Algorithms of machine learning

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VISIT 1

1. Introduction to machine learning. Discriminant functions. CrispDM. K-nearest neighbours method.
2. *Python basics. Ipython basics, numpy, matplotlib.*
3. K-nearest neighbours extension & optimization.
4. Decision trees. Bagging.
5. Classifier evaluation. Probability smoothing (Laplace). Exponential smooting. Regression.
6. *Pandas. Sciki-learn.*

VISIT 2

1. Data transformation: Principal components analysis, singular value decomposition
2. Linear methods of classification. SGD. Logistic regression.
3. *Applying PCA and SVD in practice. Explained variance ratio. Classifying text/images. Using linear methods for that.*
4. Support vector machines
5. Kernel methods
6. Working with texts. *Working with texts in practice.*

VISIT 3

1. Ensemble methods: Bagging, Random Forest, Stacking.
2. Boosting
3. *Kaggle presentations & discussion. Ensemble methods in practice.*
4. xgBoost. Kaggle tips & tricks.
5. Feature selection.
6. Sparse & non-linear feature extraction

VISIT 4

1. Neural networks: activations, different targets, backprop, dropout.
2. *Using neural nets in practice.*
3. *Kaggle presentations & discussion.*
4. Recommender systems.
5. Clustering: k-means, hierarchical, spectral.
6. *Clustering in practice.*

VISIT 5

1. Exam (oral)
2. Exam (oral)
3. Exam
4. Bayes decision rule. Gaussian. Naive Bayes.
5. *Kaggle presentations & discussion.*
6. Kernel density estimation. Density estimation with mixtures. EM-algorithm.
7. Active learning.