



Classification by Back Propagation

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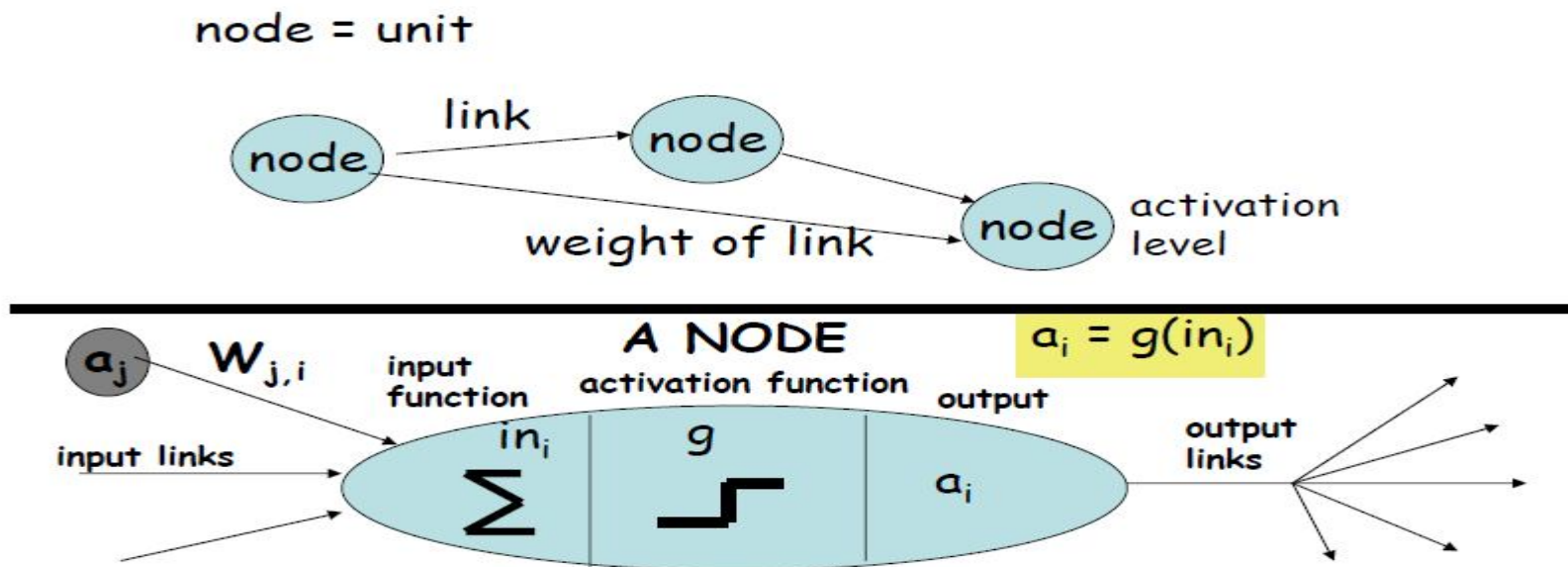
AP/IT



Back Propagation

- Neural Network learning algorithm.

Neural Networks





NNs: Dimensions of a Neural Network

- Knowledge about the learning task is given in the form of examples called training examples.
- A NN is specified by:
 - an architecture: a set of neurons and links connecting neurons. Each link has a weight,
 - a neuron model: the information processing unit of the NN,
 - a learning algorithm: used for training the NN by modifying the weights in order to solve the particular learning task correctly on the training examples.



Neural Network Architectures

Many kinds of structures, main distinction made between two classes:

- a) feed-forward (a directed acyclic graph (DAG): links are unidirectional, no cycles

- b) recurrent: links form arbitrary topologies e.g., Hopfield Networks and Boltzmann machines

Recurrent networks: can be unstable, or oscillate, or exhibit chaotic behavior e.g., given some input values, can take a long time to compute stable output and learning is made more difficult....

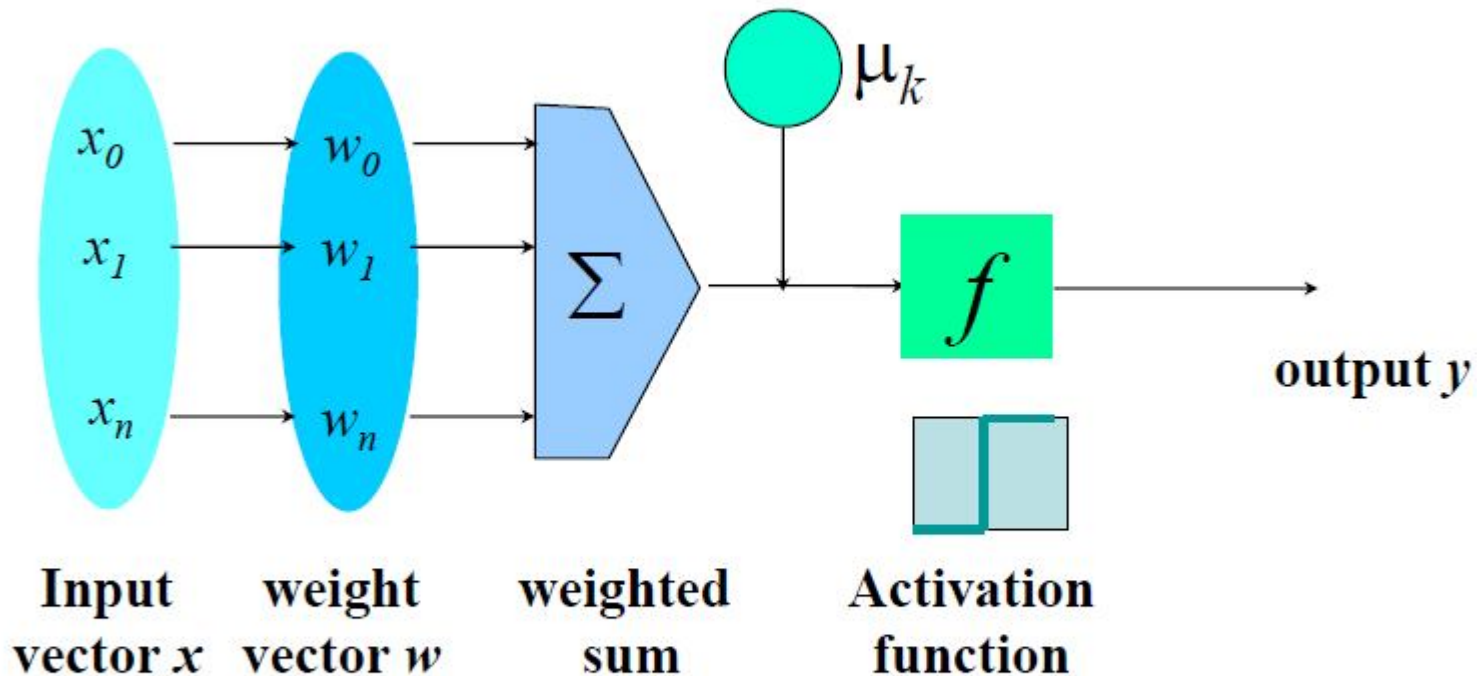


Neural Network Learning

- Objective of neural network learning: given a set of examples, find parameter settings that minimize the error.
- **Programmer specifies**
 - numbers of units in each layer
 - connectivity between units,
- **Unknowns**
 - connection weights



A Neuron



For Example

$$y = \text{sign}\left(\sum_{i=0}^n w_i x_i + \mu_k\right)$$



Thank You...