



Machine Learning Engineering Career Track

Mentor Course Guide

Curriculum Version 3

CONFIDENTIAL

This document is for your eyes only. Please do not share with anyone else!

Machine Learning Engineering Career Track	1
Mentor Course Guide	1
CONFIDENTIAL	1
Introduction	3
Template for Weekly Video Call Sessions (30 minutes)	4
Course Overview	5
Course Learning Outcomes	5
Pre-work	6
Learning Prerequisites	6
Course Structure	6
Course Sequence	7
Capstone Projects	8
Unit 1: Getting Started with the Machine Learning Career Track	9
Unit 3: The Machine Learning Engineering Stack	11
Unit 4: Creating Your Job Search Strategy	12
Unit 5: Data Wrangling	13
Unit 6: Mathematics and Statistics for ML	14
Unit 7: Effective Networking: Build your Network	15
Unit 8: Foundations of ML	16
Unit 9: ML at Scale	17
Unit 10: Informational Interviews	18
Unit 11: Deep Learning	19

Unit 12: Find the Right Job Title & Companies	21
Unit 13: Natural Language Processing	22
Unit 14: Image Processing & Computer Vision	23
Unit 15: Image Processing Tutorial	23
Unit 16: Preparing For and Getting Interviews	23
Unit 17: Deploying ML Systems to Production	24
Build an API	25
Design solution architecture	25
Run code end-to-end with logging and testing	25
Unit 18: Effective Interviewing for Machine Learning Engineers	25
Unit 19: Congratulations!	26

Introduction

Thank you for mentoring students in the Machine Learning Engineering Career Track. The insight you provide is central to each student's learning. This guide is designed to make it easier for you to access the information you need to create a smoother mentoring experience.

Thank you for reading!

This guide provides:



Unit Overview - Describes each unit.



Unit Learning Objectives - Lists high level objectives to indicate the aims of each unit.



Major Mentee Activities - Explains the activities that your mentee will complete in each unit.



Common Concerns - Highlights potential challenges that your mentee may face in each unit, helping you structure 1-1 sessions to address concerns.



Industry Expert Insights - Provides potential insights and experiences that you, as an industry expert, can share with your mentee.

Note: While this guide provides a sufficient overview of the course to help you understand the covered material and requirements, it doesn't contain specific lesson plans, so if you'd like to understand the details of the learning activities, please refer to the course.

Template for Weekly Video Call Sessions (30 minutes)

Weekly calls with mentors are at the heart of our students' learning. The calls help you better understand what your mentees learned each week, keep them on task, and provide feedback, encouragement, and inspiration for career advancement.

Here are five suggested steps on how to structure the weekly calls for **G.R.E.A.T.** meeting. While the G.R.E.A.T. template establishes a consistent conversation structure, which allows your mentee to know what to expect, come prepared, and contribute to productive conversations, **we value the perspective and experience you bring as a mentor, and your ability to respond to your mentee's immediate needs**, so please feel empowered to structure calls as you wish.

		Suggested time (mins)
1	Greet <ul style="list-style-type: none"> Break the ice by asking about their day or extracurricular activities 	1 min max
2	Review (Ask students to) <ul style="list-style-type: none"> Recap what they learned by referring to learning objectives Identify the tasks they performed Discuss any challenges they faced Reflect on what they enjoyed and why 	5 mins
3	Evaluate (Provide students) <ul style="list-style-type: none"> Feedback on submitted projects Feedback on completed tasks Insight from your professional experiences 	10-15 mins
4	Address (Student call agenda) <ul style="list-style-type: none"> Clarify issues raised in the agenda Address your mentee's questions (or note for later response) Share key tasks by referring to learning objectives. Provide additional resources as needed 	10-15 mins
5	Tie-up <ul style="list-style-type: none"> Reiterate key information and next steps End on a positive and encouraging tone Confirm the next 1-1 video call session 	5 mins

Course Overview

The Machine Learning Career Track is designed to equip students with the skills and knowledge to launch successful careers in the machine learning field. Students will learn both technical and professional skills to help differentiate them from other candidates on the job market.

