Supervised machine learning algorithms:

1. Linear Regression
- Simple Linear Regression
- Multiple Linear Regression
- Polynomial Linear Regression

2. Logistic Regression
-Softmax Regression
-Multinomial Logistic Regression
-Polynomial Features in Logistic Regression
-Logistic Regression Hyperparameters

3. Decision Trees
4. Random Forest
5. Gradient Boosting Machines (GBM)
-Gradient Descent
-Batch Gradient Descent
-Stochastic Gradient Descent
- Mini-Batch Gradient Descent

6. Support Vector Machines (SVM)
7. Naive Bayes
8. K-Nearest Neighbors (KNN)
9. Neural Networks
10. Ensemble Methods
11. Ridge Regression

12. Lasso Regression
13. ElasticNet
14. XGBoost (Extreme Gradient Boosting)
15. LightGBM
16. CatBoost
17. Bayesian Methods
18. Gaussian Processes
19. Polynomial Regression
20. Regularized Linear Models

* Regression metrice

-MSE

-MAE

-RMSE

-R2 Score

-Adjusted R2 Score

* Terms

-Bias

-Variance

-Overfitting

-Underfitting

-Accuracy

*Confusion Matrix

-Precision

-Recall

-F1 Score

Unsupervised learning available algorithms:

1. Clustering Algorithms:

- K-means
- Hierarchical Clustering
- DBSCAN (Density-Based Spatial Clustering of Applications with Noise)
- Gaussian Mixture Models (GMM)
- Mean Shift

2. Dimensionality Reduction Algorithms

- Principal Component Analysis (PCA)
- t-Distributed Stochastic Neighbor Embedding (t-SNE)
- Autoencoders
- Linear Discriminant Analysis (LDA)

3. Association Rule Learning

- Apriori Algorithm

4. Anomaly Detection

- Isolation Forest
- One-Class SVM (Support Vector Machine)

5. Generative Models

- Generative Adversarial Networks (GANs)
- Variational Autoencoders (VAEs)

Loss functions:

1. Binary Cross-Entropy Loss (Log Loss):

- Algorithm: Logistic Regression, Binary Classification Neural Networks
- Activation Function: Sigmoid

2. Categorical Cross-Entropy Loss:

- Algorithm: Multiclass Classification Neural Networks
- Activation Function: Softmax

3. Mean Squared Error (MSE):

- Algorithm: Linear Regression, Multilayer Perceptrons
- Activation Function: None

4. Mean Absolute Error (MAE):

- Algorithm: Regression Models
- Activation Function: None

5. Huber Loss:

- Algorithm: Regression Models
- Activation Function: None

6. Hinge Loss (SVM Loss):
- Algorithm: Support Vector Machines (SVM)
- Activation Function: None

7. Pairwise Ranking Loss:
- Algorithm: Learning to Rank Models (e.g., RankNet)
- Activation Function: None

8. Listwise Ranking Loss:
- Algorithm: Learning to Rank Models (e.g., ListNet)
- Activation Function: None

9. Custom Loss Functions:
- Algorithm: Any
- Activation Function: Varies based on the problem and implementation

Decision tree:

Available algorithms:
1. CART (Classification and Regression Trees)
2. ID3 (Iterative Dichotomiser 3)
3. C4.5 (successor of ID3)
4. CHAID (Chi-squared Automatic Interaction Detection)
5. MARS (Multivariate Adaptive Regression Splines)

* Decision trees hyperparameters: to reduce overfitting

1. Criterion
2. Splitter
3. Max Depth
4. Min Samples Split
5. Min Samples Leaf
6. Max Features
7. Max Leaf Nodes
8. Min Impurity Decrease

Regression tree available algorithms:

1. CART (Classification and Regression Trees)
2. MSE (Mean Squared Error)
3. Friedman MSE

* Awesome Decision Tree Visualization using :- dtreeviz library

Ensemble Learning:

can be done by three combination:

- different model
- different data

- different model and data

Types of Ensemble Learning:

1. Bagging (Bootstrap Aggregating)

- random forest (out of bag evaluation)

2. Boosting

- Ada boost

-Gradient boosting

-Xgboost

3. Stacking (Stacked Generalization)

4. Voting

- Ensambling