Chapter 1: Introduction and Fundamentals

1. **Introduction to Machine Learning**
    - 01.A Gentle Introduction to Machine Learning
    - *Introduction to Supervised Learning*
    - *Introduction to Unsupervised Learning*
2. **Basic Concepts and Metrics**
    - 02.Machine Learning Fundamentals_ Cross Validation
    - 03.Machine Learning Fundamentals_ The Confusion Matrix
    - 04.Machine Learning Fundamentals_ Sensitivity and Specificity
    - 05.The Sensitivity, Specificity, Precision, Recall Sing-a-Long!!!
    - 06.Machine Learning Fundamentals_ Bias and Variance
    - 07.ROC and AUC, Clearly Explained!
    - 08.ROC and AUC in R
    - *Introduction to Training, Validation, and Testing Sets*
    - *Evaluation Metrics for Classification and Regression*

Chapter 2: Data Preprocessing and Feature Engineering

1. **Data Preprocessing Techniques**
    - 10.Mutual Information, Clearly Explained!!!
    - *Handling Missing Data*
    - *Data Normalization and Standardization*
    - 50.One-Hot, Label, Target and K-Fold Target Encoding, Clearly Explained!!!
2. **Feature Engineering**
    - 16.Odds and Log(Odds), Clearly Explained!!!
    - 17.Odds Ratios and Log(Odds Ratios), Clearly Explained!!!
    - *Feature Scaling Techniques*
    - *Handling Imbalanced Data*

Chapter 3: Supervised Learning

1. **Linear Models**
    - 11.The Main Ideas of Fitting a Line to Data (The Main Ideas of Least Squares and Linear Regression.)
    - 12.Linear Regression, Clearly Explained!!!
    - 13.Multiple Regression, Clearly Explained!!!
    - 14.Using Linear Models for t-tests and ANOVA, Clearly Explained!!!
    - 15.Design Matrices For Linear Models, Clearly Explained!!!
2. **Logistic Regression**
    - 19.StatQuest_ Logistic Regression
    - 20.Logistic Regression Details Pt 2_Maximum Likelihood
    - 21.Logistic Regression Details Pt 3_R-squared and p-value
    - 22.Saturated Models and Deviance
    - 23.Logistic Regression in R, Clearly Explained!!!!
    - 24.Deviance Residuals

3. **Regularization Techniques**
    - 25.Regularization Part 1_Ridge (L2) Regression
    - 26.Regularization Part 2_Lasso (L1) Regression
    - 27.Ridge vs Lasso Regression, Visualized!!!
    - 28.Regularization Part 3_ Elastic Net Regression
    - 29.Ridge, Lasso and Elastic-Net Regression in R
4. **Advanced Topics in Linear Models**
    - *Polynomial Regression*
    - *Quantile Regression*

Chapter 4: Decision Trees and Ensemble Methods

1. **Decision Trees**
    - 46.Decision and Classification Trees, Clearly Explained!!!
    - 47.StatQuest_ Decision Trees, Part 2 - Feature Selection and Missing Data
    - 48.Regression Trees, Clearly Explained!!!
    - 49.How to Prune Regression Trees, Clearly Explained!!!
    - 51.Classification Trees in Python from Start to Finish
2. **Ensemble Methods**
    - 52.StatQuest_ Random Forests Part 1 - Building, Using and Evaluating
    - 53.StatQuest_ Random Forests Part 2_ Missing data and clustering
    - 54.StatQuest_ Random Forests in R
    - 58.AdaBoost, Clearly Explained
    - 59.Gradient Boost Part 1 (of 4)_ Regression Main Ideas
    - 60.Gradient Boost Part 2 (of 4)_ Regression Details
    - 61.Gradient Boost Part 3 (of 4)_ Classification
    - 62.Gradient Boost Part 4 (of 4)_ Classification Details
    - 63.Troll 2, Clearly Explained!!!
    - 64.XGBoost Part 1 (of 4)_ Regression
    - 65.XGBoost Part 2 (of 4)_ Classification
    - 66.XGBoost Part 3 (of 4)_ Mathematical Details
    - 67.XGBoost Part 4 (of 4)_ Crazy Cool Optimizations
    - 68.XGBoost in Python from Start to Finish
    - *Bagging and Boosting Concepts*
    - *Stacking Ensemble Learning*

