Introduction

Last time:

Why are people smarter than machines?

- different *hardware* (or "wetware")

  lots of slow, dumb, noisy components

  that cooperate to solve problems:

  a *massively parallel machine*

What are the outstanding features of human computation?

-constraint satisfaction

-noise tolerance

-interaction of many types of knowledge

What are the features of connectionist models?

-simple processing units

-connected via weighted links

-spread activation and inhibition

-*relax* to a solution

More models: The skilled typist

People type fast!

Interstroke interval is shorter than

the time it takes for a signal to go from

hand to brain and back.

How do they do it?

Must be a parallel, overlapping process

Model:

More models: Interactive activation model

People are better at perceiving letters when they

are in words:

Paradigm: Time

*A=& 0

70 ms later

A later: forced choice
R

In a word:

WAKE

####

A
R

In a "pseudoword":

MAVE

More models: Interactive activation model

Model:

More models: Interactive activation model

Behavior:

More models: Interactive activation model

This model demonstrated:

context effects:

top-down activation helps perception

Rule-like behavior:

acts *as if* it knows

the orthographic rules of English

(pseudoword effect)

Noise tolerance:

cleans up noisy inputs

even for novel inputs!

More models: The Jets & the Sharks

Motivation

Humans have a *content-addressable memory*

I'm thinking of someone. They are:

a former actor

intelligent

a former president

old

You probably retrieved the right person,

even though part of the description is incorrect!

Computers access memories differently:

To get an item out of memory, you need:

an *address* (where it is in memory)

the CPU gets the contents of that address

puts it in a working memory (register)

More models: The Jets and the Sharks

The domain

Basically, the interactive activation model

applied to memory

Suppose we have two gangs:

More models: The Jets and the Sharks

The Model

More models: The Jets and the Sharks

Properties

1. Content addressable

   We can retrieve all of someone's name from their properties

2. Graceful degradation

   Works even with some misleading information:

      "best match search"

3. Default assignment

   Missing features can be "filled in"

4. Spontaneous generalization

   Even though only specific properties

   of individuals are encoded

      prototype formation