Hw 09 - Warm-up

Topics

1. **Kiran** - Options Trading -> Understanding how options work and basics of when to buy/sell call and put options
2. **Atul** - Deep Learning -> Neural Networks -> Optimizers
3. **Benjamin** - Cooking -> Italian Cooking -> building blocks of Italian pasta sauces
4. **Silvia** - Baking -> how to make chocolate chip cookies
5. **Tong** - Sports -> Parkour -> the fundamentals of different actions and flipings

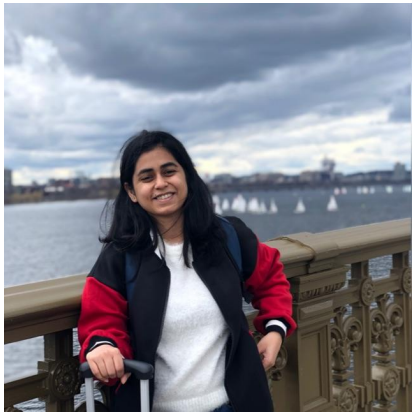
Topic 1 - Kiran

Domain: Options Trading

Topic: Understanding how options work and basics of when to buy/sell call and put options

Expert: Kiran Muthigi. I have been trading/investing at the stock market for 4 years now and moved to options trading in 2019 (managed a small amount of capital before coming to Columbia and generated a decent return).

User: Nandini Agrawal is a 22 year old MS CS student at Columbia. She is also taking Algorithmic trading this semester. A lot independent traders and big firms use options and the trend of using options by the retail community has been growing a lot recently. It didn't make sense to her that calls for Facebook had twice as many buyers as sellers, yet, its price was decreasing rapidly. As a stock market enthusiast and as someone in online stock market communities, she often finds herself lost when people around her talk about options. She would love to understand its basics so that she can understand the conversation about options in these communities and hopefully, take trades in future.



Topic 1 - Kiran - continued

Media: We will use sample stock charts divided into two parts: historical performance and predicted performance. There will be images, animations and a small amount of text in each lesson.

Quiz: After each lesson, we will generate random graphs and quiz users on what option strategy they will be implementing here. We will only cover basics, that is, buying call option, selling call option, buying put option, selling put option. The idea is not to teach them everything at once, but do so iteratively. In the end, there will be a 1-minute rapid fire round and the user's score will be entered into a leaderboard!

Positive piece of feedback: It is a cool topic with not many experts

Cautionary piece of feedback: Try not to info-dump or regurgitate facts. Focus on a specific subset of information.

Topic 2 - Atul

Domain: Neural Networks (Deep Learning)

Topic: Exploring different Optimizers for training neural networks

Expert: Atul Balaji. I have taken courses on machine learning and deep learning and worked on projects in these areas in my undergraduate and graduate studies. Some other members of the team are also familiar with this topic as they are in the Machine Learning track.

User: Sairam Haribabu. He is a MS CS student at Columbia. He is interested in working on machine learning projects and has started to code an emotion classification model. He observed that there are many different optimizers available in the framework, but is not sure which to use. So, he wants to learn the difference between them and the advantages and disadvantages of each of them.

Topic 2 - Atul - continued

Media: We can have 2-3 videos (total of 5-7 mins) covering different optimizers like Gradient descent, SGD, Momentum, Adagrad, Adam, etc. We can also have graphs showing the performance of different optimizers on a given test function. Also, the formulae and a few points of text for each approach will be shown to summarize the key ideas learned.

Quiz: The quiz will involve multiple choice questions about the concept behind an optimizer, comparison between different optimizers, their formula and which optimizer should be preferred for a given function. A few (3-5) questions will be asked after each lesson (covering one type of optimizer). After all lessons are complete, we will also have a final quiz combining all concepts learned so far.

Positive piece of feedback: This topic is very relevant to students and has a large user pool.

Cautionary piece of feedback: Try not to turn this into a lecture. The three topics (backprop, optimizers and convolution) feel too bloated to successfully teach in 10 minutes, so focus on a singular aspect.

Topic 3 - Benjamin

Domain: Cooking
Topic: The Italian Tree of Pasta Sauces
Expert: Benjamin, a trained chef with working experience in restaurants in Tel Aviv, before finding out he a actually enjoys programming and switched to data science

User: Silvia Vlachou is a Masters student in the MS track at Columbia. Silvia loves cooking, and understands that sauces are complex but fundamental to a good pasta dish. Silvia knows how to make pasta, but lacks the clarity of the bigger image of what makes a dish of pasta truly unique. The nuances are small, and having some clarity on the ingredients and differences between a variety of simple, pasta dishes will allow Silvia more creative freedom in the kitchen.