The two goals of the Machine Learning Career Track are to:

1. Equip students with technical skills to build a successful career in machine learning.
2. Train students with professional skills to obtain a role as a machine learning engineer.

The key features of the course are:

- **Self-paced:** While most students complete the course in 6 months, the flexibility of the courses allow students to direct their own schedules.
- **Curated content:** Each unit provides the most effective videos, articles, and exercises to help enhance learning.
- **Project-based:** By working on realistic projects, students test their skills and develop a machine learning mindset.
- **Mentor-led:** Personalized feedback, industry insights, and job-search strategies help students prepare for the workplace.
- **Career-focused:** Through a proven strategy, which includes the creation of a professional portfolio, students receive career support to help them find a machine learning job.

Course Learning Outcomes

Upon completion of the course, students will be able to:

- Collect data at scale from APIs, real-time systems, and websites.
- Transform data efficiently and effectively so that ML algorithms can crunch it down the pipeline.
- Use frequentist statistical inference and hypothesis testing to draw insights from data.
- Implement supervised and unsupervised machine learning algorithms.
- Establish a thorough foundation in deep learning and build real-world applications.
- Learn about neural network principles and engineering frameworks, such as Keras and PyTorch.
- Learn the basics of text data, including how to clean and process it, and how to extract insights from text and conversations.
- Work through a detailed case study and solve a real NLP problem using deep learning and other techniques.
- Learn image processing techniques and solve a real image processing problem.
- Dive into the foundations of computer vision and deep learning for images.
- Develop a realistic, large-scale, deployed ML systems.
- Build a realistic, complete, large-scale API application that's available to use via an API, a web service, or – optionally – a website.

Pre-work

Before students began the course, they were sent pre-work assignments to help them develop foundational skills. Some of the assignments required the creation of necessary accounts, while other assignments provided background information. Students who are completely new to machine learning engineering were encouraged to complete the pre-work in its entirety. Students with some knowledge were encouraged to use the pre-work to refresh their skills and knowledge. If students struggle with foundational concepts, refer them to the appropriate pre-work section to strengthen their skills. View the pre-work [here](#).

Learning Prerequisites

Students in this course are expected to have:

- At least one year of professional software engineering experience using a general purpose Object-oriented programming language, such as Python, Java, and C++. If a student does not have professional software experience, 1-2 years on-the-job coding experience in graduate school, a bachelor's program, or on open-source projects may meet the requirements.
- Completed university-level courses on probability and descriptive statistics, linear algebra, and calculus.
- Conversational fluency in English, as determined by initial interactions with the Admissions team.
- Students are not required to have a Bachelor's degree, but we highly recommend that they have a college level understanding of linear algebra, probability and descriptive statistics, and calculus.

Note: If you feel that your mentee doesn't meet the prerequisites, please contact us immediately at mentors@springboard.com.

Course Structure

We follow a project-based learning model to ensure that every skill a student acquires maps to a deliverable in a real-world project. This means that the course curriculum is set up to help them successfully complete their mini-projects and capstone project, which closely mimics an end-to-end machine learning engineering project in a professional setting.

That said, the course, like the capstone project, is divided into two phases. Phase 1 focuses on building a working prototype, while Phase 2 focuses on deploying the prototype to production.

Course Sequence

1. Getting Started
2. Overview of Artificial Intelligence and Machine Learning
Capstone Project 1: Initial Ideas
3. The Machine Learning Engineering Stack
Capstone Project: Create a Project Proposal
4. Creating Your Job Search Strategy
5. Data Wrangling
Capstone Project: Perform Data Collection and Wrangling
6. Math and Stats for ML
7. Effective Networking: Building Your Network
8. Foundations of ML
Capstone Project: Create an ML Prototype
9. ML at Scale
Capstone Project: Scale the ML Prototype
10. Informational Interviews
11. Deep Learning
Capstone Project: Create a DL Prototype
Capstone Project: Scale the DL Prototype
12. Find the Right Job Title & Companies
13. Natural Language Processing
Capstone Project: Apply NLP Technique (if Applicable)
14. Image Processing & Computer Vision
Capstone Project: Apply Image Processing Techniques (if applicable)
15. Image Processing Tutorial
16. Preparing For & Getting Interviews
17. Deploying ML Systems to Production
Capstone Project: Deploy System to Production
18. Effective Interviewing for Machine Learning Engineers
19. Congratulations
Capstone Project: Final Submission

All the projects that the students will submit as a part of this course are available [here](#).