Chapter 5: Support Vector Machines

1. **Support Vector Machines (SVM)**
    - 70.Support Vector Machines Part 1 (of 3)_ Main Ideas!!!
    - 71.Support Vector Machines Part 2_ The Polynomial Kernel (Part 2 of 3)
    - 72.Support Vector Machines Part 3_ The Radial (RBF) Kernel (Part 3 of 3)
    - 73.Support Vector Machines in Python from Start to Finish
    - *Hyperparameter Tuning for SVMs*

Chapter 6: Neural Networks

1. **Introduction to Neural Networks**
    - 74.Neural Networks Pt. 1_ Inside the Black Box
    - 75.Neural Networks Pt. 2_ Backpropagation Main Ideas
    - 76.Backpropagation Details Pt. 1_ Optimizing 3 parameters simultaneously
    - 77.Backpropagation Details Pt. 2_ Going bonkers with The Chain Rule
    - 78.Neural Networks Pt. 3_ ReLU In Action!!!
    - *Perceptron and Multi-layer Perceptron (MLP)*
2. **Advanced Neural Network Concepts**
    - 79.Neural Networks Pt. 4_ Multiple Inputs and Outputs
    - 80.Neural Networks Part 5_ ArgMax and SoftMax
    - 81.The SoftMax Derivative, Step-by-Step!!!
    - 82.Neural Networks Part 6_ Cross Entropy
    - 83.Neural Networks Part 7_ Cross Entropy Derivatives and Backpropagation
    - 84.Neural Networks Part 8_ Image Classification with Convolutional Neural Networks
3. **Recurrent Neural Networks**
    - 85.Recurrent Neural Networks (RNNs), Clearly Explained!!!
    - 86.Long Short-Term Memory (LSTM), Clearly Explained
    - *Gated Recurrent Unit (GRU)*
4. **Natural Language Processing**
    - 87.Word Embedding and Word2Vec, Clearly Explained!!!
    - 88.Tensors for Neural Networks, Clearly Explained!!!
5. **Neural Networks in PyTorch**
    - 89.The StatQuest Introduction to PyTorch
    - 90.Introduction to Coding Neural Networks with PyTorch and Lightning
    - 91.Long ShortTerm Memory with PyTorch Lightning_1080p

Chapter 7: Unsupervised Learning

1. **Clustering Techniques**
    - 39.StatQuest_ t-SNE, Clearly Explained
    - 40.StatQuest_ Hierarchical Clustering
    - 41.StatQuest_ K-means clustering
    - 42.Clustering with DBSCAN, Clearly Explained!!!
    - 69.Cosine Similarity, Clearly Explained!!!
2. **Other Techniques**
    - 43.StatQuest_ K-nearest neighbors, Clearly Explained
    - *Association Rule Learning*
    - *Dimensionality Reduction Techniques in Unsupervised Learning*

Chapter 8: Probability and Statistics

1. **Fundamental Concepts**
    - 09.Entropy (for data science) Clearly Explained!!!
    - 55.The Chain Rule
    - 56.Gradient Descent, Step-by-Step

- 57.Stochastic Gradient Descent, Clearly Explained!!!
- *Probability Distributions*
- *Statistical Hypothesis Testing*

Chapter 9: Dimensionality Reduction

1. **Principal Component Analysis (PCA)**
   - 30.StatQuest_ Principal Component Analysis (PCA), Step-by-Step
   - 31.StatQuest_ PCA main ideas in only 5 minutes!!!
   - 32.StatQuest_ PCA - Practical Tips
   - 33.StatQuest_ PCA in R
   - 34.StatQuest_ PCA in Python
2. **Other Techniques**
   - 35.StatQuest_ Linear Discriminant Analysis (LDA) clearly explained
   - 36.Bam!!! Clearly Explained!!!
   - 37.StatQuest_ MDS and PCoA
   - 38.StatQuest_ MDS and PCoA in R
   - *t-SNE*
   - *UMAP (Uniform Manifold Approximation and Projection)*

Chapter 10: Naive Bayes

1. **Naive Bayes**
   - 44.Naive Bayes, Clearly Explained!!!
   - 45.Gaussian Naive Bayes, Clearly Explained!!!
   - *Multinomial Naive Bayes*
   - *Bernoulli Naive Bayes*

Additional Topics

- *Introduction to Machine Learning Lifecycle*
- *Model Evaluation Techniques*
- *Hyperparameter Tuning and Model Selection*
- *Real-world Case Studies and Applications*
- *Introduction to Model Deployment*