## Wrap Up

Introduction to
Artificial Intelligence
COS302
Michael L. Littman
Fall 2001

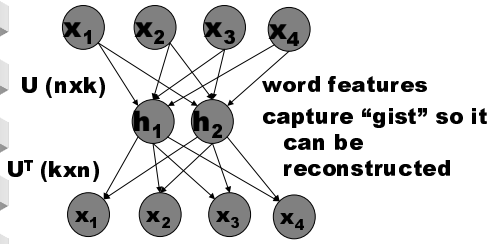
## Administration

Laptop four is busted.
Course evaluations.

## Plan

LSI and autoassociation
Topic list
Second half Themes
Wrap up

## Passage Autoassociator




## We'll Make Computers Brighter (sorry Billy Joel)

Gang and Kedar relaxation
color graphs by propagation
Neighbor goal state Davis Putnam
change to CNF
CSP & satisfaction
forward checking giving traction
BFS and DFS and
A* is the best

## Verse 2

Local search save time
optimize hill climb
Nim Sharks GSAT
chess evaluation hacks
Alpha beta game tree
prune the branch and you'll see
Fitness function reproduction
phase transition min-max

## Chorus

We'll make computers brighter
With their "and" and "or"ing
They'll beat Alan Turing.
We'll make computers brighter
Smarter than a porpoise
Train it with a corpus

## Verse 3

Markov model Chinese Room
    Nim-Rand in a matrix form
Labeled data, missing data
    logic of Boole
Discount rank list
    Altavista Wordnet
IR bag-of-words
    flip around with Bayes Rule

## Verse 4

Rap song n-queen
    Susan swallowed something green
Language model classify
    take a max and multiply
Zipf's law trigrams
    smooth it out with bigrams
Naïve Bayes winning plays
    write another program

## Chorus

We'll make computers brighter
With their "and" and "or"ing
They'll beat Alan Turing.
We'll make computers brighter
Smarter than a porpoise
Train it with a corpus

## Verse 5

HMM part-of-speech
    they will learn if you will teach
Baum-Welch if you please
    Rush Hour and Analogies
Weighted coins network lags
    Viterbi finds most likely tags
Start running watch for ties
    expectation maximize

## Verse 6

Learning function feature
    try learning who's a girl
overfit PAC bounds
    build your own decision tree
Too big memorize
    cross validate to generalize
supervising pure leaf
  fit the function to a 't'

## Chorus

We'll make computers brighter
With their "and" and "or"ing
They'll beat Alan Turing.
We'll make computers brighter
Smarter than a porpoise
Train it with a corpus

## Verse 7

Delta rule backprop
    hidden unit don't stop
Learn pairs sum squares
    linear perceptron
Error surface is quite bent
    just descend the gradient
  and-or sigmoid
    nonlinear regression

## Bridge/Chorus

XOR learning rate
    squash the sum and integrate
Neural net split the set
    How much better can it get?
Chorus: We'll make computers brighter
With their "and" and "or"ing
They'll beat Alan Turing.
We'll make computers brighter
Smarter than a porpoise
Train it with a corpus

## Verse 8

LSI max and min
    local search is back again
TOEFL pick best
    essay grade pass the test
Matrix Plato SVD
    vectors all in high D
All the points are in the space
    don't you make an Eigenface!

## Verse 9

Segmentation Saturn spin
    Probabilities a win
Q and P iteratively
    Bayes net CPT
Autopilots in the sky
Play chess masters for a tie
Alan Alda robots cry
All of this is in AI!

## Chorus

We'll make computers brighter
With their "and" and "or"ing
They'll beat Alan Turing.
We'll make computers brighter
Smarter than a porpoise
Train it with a corpus

## Final Chorus

We'll make computers brighter
Hope you had some fun
Because the class is done, is done, is done...

## Probability Models

Compare and contrast
- unigram
- bigram
- trigram
- HMM
- belief net
- Naïve Bayes

## Classification Algs

Compare and contrast
- Naïve Bayes
- decision tree
- perceptron
- multilayer neural net

## Missing Data

Compare and contrast
- EM
- SVD
- gradient descent

## Dynamic Programming

Compare and contrast
- Viterbi
- forward-backward
- minimax
- Markov chains (value iteration)
- segmentation

## Big Picture: This is AI?

We learned a bunch of programming tricks: people still do the hard work.
- Yeah, that's true.
- It's not such a bad thing: building more flexible software (search, learning).
- We're working towards more independent artifacts; not there yet

## Thank You!

Thanks for your help!

- Gang and Kedar
- Lisa and the kids
- AT&T
- Andrew Moore
- Family Feud survey respondents
- Peter Stone
- all of you!