CS540 Introduction to Artificial Intelligence
Lecture 14

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Based on lecture slides by Jerry Zhu and Yingyu Liang

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Perceptron

Review

- Perceptron update rule.
- Perceptron termination condition.

Logistic Regression

Review

- Logistic update rule.
- Logistic cost function.
- Convexity.
- Hessian, Laplacian, eigenvalue.

Neural Network

Review

- Activation.
- Backpropogation.
- L_1 and L_2 regularization.
- Cross validation.
- Multi class classification.

Multi Layer Neural Network Example

Review

LTU Activation Example

Review

Support Vector Machine

Review

- Hard margin support vector.
- Soft margin maximization.
- Subgradient descent.
- Kernel trick.

Support Vector Margin Example

Review

Feature Vector to Kernel Example

Review

Decision Tree

Review

- Entropy.
- Information gain.
- Bagging and boosting.

Decision Tree Example

Review

K Nearest Neighbor

Review

- Distance functions.

K Nearest Neighbor Cross Validation Example

Review

Convolutional Neural Network

Review

- Convolution.
- Pooling.
- Trained weights.

Convolutional Weights Count Example

Review

Computer Vision

Review

- Histogram of Gradients Features.
- Scale Invariant Feature Transform.
- Block normalization.
- Dominant orientation.
- Harr Features.

Histogram of Gradient Example

Review

Natural Language Processing

Review

- Bigram and trigram model.
- Transition matrix.
- Random word generation.
- Bayes rule.

Document Bayes Rule Example

Review

Bayesian Network

Review

- Conditional probability table.
- Maximum likelihood estimation.
- Training vs inference.
- Chow Liu algorithm.

Common Cause Network Example

Review