

# Neural Networks

notes on feedforward nets  
other network architectures  
code demos

CompNeuro 2012

# PyBrain

<http://pybrain.org>

high-level routines for building and training nnets

## PyBrain code demos

- `mnist/mnist_pybrain.py` (short code)
- `mnist/mnist_pybrain2.py` (even shorter!)

# MATLAB

## neural network toolbox

- high-level functions
- GUI-style network builders and tools

## MATLAB code demos

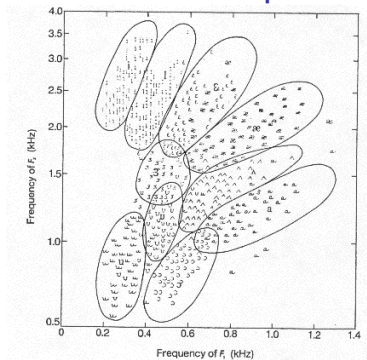
- `mnist/go.m`

# Example: Vowel classification

## Peterson & Barney (1952) original data

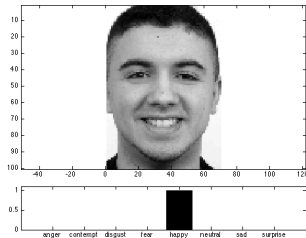
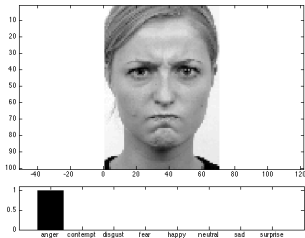
- 76 speakers (33 Male, 28 Female, 15 Children)
- 2 repetitions of 10 vowels = 1520 utterances
- acoustic measurements of “formants” (wiki)
- (F0, F1, F2, F3)
- MATLAB code demo on course website

## F1 / F2 vowel space



# Example: Face emotional expression

- Radboud Faces database
  - <http://www.socsci.ru.nl:8180/RaFD2/RaFD?p=main>
- MATLAB demo code on course website



# assignment 6

- example code using conjugate gradient descent on course website
- your new assignment:
  - ① explore how (a) number of hidden units, and (b) the cost on the sum of squared weights, affects the network's classification of the input space
  - ② (bonus): implement an additional hidden layer and explore how this affects the capability of the network to divide up the input space into classes