Preparing for ML - Interviews (Notes)

Phone Interview / ML Fundamentals
All my phone screens had 15-20 mins of ML fundamentals qns
Typically, big-tech companies have a 1-hour technical phone screen that comprises 1 leetcode style question followed by 10 to 15 mins of rapid-fire ML tech questions towards the end. Some of these questions include:

- Explain overfitting and regularization
- Explain the bias-variance tradeoff.
- How do you handle data imbalance issues?
- Explain Gradient descent and Stochastic gradient descent. Which one would you prefer?
- [Difficult] Can you explain logistic regression and derive gradient descent for Logistic regression
- [Difficult] What do eigenvalues and eigenvectors mean in PCA
- [Difficult] Explain different types of Optimizers — How is Adam optimizer different from Rmsprop?
- [Difficult] What are the different types of activation functions and explain about vanishing gradient problem>
- I've compiled a set of commonly asked ML Theory questions over here.

Study resources
https://www.deeplearning.ai/courses/machine-learning-specialization/
http://ema.cri-info.cm/wp-content/uploads/2019/07/2019BurkovTheHundred-pageMachineLearning.pdf
https://towardsdatascience.com/a-visual-explanation-of-gradient-descent-methods-momentum-adagrad-rmsprop-adam-f898b102325c

Onsite prep:

ML Coding rounds - Typically you might be asked to code linear regression, KNN, Kmeans like algorithms. I have faced Kmeans in two onsite interviews.

Best resource for ML Coding : Watch Assembly AI youtube channel videos
https://www.youtube.com/watch?v=6UF5Ysk_2gk&t=357s

Ml Theory round (45 mins - 1 hour) - Some companies have a dedicated ML Theory round in onsite.
Straightforward theory questions:

- What do L1 and L2 regularization mean and when would you use L1 vs. L2? Can you use both?

- When there are highly correlated features in your dataset, how would the weights for L1 and L2 end up being?
- Nuanced derivation-based questions that requires a pen and paper:
- Can you use MSE for evaluating your classification problem instead of Cross entropy
- How does the loss curve for Cross entropy look?
- What does the "minus" in cross-entropy mean?
- Explain how Momentum differs from RMS prop optimizer?

Best way to prepare is to go through the 100 page Machine learning book.

ML Design rounds
Depends on your specialization. If you have generic ML experience, questions tend to follow the flavor of recommendations systems.

Based on my experience, questions were just a usecase of what the company does or what the team does.

"How do you design youtube"
"How do you restaurant recommendations doordash"
"Related pins at Pinterest"

Study resources:
ML Design notes: Check the recommendation systems pdf.
[Educative.io course](#)
Fennal AI blogs (https://fennel.ai/blog/tag/real-world-recommendation-system/)
ML System design by Alex Xu