Prerequisites Transcript

Now let me say a few words about pre-requisites to the Specialization.
First, let me start with the programming part.
I assume that you know at least some Python, and have used, or at least have seen, Jupyter notebooks.
If you are not familiar with Jupyter notebooks, take a look at tutorials referenced for you in this week's reading list.
I also assume you are familiar with other python libraries such as numpy and pandas.
A prior knowledge of TensorFlow is not assumed, as TensorFlow will be gradually introduced within the course.
Now let's talk about pre-requisites for the math part.
Here is what I expect you to know.
First, Machine Learning uses lots of linear algebra, so I expect you to be familiar with linear matrix equations, eigenvalue decomposition, inverse matrices and other related concepts.
I also asssume you know basic probability theory, for example you are familiar with a Guassian, exponential or binomial distributions, basic probability rules such as the Bayes lemma, and you also know some basic statistics.
Finally on the math side, I assume that you know basic calculus, including in particular rules of differentiation of composite functions, so that formulas like this

or like that

or even like that

would not perplex you. If they do, please refresh you knowledge of calculus.
As one of my heroes in science Lev Landau used to say, the math should not stand between you and the problem you want to solve.
Just the opposite, it should be able to help you once you know how to use it.
By the way, the question of how much of math you need to know to do machine learning is a popular topic on various discussion boards.
Recently I came across a very lovely post written by an ex-physicist currently working in the Machine Learning space.
I strongly recommend you read this post, here is the link for your convenience.
On my side, I can confirm that everything this guy says is exactly how physicists approach problems on the mathematical side.
If I had to condense this just approach into a few sentences, I would put it as follows.
When you come across a new Machine Learning model, be it in our lectures, books or original papers, start with an abstract or whatever replaces the abstract.
If the statement about what the model does attracts your interest so that you want to know more, skim through the main equations of the paper and make sure you understand what they mean - not yet how they are obtained.

Do some sort of a meditation on main formulas, like observe what quantity stands in the left hand side of an equation, and what terms appear on the right.
How do they enter, for example, exponentially or logarithmically?
Then, assume that all equations are right, and that an implementation available for you is right, proceed directly to playing hands-on with the model.
You may want to first feed your model with data you understand, for example with purely random data or constant data so see if it passes some sort of sanity checks.
If it does, then feed the model your actual data you want to explore.
When you get results, chances are that you will either like or dislike them, but most likely you will notice some behavior and will have questions about it.
It is only then that you can return to the math and follow it more carefully.
The long story short, if you are stuck with the math, just move on and come back to it later if needed.
That would be my practical advice for you both for this course and beyond, unless of course you have an unlimited time budget.
But if you don't, which is most often the case in the real life, the approach that I just described can save you lots of time.
Finally, lets talk about pre-requisites on Finance.
This will be really short, because in fact I do not assume that you have any specific knowledge in Finance, and all financial concepts or problems discussed in this Specialization will be properly explained for non-specialists.

Ok, I covered most of what I wanted to say here as a way of a general introduction to the Specialization.
Let me now conclude with the list of recommended literature.
There is a number of excellent textbooks on Machine Learning, but there are no textbooks specifically on Machine Learning in Finance.
So what I did for this course is combining multiple sources including in particular parts of books by Bishop, Murhpy, Goodfellow et al, and a very recent book by Geron.
Few other books that I like a lot are the books by Marsland, and an older book by Gershenfeld.
In addition to textbooks, I have used original publications, my own research, industry papers, blogs, Wikipedia, posts on discussion forums and so on - in short, any sort of digital information that I found useful for the purpose of creation of this course.
As I rule, I always refer to the original source whenever I base any substantial part of a lecture on any single source, so that you can always look it up for more details.
Also, in such cases I usually keep the notation of an original publication, or adjust it only a bit to align with more common conventions, if needed, so that it would be easy for you to pick it up from where I left it
in a lecture.
Ok, I think that is finally all I had to say in this introductory part to the Specialization.
In the next video, we will start our first course.

I hope you will find it helpful and interesting, but if you feel that I move too slow or too fast, too deep or too shallow, do not cover some topics of interest or the opposite, stay too long with some non-interesting topics and so on, please share you thoughts on the course forum.

Good luck with the course, and remember: Machine Learning in Finance starts here! See you soon!