Linear Algebra

1. Define Point/Vector (2-D, 3-D, n-D)?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/introduction-to-vectors2-d-3-d-n-d-copy-8/)
2. How to calculate Dot product and angle between 2 vectors?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/dot-product-and-angle-between-2-vectors-1/)
3. Define Projection, unit vector?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/projection-and-unit-vector-1/)
4. Equation of a line (2-D), plane(3-D) and hyperplane (n-D)?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/equation-of-a-line-2-d-plane3-d-and-hyperplane-n-d-1/)
5. Distance of a point from a plane/hyperplane, half-spaces?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/distance-of-a-point-from-a-planehyperplane-half-spaces-1/)
6. Equation of a circle (2-D), sphere (3-D) and hypersphere (n-D)?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/equation-of-a-circle-2-d-sphere-3-d-and-hypersphere-n-d-1/)
7. Equation of an ellipse (2-D), ellipsoid (3-D) and hyperellipsoid (n-D)?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/equation-of-an-ellipse-2-d-ellipsoid-3-d-and-hyperellipsoid-n-d-1/)
8. Square, Rectangle, Hyper-cube and Hyper-cuboid?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/square-rectangle/)

Probability And Statistics

1. What is Random variables: discrete and continuous?
2. Define Outliers (or) extreme points?.
3. What is PDF?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/gaussiannormal-distribution-1/)
4. What is CDF?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/introduction-to-correlation-and-co-variance-1/)
5. explain about 1-std-dev, 2-std-dev, 3-std-dev range?
6. What is Symmetric distribution, Skewness and Kurtosis?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/symmetric-distribution-skewness-and-kurtosis/)
7. How to do Standard normal variate (z) and standardization?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/standard-normal-variate-z-and-standardization/)
8. What is Kernel density estimation?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/kernel-density-estimation/)
9. Importance of Sampling distribution & Central Limit theorem.(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/sampling-distribution-central-limit-theorem/)
10. Importance of Q-Q Plot: Is a given random variable Gaussian distributed?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/q-q-plothow-to-test-if-a-random-variable-is-normally-distributed-or-not/)
11. What is Uniform Distribution and random number generators(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/uniform-distribution-random-number-generators/)
12. What Discrete and Continuous Uniform distributions?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/uniform-distribution-and-its-parameters-pdf-and-cdf/)
13. How to randomly sample data points?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/uniform-distribution-random-number-generators/)
14. Explain about Bernoulli and Binomial distribution?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/bernoulli-and-binomial-distribution/)
15. What is Log-normal and power law distribution?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/log-normal-distribution/)
16. What is Power-law & Pareto distributions: PDF, examples(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/power-law-distribution/)
17. Explain about Box-Cox/Power transform?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/box-cox-transform/)
18. What is Co-variance?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/co-variance/)
19. Importance of Pearson Correlation Coefficient?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/pearson-correlation-coefficient-3/)
20. Importance Spearman Rank Correlation Coefficient?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/spearman-rank-correlation-coefficient-3/)
21. Correlation vs Causation?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/correlation-vs-causation-3/)
22. What is Confidence Intervals?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/confidence-interval-c-i-introduction/)
23. Confidence Interval vs Point estimate?
24. Explain about Hypothesis testing?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/hypothesis-testing-testing-methodology-null-hypothesis-p-value/)
25. Define Hypothesis Testing methodology, Null-hypothesis, test-statistic, p-value?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/hypothesis-testing-testing-methodology-null-hypothesis-p-value/)
26. How to do K-S Test for similarity of two distributions?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/k-s-test-for-similarity-of-two-distributions-3/)

Dimensionality Reduction

1. What is dimensionality reduction? (https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/what-is-dimensionality-reduction-1/)
2. Explain Principal Component Analysis?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/geometric-intuition-of-pca/)
3. Importance of PCA?.(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/why-learn-pca/)
4. Limitations of PCA?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/limitations-of-pca/)
5. What is t-SNE?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/t-distributed-stochastic-neighbourhood-embeddingt-sne-part-1/)
6. What is Crowding problem?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/crowding-problem-t-sne/)
7. How to apply t-SNE and interpret its output ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/how-to-use-t-sne-effectively/)

Performance Measurement Models:

1. What is Accuracy ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/accuracy-1/)
2. Explain about Confusion matrix, TPR, FPR, FNR, TNR?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/confusion-matrix-tpr-fpr-fnr-tnr-1/)
3. What do you understand about Precision & recall, F1-score? How would you use it?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/precision-and-recall-1/)
4. What is the ROC Curve and what is AUC (a.k.a. AUROC)?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/receiver-operating-characteristic-curve-roc-curve-and-auc-1/)
5. What is Log-loss and how it helps to improve performance?.(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/log-loss-1/)
6. Explain about R-Squared/ Coefficient of determination.(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/r-squared-1/)
7. Explain about Median absolute deviation (MAD) ?Importance of MAD?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/median-absolute-deviation-mad-1/)
8. Define Distribution of errors?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/distribution-of-errors/)

