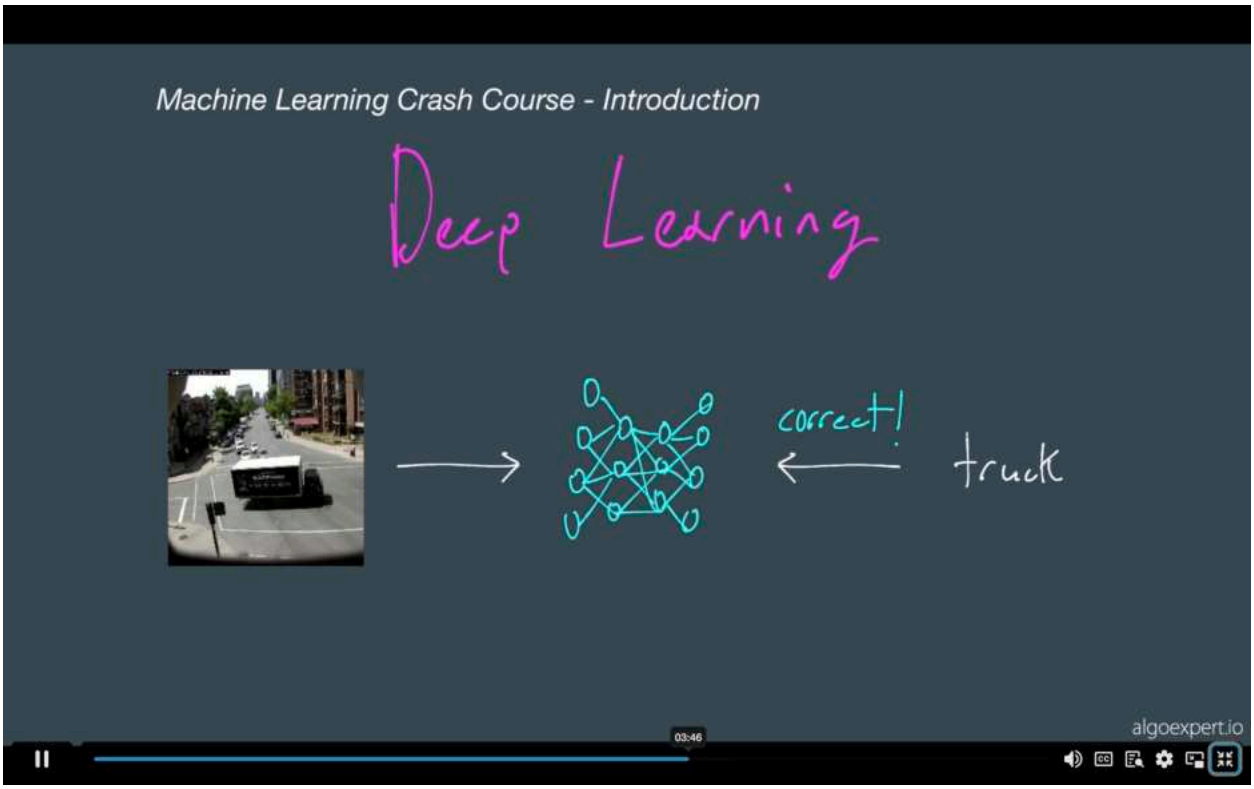
So here, the prediction is that the price of bitcoin on the first day of June will be lower than the price of bitcoin on the first day of May.