Topic 3 - Benjamin - continued

Media: I will be using still images and snapshots from live cooking, and ingredients, as well as interactive graphs (trees would be the most relevant), as well as slideshows and step by step reveals.

Quiz: In order to assess whether the users have learned the material I plan to ask questions about different processes during cooking, and how adding as little as a single ingredient completely changes the pasta dish. In essence i will be quizzing about the different “sauce” families, and how to get from one sauce “sibling” to another, with simple additions to the recipe.

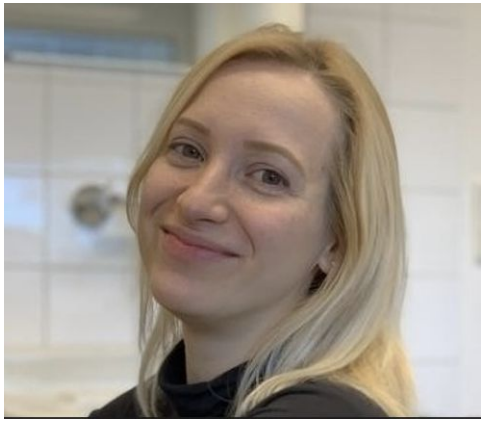
Positive piece of feedback: interesting topic, good focus on French cooking specifically (changed to Italian post critique)

Cautionary piece of feedback: Make sure the tutorials don’t require special equipment and make sure not to skew too widely into “french cooking”. In short, be focused and accessible in what you plan to teach. (focused more on pasta sauces per the TA)

Topic 4 - Silvia

Domain: Baking
Topic: How to make chocolate chip cookies
Expert: Silvia loves everything chocolate and cookies and has tried multiple recipes to learn how to make the best chocolate chip cookies.

User: Bettina Schlager is 29 years old and a 1st year PhD student at Columbia. Bettina loves to cook, but she always has a hard time when trying to bake something. Many things could go wrong during the baking process. She would be very interested in a bullet-proof cookie recipe (Who does not love cookies?) because she prefers homemade treats rather than buying them from a grocery store. She thinks that practicing a cookie recipe online and getting to know the process and the ingredients might increase the success rate and lead to tasteful cookies.



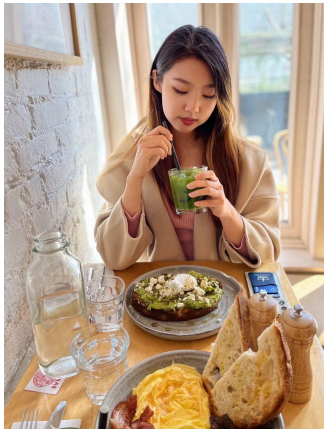
Topic 4 - Silvia - continued

Media: I plan to show images of the ingredients as well as animations/videos of the steps of the baking process.
Quiz: In order to assess whether the users have learned the material I plan to ask questions about the ingredients (e.g., show them multiple ingredients and ask which ones we use in each stage, or which ones we don't use at all, or why we use specific ingredients) and the process (e.g., show an image of the current stage and ask what we should do next).

Positive piece of feedback: it's good that the topic focuses on a specific skill that can be introduced to everyone
Cautionary piece of feedback: make sure the experience doesn't feel like you just dump information to the users and then just test them

Topic 5 - Zhan Tong

Domain: Sports
Topic: The basic actions of Parkour and how to use them
Expert: Zhan Tong. I have learnt and been trained on parkour since high school. I also made a parkour video.



User: Liu Xiaoyu is pursuing MSEE at Columbia University. When Xiaoyu was young, she once saw a group of teenagers doing some fancy flippings and jumpings in a park. She thought these actions were really cool, and She wanted to know the name of this sport and how these young people learn this. She thought those actions were kind of dangerous, but seems that those young people could control them smoothly. So she also wanted to learn a bit of parkour.

Topic 5 - Zhan Tong - continued

Media: I would like to use a series of videos to show how a single action performed, and also videos showing how to combine these actions according to different terrain.

Quiz: I would like to give out some action pictures and ask users the corresponding name of a certain action, and also give a new terrain, seeing how they apply these learned actions to this terrain

Positive piece of feedback: unique and interesting, I don't think I've heard of anyone doing this topic before

Cautionary piece of feedback: Sounds super fun but how would you test this? I would assume if you're teaching someone they'd want to get involved in parkour itself, which might be difficult to do. Are there simple enough movements that beginners could try