Welcome to CSC411

Y. Nikulin and R. Novak, Exploring the Neural Algorithm of Artistic Style

CSC411: Machine Learning and Data Mining, Winter 2017

Many slides from Daniel Sheldon

Michael Guerzhoy
Machine Learning

• Tasks which are hard to solve programmatically:
  • Recognizing faces
  • Recommending movies based on a person’s ratings
  • Deciding which web pages are relevant to a given Google search query
A simple task: Recognizing Justin Bieber
To a computer, this is what Justin Bieber looks like
Machine Learning: Learn From Examples

Labeled Examples
Machine Learning Applications
Neural Network Applications

ML watches YouTube for three straight days!
(and learns to recognize cats)

http://www.npr.org/2012/06/26/155792609/a-massive-google-network-learns-to-identify

Building High-level Features Using Large Scale Unsupervised Learning

Quoc V. Le, Marc’Aurelio Ranzato, Rajat Monga, Mathieu Devin, Kai Chen, Greg S. Corrado, Jeffrey Dean, and Andrew Y. Ng
Course Goals

• Learn the basic building blocks and the general principles of designing machine learning algorithms
  • Understand the mathematical ideas needed for understanding and designing machine learning/neural networks algorithms

• Learn basic machine learning algorithms

• Learn the methodology of applying machine learning algorithms to data and evaluate their performance

• Apply the principles of machine learning in the context of neural networks and (probably) reinforcement learning
Required math background

• Calculus: derivatives, derivatives as the slope of the function; integrals (a little bit)
• Probability: random variables, expectation, independence
• Linear Algebra: vectors: the dot product, vector norm, vector addition; matrices: matrix multiplication. (Probably: eigenvectors)
• Other topics may be needed, but will be covered in class
• It really helps to like and be comfortable with math: you probably won’t enjoy this class if you dislike math
Administrative details

• Marking scheme to be finalized and posted within the next few days

• **Tentative** marking scheme
  
  • 4 projects worth about 35%
    • First one to be done individually, others probably can be done in teams of two
  
  • A midterm worth about 25%
    • Scheduled for Friday March 3 4pm-6pm (alternate timeslots available in case of documented conflicts)
  
  • An exam worth about 40%
    • Must receive at least 40% on the exam (after adjustment) to pass the course