

AWS Certified Machine Learning Specialty

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Online Course



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Course Modules

Data Engineering

1. Create data repositories for ML

- Identify data sources (for example, content and location, etc.,)
- Determine storage mediums (databases, Amazon S3, etc.,)

2. Identify and implement a data ingestion solution

- Identify data job styles and job types (batch load, streaming).
- Orchestrate data ingestion pipelines
- Amazon Kinesis
- Amazon Kinesis Data Firehose
- Amazon EMR
- AWS Glue
- Amazon Managed Service for Apache Flink
- Schedule jobs

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3. Identify and implement a data transformation solution

- Transform data in transit (ETL, AWS Glue, Amazon EMR, etc.,)
- Handle ML-specific data by using MapReduce



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Exploratory Data Analysis

4. Sanitize and prepare data for modelling

- Identify and handle missing data, corrupt data, and stop words.
- Format, normalize, augment, and scale data.
- Determine whether there is sufficient labelled data.
- Identify mitigation strategies.
- Use data labelling tools (Amazon Mechanical Turk).



5. Perform feature engineering

- Identify and extract features from datasets
- Analyze and evaluate feature engineering concepts

6. Analyze and visualize data for ML

- Create graphs (scatter plots, time series, histograms, box plots).
- Interpret descriptive statistics (correlation, summary etc.,)
- Perform cluster analysis (hierarchical, diagnosis, etc.,)

Modelling

7. Frame business problems as ML problems

- Determine when to use and when not to use ML.
- Know the diff between supervised & unsupervised learning.
- Select from among classification, regression, forecasting, etc.,



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8. Select the appropriate model(s) for a given ML problem

- XGBoost, logistic regression, k-means, linear regression, etc.,
- Express the intuition behind models



9. Train ML models

- Split data between training and validation
- Understand optimization techniques for ML training
- Choose appropriate compute resources
- Choose appropriate compute platforms (Spark or non-Spark).
- Update and retrain models.
- Batch or real-time/online

10. Perform hyperparameter optimization

- Perform regularization.
- Drop out
- L1/L2
- Perform cross validation.
- Initialize models.
- Neural network architecture, learn rate, & activation functions.
- Understand tree-based models (number of trees & levels).
- Understand linear models (learning rate)



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11. Evaluate ML models

- Avoid overfitting or underfitting.
- Detect and handle bias and variance.
- Evaluate metrics (area under curve [AUC]-[ROC], etc.,
- Interpret confusion matrices.
- Perform offline and online model evaluation (A/B testing).
- Compare models by using metrics
- Perform cross validation.

Machine Learning Implementation and Operations

12. Build ML solutions for performance, availability, etc.,

- Log and monitor AWS environments.
- AWS CloudTrail and Amazon CloudWatch
- Build error monitoring solutions.
- Deploy to multiple AWS Regions and multiple Availability Zones.
- Create AMIs and golden images.
- Create Docker containers.
- Deploy Auto Scaling groups.
- Right size resources (instances, Provisioned IOPS, volumes).
- Perform load balancing.
- Follow AWS best practices



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13. Appropriate ML services and features for a given problem

- ML on AWS (application services)
- Amazon Polly
- Amazon Lex
- Amazon Transcribe
- Understand AWS service quotas.
- Determine when to build custom models and when.
- Understand AWS infrastructure and cost considerations.
- Use Spot Instances to train deep learning by using AWS Batch.



14. Apply basic AWS security practices to ML solutions

- AWS Identity and Access Management (IAM)
- S3 bucket policies
- Security groups
- VPCs
- Encryption and anonymization

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15. Deploy and operationalize ML solutions

- Expose endpoints and interact with them.
- Understand ML models.
- Perform A/B testing.
- Retrain pipelines.
- Debug and troubleshoot ML models.
- Detect and mitigate drops in performance.

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in terms of time management,
flexibility, and the ability
to access resources anytime,
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