

Pepsi Co. Training Syllabus

1. Day 1 - Demystifying Artificial Intelligence - Lecture

- a. AI in our everyday lives
 - i. Recommendation systems (netflix, youtube, etc)
 - ii. computer vision (self driving, object detection, segmentation analysis)
 - iii. natural language understanding (siri, alexa, GPS, google translate, email spam detection, etc)
 - iv. Job/college/loan/credit applications
 - v. Fraud detection
 - vi. Optimizing store inventory/shelving/staffing
 - b. What is AI?
 - i. Computers + Math + Data
 - ii. How does it work?
 - c. Data
 - i. What is data
 - ii. Data sources
 - iii. Data storage
 - d. Subsets of AI
 - i. Supervised vs Unsupervised vs Reinforcement Learning
 - ii. Machine learning
 - iii. Deep learning
 - iv. Reinforcement learning
 - e. Introduction to ML algorithms
 - i. What tasks are associated with what algorithms
 - ii. Flavors of ML algorithms
 - iii. Examples of ML algorithms
 - f. Identifying & Productizing ML use-cases
 - i. Consistent data
 - ii. Large volume
 - iii. Interactive vs Non-Interactive
 - iv. Single Record vs Batch
 - g. Conclusion - Day 1 - Quiz
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2. Day 2 - Machine Learning Algorithm Foundations - Lecture

- a. Establish Term Glossary
- b. The Artificial Neuron
- c. Open-source software

- i. Layers of auto-ml (code a network/keras & torch/auto-ml)
 - d. The components of ML algorithms (rudimentary concepts)
 - e. Walkthrough an example with real data
 - f. Conclusion - Day 2 - Quiz
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3. Day 3 - Functions, Data Structures & EDA - Jupyter Notebook

- a. Data Structures
 - b. Basic Functions
 - c. Intermediate Functions
 - d. Working with Datasets
 - i. Reading in different data
 - ii. Examining features
 - iii. Visualizations
 - e. Conclusion - Day 3 - Quiz
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4. Day 4 - Basic ML Algorithms (Regression) - Jupyter Notebook

- a. Regression
 - i. Different types
 - ii. How it works
 - iii. Examples
 - b. Interpreting model results
 - i. Accuracy
 - ii. ROC/AUROC/F1/recall/precision/etc
 - c. Conclusion - Day 4 - Quiz
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5. Day 5 - Feature Selection & Feature Engineering - Jupyter Notebook

- a. Feature Selection
 - i. Choosing relevant features for your ML model
- b. Feature Engineering
 - i. Process of cleaning data for a ML model
- c. Data Pipeline
 - i. Putting it all together
 - ii. Preparing data to train a ML model
- d. Conclusion - Day 5 - Quiz

6. Day 6 - Intermediate ML Algorithms - Trees/Ensemble Methods (RFs) - Jupyter Notebook

- a. Decision Trees
- b. Random Forest
- c. Hyper-Parameters & Model tuning
- d. Conclusion - Day 6 - Quiz

7. Day 7 - Advanced ML Algorithms - Neural Networks (ANNs) - Jupyter Notebook

- a. The basic, forward ANN
 - i. The artificial neuron
 - ii. The network
- b. The CNN
- c. The RNN
- d. Open-source models
- e. Transfer Learning
- f. Conclusion - Day 7 - Quiz

8. Day 8 - E2E Build - Putting It All Together - Jupyter Notebook

- a. Given a dataset, experiment with different methods & models.
- b. Develop the end-to-end process from scratch and choose the optimal solution
 - i. Feature Selection / Eng
 - ii. Define the task and experiment with different algorithms
 - iii. Tune the model
- c. Create interpretable visualizations

9. Day 9 - Productization - Infrastructure - Lecture + VSCode

- a. Different types of deployment
 - i. Interactive vs non-interactive (client facing or not)
- b. The client facing API
- c. The internal system
- d. Things to consider

- i. Model drift
 - ii. Model re-training
 - iii. Throughput & latency
 - e. Cloud infra
 - i. azure/aws/gcp/redis/etc
 - ii. Worker jobs
 - f. Conclusion - Day 9 - Quiz
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10. Day 10 - Productization - Deployment - Lecture + VSCode

- a. Hosting, and deployment of the API
- b. Moving from dev environment to prod environment!
 - i. stress-testing
 - ii. Secret keys
 - iii. Modularize code
 - iv. Encryption
- c. Conclusion - Day 10 - Quiz