Classification algorithms in various situations:

1. What is Imbalanced and balanced dataset.(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/imbalanced-vs-balanced-dataset/)
2. Define Multi-class classification?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/multi-class-classification/)
3. Explain Impact of Outliers?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/impact-of-outliers/)
4. What is Local Outlier Factor?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/local-outlier-factor-simple-solution-mean-distance-to-knn/)
5. What is k-distance (A), N(A)(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/k-distanceana/)
6. Define reachability-distance(A, B)?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/reachability-distanceab/)
7. What is Local-reachability-density(A)?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/local-reachability-densitya/)
8. Define LOF(A)?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/local-outlier-factora/)
9. Impact of Scale & Column standardization?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/impact-of-scale-column-standardization/)
10. What is Interpretability?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/interpretability/)
11. Handling categorical and numerical features?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/handling-categorical-and-numerical-features/)
12. Handling missing values by imputation?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/handling-missing-values-by-imputation/)
13. Bias-Variance tradeoff?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/bias-variance-tradeoff-3/)

K-NN(K Nearest Neighbour)

1. Explain about K-Nearest Neighbors?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/k-nearest-neighbors-geometric-intuition-with-a-toy-example-1/)
2. Failure cases of KNN?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/failure-cases-of-knn/)
3. Define Distance measures: Euclidean(L2) , Manhattan(L1), Minkowski, Hamming?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/distance-measures-euclideanl2-manhattanl1-minkowski-hamming/)
4. What is Cosine Distance & Cosine Similarity?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/cosine-distance-cosine-similarity/)
5. How to measure the effectiveness of k-NN?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/how-to-measure-the-effectiveness-of-k-nn/)
6. Limitations of KNN?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/knn-limitations-1/)
7. How to handle Overfitting and Underfitting in KNN?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/overfitting-

and-underfitting/)
8. Need for Cross validation?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/need-for-cross-validation/)
9. What is K-fold cross validation?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/k-fold-cross-validation/)
10. What is Time based splitting?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/time-based-splitting/)
11. Explain k-NN for regression?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/k-nn-for-regression/)
12. Weighted k-NN ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/weighted-k-nn/)
13. How to build a kd-tree.?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/how-to-build-a-kd-tree/)
14. Find nearest neighbors using kd-tree?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/find-nearest-neighbours-using-kd-tree/)
15. What is Locality sensitive Hashing (LSH)?(
16. Hashing vs LSH?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/hashing-vs-lsh/)
17. LSH for cosine similarity?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/lsh-for-cosine-similarity/)
18. LSH for euclidean distance?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/lsh-for-euclidean-distance/)

Naive Bayes

1. What is Conditional probability?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/conditional-probability-1/)
2. Define Independent vs Mutually exclusive events?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/independent-vs-mutually-exclusive-events-3/)
3. Explain Bayes Theorem with example?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/bayes-theorem-with-examples/)
4. How to apply Naive Bayes on Text data?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/naive-bayes-on-text-data/)
5. What is Laplace/Additive Smoothing?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/laplace-additive-smoothing/)
6. Explain Log-probabilities for numerical stability?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/log-probabilities-for-numerical-stability/)
7. In Naive bayes how to handle Bias and Variance tradeoff?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/bias-and-variance-tradeoff/)
8. What Imbalanced data?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/imbalanced-data/)
9. What is Outliers and how to handle outliers?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/outliers/)
10. How to handle Missing values?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/missing-values/)
11. How to Handling Numerical features (Gaussian NB) (https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/handling-numerical-features-gaussian-nb/)
12. Define Multiclass classification.?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/multiclass-classification/)

Logistic Regression and Linear Regression

1. Explain about Logistic regression?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/geometric-intuition-1/)
2. What is Sigmoid function & Squashing ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/sigmoid-function-squashing-1/)
3. Explain about Optimization problem in logistic regression. (https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/mathematical-formulation-of-objective-function-1/)
4. Importance of Weight vector in logistic regression.(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/weight-vector-1/)
5. L2 Regularization: Overfitting and Underfitting.(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/l2-regularization-overfitting-and-underfitting/)
6. L1 regularization and sparsity. (https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/l1-regularization-and-sparsity/)
7. What is Probabilistic Interpretation: Gaussian Naive Bayes ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/probabilistic-interpretation-gaussian-naive-bayes-1/)
8. Explain about Hyperparameter search: Grid Search and Random Search ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/hyperparameter-search-grid-search-and-random-search/)
9. What is Column Standardization.?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/column-standardization/)
10. Explain about Collinearity of features?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/collinearity-of-features-1/)
11. Find Train & Run time space and time complexity of Logistic regression?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/testrun-time-space-and-time-complexity-1/)

