

Introduction

This paper is talking about an algorithm for the artificial neural network.

2. AI

Let's talk about AI. Running on a supercomputer. There are some features that AI should have.

But we don't need to go detail about this.

3. AI robot

Simply saying, Ideal AI should think like a human being. Deal with real with real life problems. How we build it?

4. Black box

Just think it like a black box. We don't know what is in it. Our real problems can transfer into mathematical models, therefore there are statics and numbers.

Put these numbers in the black box, it will give us the answers — —desired outputs. In computer world.

5. Brain Box

The most mysterious black box. Everyone use it every day but few know how it works. Our brain contains billions of neurons and neurons form a neural network. We build an artificial network we build an AI

Go further, look what features do neurons have.

6. Neuron features

There are 3 important features that scientist think we can take advantage of, to use these features to build neuron network

Synaptic weight: how strong the connection between two neurons. Musical neurons with language neurons, weak to vision neurons

Cumulative affect: We all learning things step by step

Threshold: Only the inputs large enough to trigger neuron reaction—we touch fire we will jump up but if we shake hands we won't react abnormally.

7. Neuron network models

Synaptic weights: numbers in connection

Cumulative affect: inputs multiple their weights and add them together

Threshold, use an equation to exam the affect, output 1 or 0.

8 Perfection

Add constant input 1 and constant weight b ad bias. Cause input 0 means something.

Does this equation remind you anything?

9. Linear equation

It is a linear equation when only 1 input, what can we use this for?

Deal with the linear problem like linear regression, use this equation to anticipate linear problems.

10. Limitations & improvement

Real life is complicated, single linear can not resolve many problems, as many non-linear relationships.

Need multi-layer, with it like graph shows multi-line can draw a circle.

Linear separation, need a new activation function to deal with real life problems.

11. Models

Nodes connect with each other. Many hidden layers, new activation function for the threshold.

There is a sample of artificial neural network.

12.The paper

But we haven't build a real AI, the most important part: self-training the weights.

Give statics we know and training them, this progress is self-training weights. This paper introduce the backpropagation method to make neural network become usable.

13.Live demo

14.Impacts

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→ Appreciated by Machine Learning Community

- First method show neural network could learn good internal representations
- Allow neural network applied to a much wider field
- After 2010, becomes more popular and powerful with GPU
 - deep learning