Deep Learning

CS7015 (Deep Learning)

10/5/19
2:00am

Lecture-1, Episode 1

Biological Neurons

1871-1873 → Reticular Theory
Joseph Von Gerlach.

→ Staining Technique

→ Neuron Doctrine
(Network of cells)

1888-1891 → 1891 'Neuron'

Brain Works

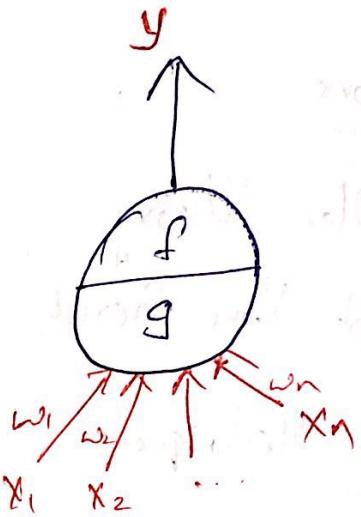
↳ How a computer works

Lecture - 1

episode - 2

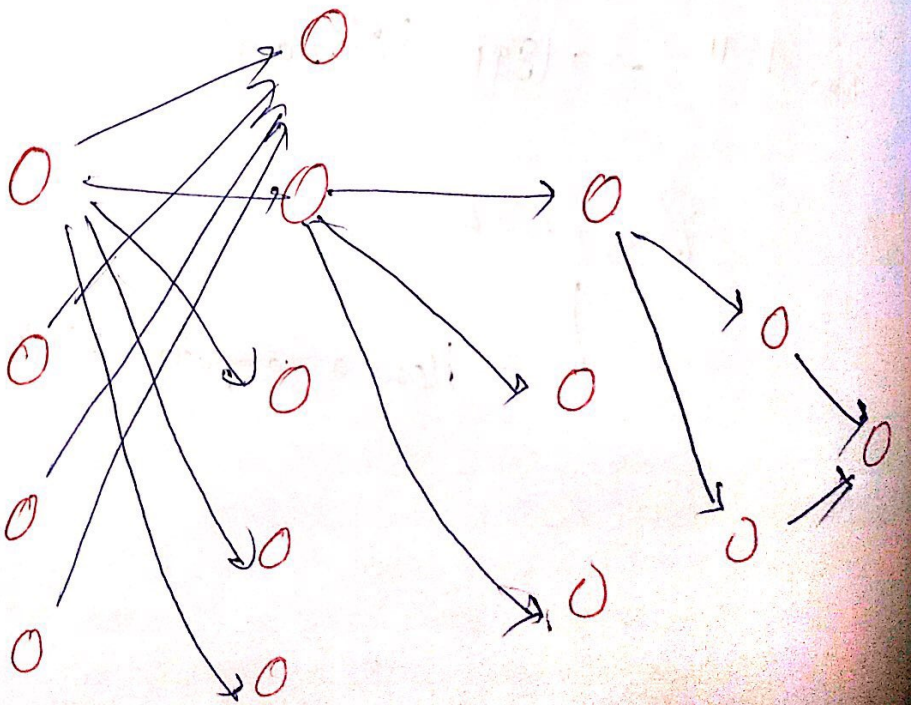
Boom in AI

McCulloch Pitts Neuron



Perceptron

Large Layer of neurons



1986

Back Propogation

Gradient Descent

Universal Approximation Theorem

Lecture - 1

Episode - 3

Unsupervised Pre-Training

10/5/19
11:30 am

Lecture - 1

Episode - 4

From Cats to Convolutional Neural Networks

Hubel & Wiesel Experiment

A neuron will fire only in response to a visual stimuli in a region.

Neocognitron

Handwritten character recognition & pattern recognition

Lecture-5

Faster, Higher, Stronger.

→ Better Optimization Methods

Nestrov – 1983

Adagrad – 2011

RmsProp – 2012

Adam – 2015

Eve – 2016

Beyond Adam – 2018.

Lecture-6

Case of Sequences.

→ Jordan Network

→ Elman Network

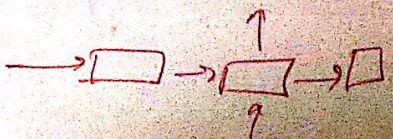
Recurrent Networks {1980's – 1990's}

Long Short Term Memory

LSTM (1997)

Sequence to Sequence Learning

{2014}



RL for Attention

Lecture 7

Beating Humans in Games

- → Atari games
- → Alpha Go
- → Deep Stack
- → Defense of Ancients

Lecture-8

The Madness (2013 - Present)

- → Language Modelling
- → Speech Recognition
- → Machine Translation.
- → Conversation Modelling
- → Question Answering
- → Computer Vision
- → Visual Tracking
- → Image Captioning
- → Video Captioning
- → Video Summarisation.
- → GAN
  - → Variational Autoencoders
- → Plug & Play Generative net

Lecture-4

Need for "Sanity"

Paradox of Deep Learning

- High Capacity
- Numerical Instability
- Sharp Minima
- Non-Robustness