

Neural Networks for Pattern Recognition: Agenda

SESSION 1

1. Overview of Supervised Machine Learning
2. EXAMPLE: Linear Regression; Squared-Error Cost Function, Root Mean Square Error (RMSE)
3. Training & Test Data Sets
4. Regularization by Weight Penalty; Its Effects on Training & Test Performances
5. Validation Data Set; Learning Curves; Weight Regularization by Early Stopping
6. EXAMPLE: Logistic Regression; Cross-Entropy Cost Function

HOMEWORK:

1. Regularizing Logistic Regression by Weight Penalty
2. Regularizing Logistic Regression by Early Stopping

SESSION 2

1. Neural Networks with Logistic Transformation Functions
2. EXAMPLE: Learning Logical Functions AND & OR
3. How Neural Networks Learn: Forward Propagation & Backward Propagation
4. EXAMPLE: Learning Complicated, Many-Variable Logical Combinations
5. EXAMPLE: Learning Hand-Written Digits: Number 3 vs. Not Number 3

HOMEWORK:

1. Training Neural Network to Learn Number 8 vs. Not Number 8
2. CASE STUDY: Google Self-Driving Car; Video on Early Self-Driving Car

SESSION 3

1. CASE STUDY DISCUSSION: Google Self-Driving Car
2. Softmax Transformation Function for Multi-Class Classification; Comparison with Collection of One-vs.-All Binary Classifiers
3. EXAMPLE: Learning All 10 Hand-Written Digits
4. Briefing on Final Exam (Live Team Competition)

SESSION 4

Final Exam (Live Team Competition): Human Activity Tracking Dataset for Classifying Quality of Bicep Curls