

## Topic 1: Connectionism

### What is connectionism?

Connectionism is a movement in cognitive science that seeks to explain intellectual abilities using artificial neural networks. Neural networks are simplified models of the brain composed of large numbers of units (the analogs of neurons) together with weights that measure the strength of connections between the units.

### A glance at its history:

- The 1940s: it was pioneered by neurophysiologist Warren McCulloch and Walter Pitts. They noted that neurons are either 'firing' electrochemical impulses down their lengthy projections (axons) towards junctions with other neurons (synapses) or are inactive.
- Hebb's rule: Donald Hebb (1949) proposed that the connection between two biological neurons is strengthened when both neurons are simultaneously active.
- Major flaws were later on revealed.
- 1980s: connectionism underwent a potent, permanent revival and would be touted by many as the brain-inspired replacement for the computational artefact-inspired 'classical' approach to the study of cognition.

### Neural effects... How does the „output" manifest in day-to-day life?

Given pictures can trigger corresponding reactions or emotions. (e.g. Sight of food => appetite)

### Is thinking a product or process?

Some consider the electrochemical impulses/ the brain activity as a product.

### Can thought be measured?

Hebb suggests that the brain activity is based on „weights“ or units and suggests the following formula:

Change of  $weight_{iu} = a_i * a_u * I_{rate}$

### Memory:

- What is memory from a connectionist point of view?  
It is created by modifying the strength of the connections between neural units.
- Shortterm memory: depends upon ongoing electrical activity in the brain.
- Longterm memory: are based on structural changes in the synaptic connections between neurons which require the construction of new protein molecules.

### An introduction to Cartesian dualism: Are body and mind different things? Does the body really exist?

### Thematic questions