

## **Convolutional Networks for Images, Speech, and Time Series - 1995**

In 1995, LeCun and Bengio introduced convolutional neural networks (CNNs) for various tasks, including image classification, speech recognition, and time series analysis, which are now a cornerstone of modern AI systems.

A key strength of ConvNets, as discussed in the paper, is their built-in invariance to input transformations such as translations and distortions. This is achieved through mechanisms like local receptive fields, shared weights, and subsampling, which also contribute to the networks' efficiency and generalization capabilities. ConvNets' hierarchical structure allows them to build up complex patterns from simpler features, mirroring how human perception works from sensory inputs to higher-level cognition.

The paper indirectly reflects on core ingredients of human intelligence through the design and functionality of ConvNets. The networks' pattern recognition abilities, hierarchical processing of information, and invariance to changes in the input demonstrate parallels with human cognitive processes. Moreover, ConvNets' efficiency in learning and their capacity to generalize from learned data to new situations are reminiscent of human learning and adaptability.