Hyperparameter Tuning

SageMaker

Hyperparameters

Tunable Parameters of Machine Learning Algorithm

Customize how a model is trained

Improve quality of predictions

Hyperparameter Tuning is Hard

Time consuming Activity

Several hyperparameters and wide range of values

Interdependencies between hyperparameters

Need systematic way to converge to optimal values

SageMaker Automatic Model Tuning

Input:

- Algorithm, Training & Test Data
- Hyperparameters and range of values to search
- Optimization Objective

Tuning:

- Launch multiple training jobs – with different hyperparameters
- Pick the training job and hyperparameters that offer best performance

Search Strategy

Random Search

- Random combination of values from within the range of values configured

Bayesian Search

- Tuning itself is treated as regression problem
- Input features: Hyperparameters
- Target: Optimization Objective

Bayesian Search

Start with some combination of hyperparameter values

Run training jobs with these values

Assess outcome

Use regression to choose next set of hyperparameter values

Repeat

Lab: Tune Factorization Machines

Recommender System to predict how a user would rate movies

TEST RMSE Score degraded from 0.8 to 1.9 with new movie dataset

Factorization Hyperparameters – difficult to understand

Optimize as a black-box