Capstone Projects



Overview

The capstone project is a professional and academic way to illustrate your mentee's skills. The project serves as one of the most powerful tools in your mentee's job search strategy.

The purpose of the capstone project is threefold:

1. To give mentees experience working with realistic problems
2. To encourage mentees to think in terms of solving business problems for clients
3. To have a set of projects for a portfolio



Learning Objectives

The capstone is divided into two phases:

- In the first phase of the capstone, your mentee will build a working prototype and work through several steps directly linked to the first 10 technical units.
- In the second phase of the capstone, your mentee will deploy their prototype to production.



Major Mentee Activities

In phase 1 of their capstone, your mentee will:

- Propose at least three project ideas
- Write a project proposal
- Acquire and wrangle a dataset
- Create a machine learning or deep learning prototype
- Scale the prototype

In phase 2 of their capstone, your mentee will:

- Create a deployment architecture
- Run their code end-to-end with testing
- Implement their data pipeline
- Build a web service with an API of their application
- Deploy their application to production
- Test and document their API
- Build a web interface for their application

Details of each of these steps are provided in the [Capstone Project Guidelines](#) document.



Common Concerns

- Some mentees are intimidated at the prospect of picking a topic due to lack of industry knowledge. Explain that this step is meant to encourage exploration and thinking, and as a mentor, you'll help them narrow down ideas and come up with a great topic.
- Working with messy, real-world data can be challenging and discouraging for some mentees. It's important to encourage students through these difficulties and remind them of the rewards of cleaning data well.
- Mentees with academic backgrounds (PhDs or postdocs) tend to spend a lot of time trying to find the perfect algorithm and performance. Emphasize that, in the real-world, the best algorithm is one that does "well enough" for the client and meets deadlines.
- Some mentees try to take shortcuts, producing poor quality work. The capstone project will go into a mentee's portfolio, so insist that their work meets the bar of a typical machine learning employer.



Industry Expert Insights

- Emphasize the importance of both focusing on solving the original business problem and communicating the results to the client.
- Emphasize the importance of a good project portfolio in the hiring process.
- Support and encourage your mentee through the messiness of working with real data by providing examples from your own career and industry experience.
- Highlight the various lessons that your mentee has learned in the curriculum through the project.

Unit 1: Getting Started with the Machine Learning Engineering Career Track



Unit Overview

This unit introduces the course curriculum, your student's support system, and course logistics.



Unit Learning Objectives

- Become familiar with the course site
- Understand the course aims and outcomes
- Prepare for mentor 1-1 video call

- Determine how to pace the course (optional)

Major Mentee Activities

- Join their online community
- Watch videos about the curated curriculum, time estimates, mentor calls, and their extended support system
- Read through a document about how to be successful in the course



Common Concerns

- Your mentee may need assistance setting up the initial 1-1 video call. Please provide them support by emailing them instructions and other options for the initial contact (e.g. phone).



Industry Expert Insights

- For the initial 1-1 session, use icebreakers, such as talking about your hobbies, interests, or locations, to make your mentee feel comfortable and to build a rapport.

Unit 2: Overview of Artificial Intelligence & Machine Learning



Unit Overview

This unit acquaints mentees with the field of machine learning by explaining what it is and what it isn't. It also gets mentees thinking like machine learning engineers as they brainstorm ideas for their first capstone project.



