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A conversation with Andrew Ng, Antje Barth, Shelbee Eigenbrode and Sireesha Muppala

Advanced model training and tuning

Practice

ML model training challenges

Lecture Notes (Optional)

Practice

Practice Quiz: Week 1
10 questions

Week 1

Practice Quiz • 30 min

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1. Model training and model tuning are part of a typical machine learning workflow. The goal of the model training process is to find a set of model parameters that best describes the patterns found in a given training dataset. What is the goal of model tuning? **1 / 1 point**

- To reduce the training time.
- To find the best combination of hyperparameters that produces the best-performing model parameters given a set of hyperparameter combinations
- To evaluate model performance after training
- None of the above

Correct
That's right! Model tuning improves model performance by finding the best combination of hyperparameters that find the best model parameters given a set of hyper parameter combinations.

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2. Both parameters and hyperparameters are used by a deep neural network to fit a model. Weights and biases are examples of parameters while the number of epochs, batch size and learning rate are hyperparameters. Which of these are defined before model training and used to control the algorithm's learning process? **1 / 1 point**

- Parameters
- Hyperparameters
- Both parameters and hyperparameters
- None of these

Correct
Correct! hyperparameters are used as inputs to control how the algorithm learns the model parameters during the training process.

3. Which hyperparameter tuning algorithm(s) use prior information throughout the tuning process to often reduce the time needed to find the optimal set of hyperparameters? **1 / 1 point**

- [x] Hyperband

Correct
That's right! Hyperband is a bandit-based algorithm that uses prior information during the tuning process to reduce the time needed to find the optimal set of hyperparameters. Please revisit the "Algorithms for Automatic Model Tuning" lecture in Week 1.

- [ ] Grid Search
- [ ] Random Search
- [x] Bayesian Search

Correct
That's right! Bayesian search uses Bayesian statistics throughout the tuning process to reduce the time needed to find the optimal set of hyperparameters.

4. Ben needs to deliver the first version of an NLP text classifier with a large number of hyperparameters by the end of the day. Testing all hyperparameter combinations would require many days to compare all combinations. He can either use the Grid Search or Random Search algorithm to perform the hyperparameter tuning on the model. **1 / 1 point**

Which search algorithm would you recommend to Ben to deliver the model by the end of the day?

- Either, both algorithms will take the same amount of time to produce the results
- Grid Search
- Random Search
- Combine the two algorithms

Correct
Random search is the best option here given the time constraint. In random search, only a limited number of random hyperparameter combinations are tested. Unlike in Grid Search where every combination of hyperparameters is tested. In this case, a full Grid Search would take several days which does not fit within the time constraint.

5. Which of the following steps are required to perform hyperparameter tuning with a SageMaker hyperparameter Tuning (HPT) Job: **1 / 1 point**

- Analyze results and select the best model candidate
- Start a SageMaker HPT Job
- Create an Estimator
- Define the combination of hyperparameters to use for the HPT Job
- All of the above

Correct
Correct! We must first create an Estimator and define the combination of hyperparameters to use for the HPT Job. We then start the SageMaker HPT Job. Finally, we can analyze the results of the tuning job and select the best model candidate.

6. Amazon SageMaker hyperparameter Tuning supports a "warm start" feature that reuses the results from a previous hyperparameter tuning job to speed up subsequent tuning jobs. Warm start helps reduce the overall tuning time. In which of the following scenarios is the warm start feature particularly useful? (Select all that apply) **1 / 1 point**

- [x] Adding new hyperparameters

Correct
Correct! The model can benefit from the knowledge of previous tuning jobs to more quickly find the best hyperparameters in subsequent tuning jobs.

- [ ] Removing all hyperparameters
- [x] Changing hyperparameter tuning ranges

Correct
Correct! The model can benefit from the knowledge of a previous tuning job to more quickly find the best hyperparameters in subsequent tuning jobs.