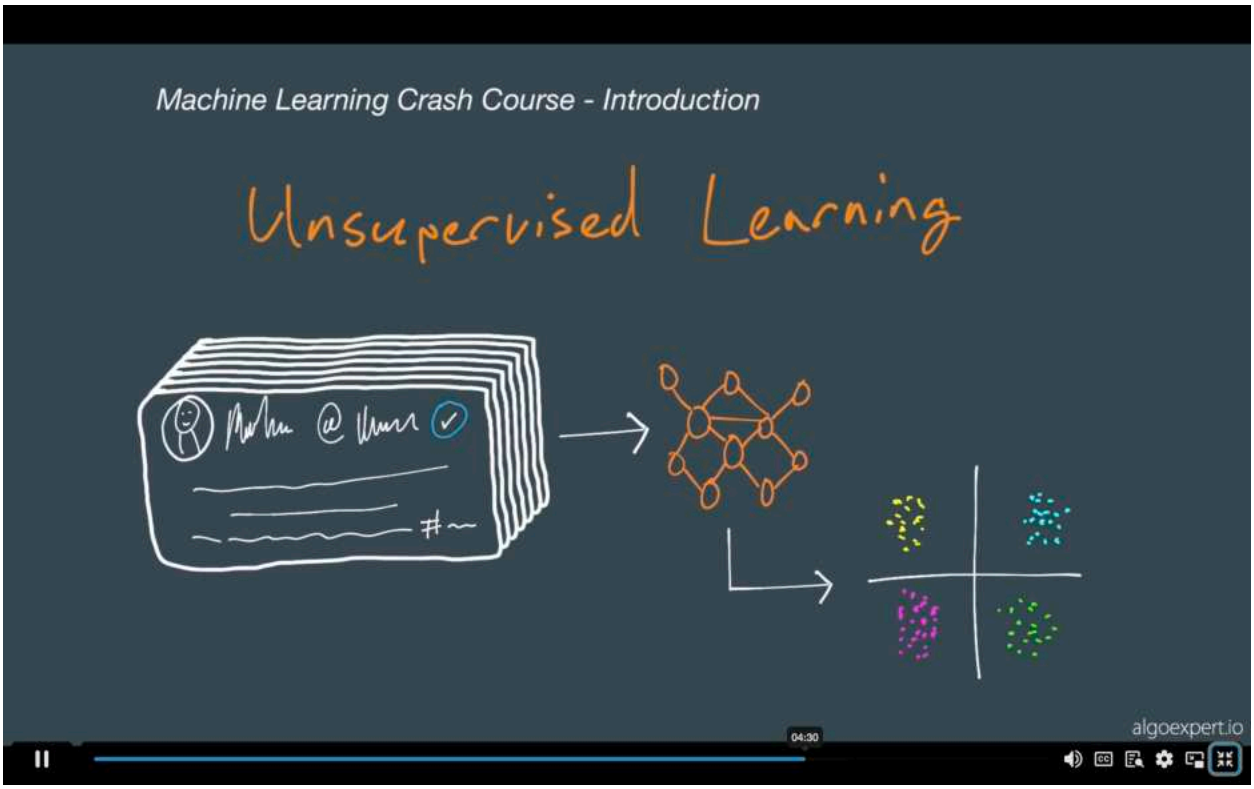
So, what if we don't have neatly structured data like we do in this example? **Well, then we can use something called deep learning.** Now, the supervised learning version of deep learning would still have data and labels. But in this case, **the data could be images**, which wouldn't be that neatly organized data that we had before. However, the labels would be very similar. So, in this case, this image has no truck. This image has a truck. This image has a truck. And this image has no truck. So, our goal now would be to take an image. Feed this image into a deep learning model. And then the model would make a prediction based on what it thought the image contained, either a truck or not.



Well in this case, the model got it wrong. This is okay because we're still training this deep learning model. But we have to give feedback to the model and let it know that it guessed wrong. In that case, the model would update itself in order to better guess next time. So, we would give it another image. This time, this image contains a truck and the model did predict truck. We would then let the model know that it was correct this time. We would then repeat this process for other images, letting it know whether it was wrong or right and its prediction. After we've done this several times, we could present a new image to this deep learning model that it hasn't seen in training. And it will make a prediction for that image. In this case, the model did correctly guess that the image did not contain a truck.