Support Vector Machine

1. Explain About SVM? (https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/geometric-intution-1/)
2. What is Hinge Loss?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/loss-function-hinge-loss-based-interpretation-copy-8/)
3. Dual form of SVM formulation.?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/dual-form-of-svm-formulation/)
4. What is Kernel trick.?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/kernel-trick/)

5. What is Polynomial kernel.?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/polynomial-kernel-copy-8/)
6. What is RBF-Kernel.?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/rbf-kernel-copy-8/)
7. Explain about Domain specific Kernels. ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/domain-specific-kernels-copy-8/)
8. Find Train and run time complexities for SVM?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/train-and-run-time-complexities-copy-8/)

Explain about SVM Regression. ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/svm-regression-copy-8/)

Decision Trees

1. How to Building a decision Tree?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/geometric-intuition-axis-parallel-hyperplanes-1/)
2. What is Entropy? (https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/building-a-decision-treeentropy/)
3. What is information Gain ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/building-a-decision-treeinformation-gain/)
4. What is Gini Impurity?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/building-a-decision-tree-gini-impurity/)
5. How to Constructing a DT. ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/building-a-decision-tree-constructing-a-dt/)
6. Importance of Splitting numerical features.?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/building-a-decision-tree-splitting-numerical-features/)
7. How to handle Overfitting and Underfitting in DT?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/overfitting-and-underfitting-4/)
8. What are Train and Run time complexity for DT?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/train-and-run-time-complexity/)
9. How to implement Regression using Decision Trees?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/regression-using-decision-trees-2/)

Ensemble Models:

1. What are ensembles?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/what-are-ensembles/)
2. What is Bootstrapped Aggregation (Bagging) ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/bootstrapped-aggregation-bagging-intuition/)
3. Explain about Random Forest and their construction?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/random-forest-and-their-construction-2/)
4. Explain about Boosting?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/boosting-intuition/)
5. What are Residuals, Loss functions and gradients ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/residuals-loss-functions-and-gradients/)
6. Explain about Gradient Boosting?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/gradient-boosting/)
7. What is Regularization by Shrinkage?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/regularization-by-shrinkage/)
8. Explain about XGBoost?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/xgboost-boosting-randomization/)
9. Explain about AdaBoost?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/adaboost-geometric-intuition-2/)
10. How do you implement Stacking models?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/stacking-models/)
11. Explain about cascading classifiers. ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/cascading-classifiers/)

Clustering:

1. What is K-means? How can you select K for K-means?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/k-means-algorithm/)
2. How is KNN different from k-means clustering?
3. Explain about Hierarchical clustering?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/agglomerative-divisive-dendrograms/)
4. Limitations of Hierarchical clustering?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/limitations-of-hierarchical-clustering/)
5. Time complexity of Hierarchical clustering?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/time-and-space-complexity-3/)
6. Explain about DBSCAN?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/dbscan-algorithm-2/)
7. Advantages and Limitations of DBSCAN?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/advantages-and-limitations-of-dbscan/)

Recommender Systems and Matrix Factorisation.

1. Explain about Content based and Collaborative Filtering?(https://www.appliedaicourse.com/course/applied-ai-course-

online/lessons/content-based-vs-collaborative-filtering-copy-5/)

2. What is PCA, SVD?(hWhat is K-means? How can you select K for K-means?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/k-means-algorithm/)
3. How is KNN different from k-means clustering?
4. Explain about Hierarchical clustering?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/agglomerative-divisive-dendrograms/)
5. Limitations of Hierarchical clustering?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/limitations-of-hierarchical-clustering/)
6. Time complexity of Hierarchical clustering?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/time-and-space-complexity-3/)
7. Explain about DBSCAN?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/dbscan-algorithm-2/)
8. Advantages and Limitations of DBSCAN?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/advantages-and-limitations-of-dbscan/)ttps://www.appliedaicourse.com/course/applied-ai-course-online/lessons/matrix-factorization-pca-svd/)
9. What is NMF?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/matrix-factorization-nmf/)
10. How to do MF for Collaborative filtering ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/matrix-factorization-for-collaborative-filtering/)
11. How to do MF for feature engineering.?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/matrix-factorization-for-feature-engineering/)
12. Explain relation between Clustering And MF?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/clustering-as-mf/)
13. What is Hyperparameter tuning. ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/hyperparameter-tuning/)
14. Explain about Cold Start problem.?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/cold-start-problem/)
15. How to solve Word Vectors using MF?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/word-vectors-as-mf/)
16. Explain about Eigenfaces. ?(https://www.appliedaicourse.com/course/applied-ai-course-online/lessons/eigen-faces/)