Unit Learning Objectives

- Become familiar with the field of machine learning, its applications, larger impact, and limitations
- Learn some applications of machine learning
- Have a clear idea of the broad skill sets that ML engineers need
- List at least three initial capstone project 1 ideas



Major Mentee Activities

- Work through resources that cover an intro to the world of ML, what a machine engineering job looks like, and the ethical and legal implications of AI
- Work through an optional tech refresher that covers Git, algorithms, and data structures

- Brainstorm three potential ideas for their first Capstone Project at a very general level. These are not meant to be final. Mentors will work with the mentee to guide them through this process



Common Concerns

- Mentees may have inaccurate views of ML applications and limitations, so it's important to understand what your mentee thinks of the field and correct misinformation.
- Some mentees are intimidated at the prospect of picking a topic due to lack of industry knowledge. For these mentees:
 - Encourage them to pick topics with real-life applications by recommending that they have a hypothetical or real client in mind for the project. See the [Capstone Project Guidelines](#) for more details.
 - You can provide reassurance that these topics are not final and are just the first step of a discussion. Share that you'll provide expert guidance to help them narrow down a project topic over the next few weeks.
 - Assure your mentee that they won't fall behind if they stay on track and absorb your feedback during 1-1 sessions.



Industry Expert Insights

- Discuss how you entered the ML field and got your first job.
- Share how your work fits within the industry and any impact your work has had.
- Explain the applications and limitations of ML.
- Provide information on how machine learning has evolved since you started working .
- Recommend additional activities or resources that you might find relevant for your mentee.

Unit 3: The Machine Learning Engineering Stack



Unit Overview

One of the main aims of this course is to make your mentee ready for a career in ML. This unit introduces a job search strategy that Springboard recommends and discusses the common mistakes made by job seekers. In addition, mentees also create their personal story and pitch.



Unit Learning Objectives

- Learn how to use various ML libraries and deployment tools that ML engineers use on a daily basis. Tools covered in this unit include: Scikit Learn, Pytorch, Keras, Hadoop, and Luigi

- Become familiar with software engineering best practices including continuous integration and continuous delivery (CI/CD), version control with Git, testing, and debugging



Major Mentee Activities

- Watch videos and read articles related to the role of an ML engineer, the common tools used in the industry, the differences between ML and data engineers, and best practices for software engineering
- Work through an optional unit that covers computer science techniques to improve code performance
- Students will submit a project proposal outlining their capstone project idea



Common Concerns

- Mentees may be skeptical confused about the differences between ML engineers, data science engineers, and software engineers. Try to separate these roles as best you can and provide examples of work that each role might do.
- Students may need help identifying the best capstone project to move forward with and may struggle with framing the problem they would like to solve. Refer to the [project proposal guidelines](#) (which are also included in the capstone project guidelines linked above) for more information.



Industry Expert Insights

- Provide tips on how to refine the scope of their project proposal
- Share any experiences you've had working with different types of engineers that might give your mentee clarity about the different roles

Unit 4: Creating Your Job Search Strategy



Unit Overview

One of the main aims of this course is to make your mentee ready for a career in machine learning. This unit introduces a job search strategy that Springboard recommends and discusses the common mistakes made by job seekers. In addition, mentees also create their personal story and pitch.



Unit Learning Objectives

- Appreciate the greater importance of network building and referrals over resumes, and start doing the upfront work to build a network

- Recognize some common preconceptions, (e.g. only jobs titled “Machine Learning” are worth pursuing, or that good ML jobs are only limited to well-known tech firms)
- Create a personal pitch and story to talk about to potential employers



Major Mentee Activities

- Watch videos and presentations related to the anatomy of a tech company
- Create or update a LinkedIn profile
- Have LinkedIn profile reviewed by their career coach



Common Concerns

- Mentees may be skeptical about the idea of applying for jobs via networking and referrals. Some mentees believe that if they’re not sending out resumes right away, they won’t get a job. Reinforce that networking is how a job search often works in technical fields.