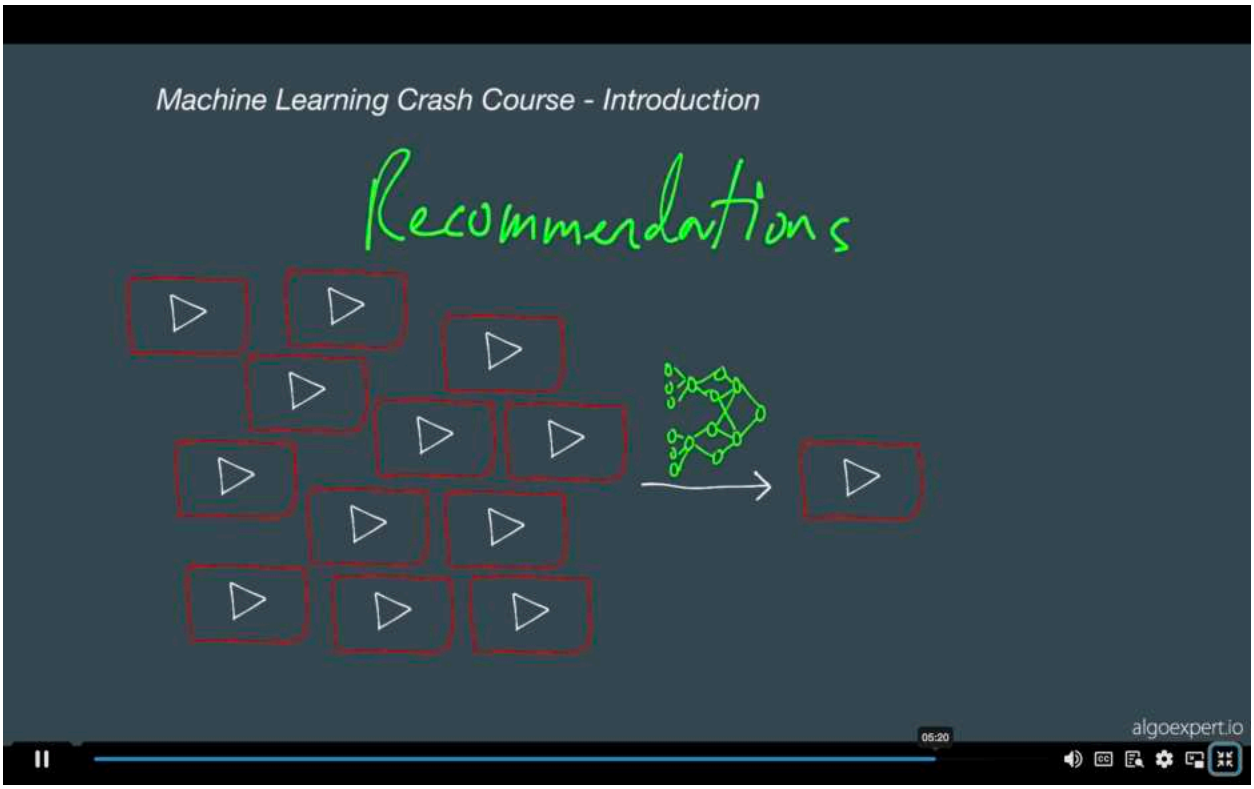
So now, what if we don't have any labels? **Well, in that case, we can use unsupervised learning**. So, let's say that we were given a bunch of tweets and we were tasked with grouping the tweets together based on their content.



So, in this case, we don't have any labels but we do have the data. **What we can do is use an unsupervised learning algorithm to group like tweets together.** Then we could go into one of the **clusters of tweets**, look and read that tweet that's in a cluster. And we would be able to see the topics. This could be sports, politics, and other categories. This would really save us a lot of time as opposed to going through each and every one of the tweets.

All right. Next up, we're going to talk about **recommendations**. So, let's say that we're browsing YouTube and there just happens to be potentially hundreds of videos that the service would like t

o recommend to you to watch next.



Well, YouTube is job now is to take all of these potentially hundreds of videos that are related or what they think you'll like compared to what you're watching now and select just a single video with some recommendations model to automatically play next. This is the core idea behind recommendations. **This leads into our final topic of ranking.**

So, let's say that we want to open up the TikTok app. Well, there's literally millions, if not billions of TikToks out there. So, how does TikTok know which TikTok to put in your feed when you open the app? Well, first they should narrow down to let's say a hundred or so, and then they can use a ranking model to select the first, second and third TikTok that you will be viewing as you scroll through your feed. The goal here would be to keep you scrolling for as long as possible. So, the idea is to appropriately rank these TikToks to keep you on the platform. All right. So, those are going to be the topics that we'll be covering. Let's get started.

Key Terms

Ranking

Optimizing machine learning models to rank candidates, such as music, articles, or products. Typically, the goal is to order the candidates such that the candidates which are most likely to be interacted with (purchased, viewed, liked, etc.) are above other candidates that aren't as likely to be interacted with.

Supervised Learning

Optimizing machine learning models based on previously observed features and labels. Typically, the goal is to attach the most likely label to some provided features.

Unsupervised Learning

An approach within machine learning that takes in unlabeled examples and produces patterns from the provided data. Typically, the goal is to discover something previously unknown about the unlabeled examples.

Deep Learning

Optimizing neural networks, often with many hidden layers, to perform unsupervised or supervised learning.

Recommendation Systems

Systems with the goal of presenting an item to a user such that the user will most likely purchase, view, or like the recommended item. Items can take many forms, such as music, movies, or products. Also called recommender systems.