Industry Expert Insights

- Provide tips on network building.
- Share examples of how you or your colleagues found your machine learning jobs.
- Discuss the hiring process you went through at a high level.
- Review your mentee’s LinkedIn profile from an employer’s point of view.
- Provide examples of skills and qualities employers are looking for in machine learning engineers.

Unit 5: Data Wrangling



Unit Overview

This unit teaches mentees how to work with messy raw data: extract, clean, and deal with missing, invalid or corrupted values. It also teaches students how to work with APIs, use Python’s pandas to wrangle data, conduct complex SQL queries, and wrangle data at scale.



Unit Learning Objectives

- Become proficient at data manipulation using Pandas and other Python packages as needed
- Learn to clean data, including working with missing or invalid values
- Wrangle data at scale

- Work with SQL-based databases and write basic SQL queries upto basic aggregations and joins



Major Mentee Activities

- Go through DataCamp courses to learn how to clean and manipulate data with Pandas
- Work through an optional unit about data storytelling
- Work on several mini-projects that cover APIs ([rubric](#)), data wrangling with pandas ([rubric](#)), a JSON-based exercise ([rubric](#)), SQL at scale with Spark ([rubric](#)), and data wrangling at scale with Spark ([rubric](#)).
- Perform data collection and data wrangling for their capstone project



Common Concerns

- Boredom: This unit dives into the weeds of data wrangling, which might begin to seem tedious for some mentees. You can help your mentee by reminding them that data wrangling is a critical part of machine learning and is essential to ensure that all further analysis is on a solid foundation.



Industry Expert Insights

- Share the importance of data wrangling and how it's a critical skill for a machine learning engineer.
- Emphasize the amount of time and effort that data wrangling and cleaning can take in real-world projects.
- Give examples of common pitfalls during data wrangling and how to address them.
- Provide practical Pandas and SQL tips and tricks.

Unit 6: Mathematics and Statistics for MLE



Unit Overview

In this unit, students learn about the fundamental mathematical and statistical concepts that make up the core of the field of machine learning. It covers calculus, covers a refresher on linear algebra, and includes resources about statistics.

Unit Learning Objectives



- Learn or sharpen calculus, linear algebra, and statistics skills and knowledge

Major Mentee Activities

- Work through resources that cover calculus, linear algebra, and statistics, including Bayes Theorem.
- Work through a probabilistic programming primer that covers statistical inference using Bayesian Statistics and Monte Carlo sampling



Common Concerns

- Similar to last unit, some mentees can become bored with the topic of math and stats, especially if they already have a fairly good grasp on the concepts covered in this unit. You can help your mentee by reminding them that math is one of the foundational pillars of machine learning



Industry Expert Insights

- Share the importance of the mathematical concepts covered in this unit and how understanding them is critical to success as a machine learning engineer

Unit 7: Effective Networking: Build your Network



Unit Overview

Effective networking is a cornerstone of this machine learning engineering career track course, since building a solid network in the ML field upfront often comes from obtaining referrals from target companies. The unit leads your mentee through their first steps in building a machine learning network.

Unit Learning Objectives



- Build new network contacts in and beyond your city/state
- Practice the art of “cold emailing” to reach out to industry experts
- Participate in machine learning meetups to build a professional community



Major Mentee Activities

- Read an article about “How to Use Meetups to Build Your Network”
- Read article on cold emailing
- Watch the video on “Imposter Syndrome”
- Sign up for a Meetup.com account and attend a machine learning Meetup
- Submit a brief summary of the meetup

Common Concerns

- Introverted and shy mentees: Many mentees are not used to the concept of networking and are terrified of going out and meeting strangers. This is particularly true of those who are naturally introverted or shy.
- Severe “imposter syndrome”: Some mentees are convinced that because they are new to the field of machine learning, they have nothing of value to offer experts. “Why would any experienced ML engineer talk to me?” Help them understand that relationship building starts with listening and being genuinely curious about other people. Most people, including experienced ML engineers, are excited to talk about themselves and their work, which can provide a lot of information.
- First time networking jitters: Some mentees have never been to or even heard of a meetup before and are nervous about going to one for the first time. Explain to them that meetups are very casual events, and there’s absolutely no pressure there. At this point, they’re still new and may not understand all the technical content people are talking about. That’s completely fine. It’s still useful to be curious, ask people about what they do, and listen well.



Industry Expert Insights

- Share how networking has helped you (or your colleagues/friends) with finding new opportunities.
- Share your experience going to or speaking at meetups and similar events.
- Give tips and tricks for building relationships with ML engineers.

Unit 8: Foundations of ML



Unit Overview

In this unit, students begin to hone their ML skills by working with popular ML models like linear and logistic regression and advanced algorithms like Decision Tree and Random Forests. To help them focus on features that are most useful to an ML model and prevent “the Curse of Dimensionality,” they’ll also gain an understanding of cross-validations to assess the best ML model for their work and identify the implications of ML model interpretability and reliability.



Unit Learning Objectives

- Get comfortable with ML models and advanced algorithms
- Gain an understanding of cross validations
- Practice problem-solving with different ML algorithms, managing large datasets, and optimizing ML pipelines

Major Major Mentee Activities



- Work through resources that will introduce them to common ML algorithms, advanced ML algorithms, and model selection, evaluation and interpretation
- Work on several mini-projects about linear regression ([rubric](#)), logistic regression ([rubric](#)), tree-based algorithms ([rubric](#)), and clustering ([rubric](#)).
- Create a machine learning prototype for the capstone project (students get to choose if they want to create and scale an ML prototype or DL prototype so this submission will not apply to all students)



Common Concerns

- Your mentee might run into roadblocks while creating their ML prototype. Please assist them and offer guidance as best you can.

Industry Expert Insights



- Share your experience working with basic and advanced algorithms

Unit 9: ML at Scale



Unit Overview

This unit teaches students how to take their data wrangling skills to the next level. They'll learn how to optimize pandas code and try your hand at working with advanced SQL, use Spark ML to scale an ML model, and practice debugging and monitoring Spark ML applications and pipelines.



Unit Learning Objectives

- Learn how to wrangle data at scale
- Get comfortable using Spark ML to scale ML models
- Learn how to monitor Spark ML applications and pipelines



Major Mentee Activities

- Use Dask to scale larger datasets while working in a distributed or parallel computing environment
- Practice building a complete ML pipeline
- Work through resources that will teach them about high-performance ML and real-time predictions
- Work on a Spark ML mini-project ([rubric](#))

- Scale their ML prototype for their capstone project (this submission does not apply to students who have chosen to submit a DL prototype)



Common Concerns

- Some mentees may have a hard time adjusting to working with data at scale. Share with them any tips or tricks you have for wrangling large quantities of data.

Industry Expert Insights



- Provide practical applications machine learning at scale
 - Give tips and tricks for working with large amounts of data
-

Unit 10: Informational Interviews



Unit Overview

Informational interviews are one of the best ways to quickly get information (beyond what is available through internet searches) about a company. This unit delves into improving social skills, participating in an informational interview, and developing long-lasting professional relationships.



Unit Learning Objectives

- Build social skills to confidently participate in an informational interview
- Develop the ability to listen carefully and ask the right questions during an informational interview
- Appreciate the importance of developing long-lasting professional relationships



Major Mentee Activities

- Watch the videos on “How to improve your social skills” and “How to turn any meeting into a lasting relationship”
- Reach out to five experts in the field and request to have an informational interviews with them
- Submit a summary of practice informational interview sessions



Common Concerns

- Some mentees have a hard time setting up informational interview, so it's important to reassure them that it's normal and to continue reaching out to more people or help connect the with ML engineers.

- Some mentees are scared of rejection and are nervous to reach out to people for fear of appearing too forward or “weird.” Reassure them that there’s nothing wrong with a professional request for information.



Industry Expert Insights

- Share a story about an informational interview you’ve had. Talk about the takeaways from that story.
 - Discuss how an informational interview helped you in your career, or how you ended up helping someone because they asked you for an informational interview.
-

Unit 11: Deep Learning



Unit Overview

In this unit, students gain a thorough understanding of the concepts associated with deep learning, including the principle of neural networks and the process by which deep neural networks learn. They’ll also learn how to implement deep learning through tools like Keras and TensorFlow, as well as how to develop two types of neural networks: **convolutional neural networks** for videos and images and **recurrent neural networks** for sequential data.

Finally, they’ll explore the concept of transfer learning and wrap up the unit by working through a comprehensive discussion of the applications and best practices for building deep neural networks.



Unit Learning Objectives

- Gain a thorough understanding of deep learning best practices
- Learn how to use deep learning tools and work with different types of neural networks



Major Mentee Activities

- Work through resources that introduce them to deep learning neural network best practices
- Expand their DL toolbox by engaging with resources that cover Keras and TensorFlow
- Learn about AutoML and optimization for DL
- Create a DL prototype for their capstone (students get to choose if they want to create and scale an ML prototype or DL prototype so this submission will not apply to all students)

- Scale their DL prototype for their capstone (again, this may not apply to all students)



Common Concerns

- Mentees may need guidance about whether or not they should create a DL prototype. Students are welcome to create both an ML and DL prototype, but should only be advised to do so if they are on track with this course.



Industry Expert Insights

- Provide practical examples of deep learning applications
- Share your own experience working with DL

Unit 12: Find the Right Job Title & Companies



Unit Overview

A dream job is the intersection of two phenomena: the right role at the right company. There are several job titles and a diverse array of companies in the ML domain. In this unit, students will research roles within the field that might be a good fit and identify industries and companies that offer those roles.



Unit Learning Objectives

- Research and identify companies that mentees would like to work at



Major Mentee Activities

- A short paper describing at least three job titles that are right for the mentee
- A list of 40-50 companies they'd like to join



Common Concerns

- Mentees might struggle with how to know if a company would be a good fit for them.
- Mentees may feel discouraged when reading job descriptions. Encourage them but provide honest feedback.



Industry Expert Insights

- Share your own experiences looking for companies that you considered applying to.
- Explain the importance of resiliency when searching for a job.

Unit 13: Natural Language Processing



Unit Overview

In this unit, students learn about Natural Language Processing (NLP). They learn the fundamentals of NLP, create a chatbot, and extract features from raw text data. They study an NLP application by working through a guided case study on Quora. Some students may apply NLP techniques to their Capstone Project.



Unit Learning Objectives

- Understand and create chatbots
- Learn data extraction techniques
- Understand how NLP techniques can be used in the workplace



Major Mentee Activities

- Work through resources that help them understand natural language processing
- Create a chatbot
- Work through a guided case study on Quora
- Apply NLP techniques to Capstone (if appropriate)



Common Concerns

- Mentees will ask you whether their Capstone should include NLP. If it does, please provide them with tips and examples of NLP application. If it doesn't, please guide them in cleaning up their project.
- Since NLP is a cutting-edge field, some students may have trouble absorbing the information in a practical sense.



Industry Expert Insights

- Share examples of how NLP is used in the industry
 - Explain the impact of NLP to help students move theory into application
-



Unit 14: Image Processing & Computer Vision and Unit 15: Image Processing Tutorial

Unit Overviews

These two units cover image processing and computer vision. These units build on each other so that mentees can do increasingly complex tasks in computer vision.

Unit 14 introduces the theory associated with these interesting concepts. Unit 15 features a hands-on tutorial that will allow students to put the theory they've learned into practice.



Unit Learning Objectives

- Understand the theories and fundamentals of computer vision and image processing
- Develop practical skills to conduct image processing



Major Mentee Activities

- Some students may apply image processing techniques to their Capstone Project.
- Work through case studies to see how the industry leverages image processing theories
- Make an image processing model while working through the unit 15 tutorial
- Deploy a trained model into production on the web



Common Concerns

- Mentees may need guidance about whether they should apply image processing techniques to their Capstone. Provide them with next steps on how they should tackle their Capstone – in both scenarios of applying or not applying these methods. If they are not going to apply image processing techniques, help them determine how best to clean up their capstone.
- Some students may feel overwhelmed with the practical portion (Unit 15). Provide them with tips and advice.



Industry Expert Insights

- Share real-world examples of image processing and computer vision applications



Unit 16: Preparing For and Getting Interviews

Unit Overview

Preparing for interviews is one of the most important steps in excelling in the ML field. Preparing for and getting interviews involves two steps: growing your network and creating a compelling resume. This unit explores how to help students reach out to their networks to get interviews and create resumes to impress hiring managers.



Unit Learning Objectives

- Review all job search steps, including building network contacts, identifying the right job title, company, updating or creating a ML resume
- Write an effective cover letter
- Line up job interviews through their professional network



Major Mentee Activities

- Write a cover letter
- Create an MLE resume
- Referrals spreadsheet
- Update LinkedIn profile



Common Concerns

- Writing skills: Some mentees may not feel confident about their writing skills. Review your mentee's cover letter and provide feedback and encouragement during the 1:1 session.
- Mentees may have trouble keeping their resume concise and determine what parts of their experience/education are most relevant. Help your mentee create an outline for their resumé and highlight the most important achievements or skills.



Industry Expert Insights

- If you are comfortable, share the resume and cover letter that landed you your dream job.

Unit 17: Deploying ML Systems to Production



Unit Overview

This is one of the most important units in the course. Students will learn the tools and techniques for deploying machine learning models. Until this point, students have learned

pieces of this process and now they'll take a comprehensive approach to help them deploy their Capstone Project.



Unit Learning Objectives

- Develop skills to deploy systems to production
- Learn best practices and common tools
- Confidently learn how to refactor code and design an architecture for a system,
- Implement the architecture and deploy it to production



Major Mentee Activities

- Build an API
- Design solution architecture
- Run code end-to-end with logging and testing
- Deploy an application to production



Common Concerns

- Many students find this unit challenging, so please review the concepts learned in Unit 3 and the sections on ML At Scale and Deep Learning to answer questions



Industry Expert Insights

- Share real-world examples of how ML systems are deployed

Unit 18: Effective Interviewing for Machine Learning Engineers



Unit Overview

This unit explores the typical steps in the interview process for an ML practitioner. Since this course is designed to help students obtain an ML job upon graduation, this unit serves as an important step in their journey.



Unit Learning Objectives

- Master each step in the Machine Learning interview process
- Practice interviewing techniques for both technical and behavioral interviews
- Confidently answer the “Must know Machine Learning Engineer interview questions”



Major Mentee Activities

- Complete sample take-home challenges
- Set up behavioral and technical mock interviews



Common Concerns

- Interviewing is a nerve-wracking process, so provide your mentee with practice and encouragement.
- Mentees might believe that the non-technical portion of the interview is not as important, so remind them that it's an important aspect of their job search and provide examples. The non-technical portion, for example, is often conducted by a recruiter at the beginning of the interview process as a filtering step.
- Some mentees may forget about nonverbal communication, so give them examples of things to remember during the interview (e.g. eye contact, nodding when the interviewer asks a question, having a pleasant facial expression, sitting professionally).



Industry Expert Insights

- Share your interview stories, both good and bad.
- Encourage mentees to sign up for mock interviews when they're ready.
- Give mentees candid feedback on what aspects of interview skills they might need to put more work into.

Unit 19: Congratulations!



Unit Overview

This is the conclusion of the course. Your mentee has learned the career development skills and technical concepts and tools needed to get a job in the ML industry.

Congratulate your mentee on completing the course and provide a few words of encouragement and advice. Your mentee is just beginning their ML journey, so your support is meaningful and impactful. Reinforce that they shouldn't get discouraged if it takes them a few months to find a job - they'll find the position that's right for them.

Thank you for mentoring your Springboard student. Your advice and guidance is invaluable, and you've had a meaningful influence in helping someone achieve their dream of becoming an MLE professional.