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Introduction to Deep Learning

Welcome



- AI is the new Electricity
- Electricity had once transformed countless industries: transportation, manufacturing, healthcare, communications, and more

- AI will now bring about an equally big transformation.

Andrew Ng

What you'll learn



Courses in this sequence (Specialization):

1. Neural Networks and Deep Learning
2. Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization
3. Structuring your Machine Learning project
4. Convolutional Neural Networks
5. Natural Language Processing: Building sequence models

train/dev/test

end-to-end

CNN

RNN, LSTM

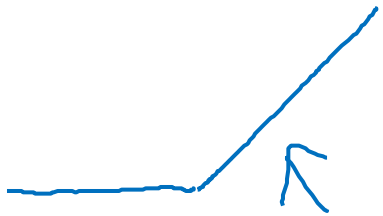


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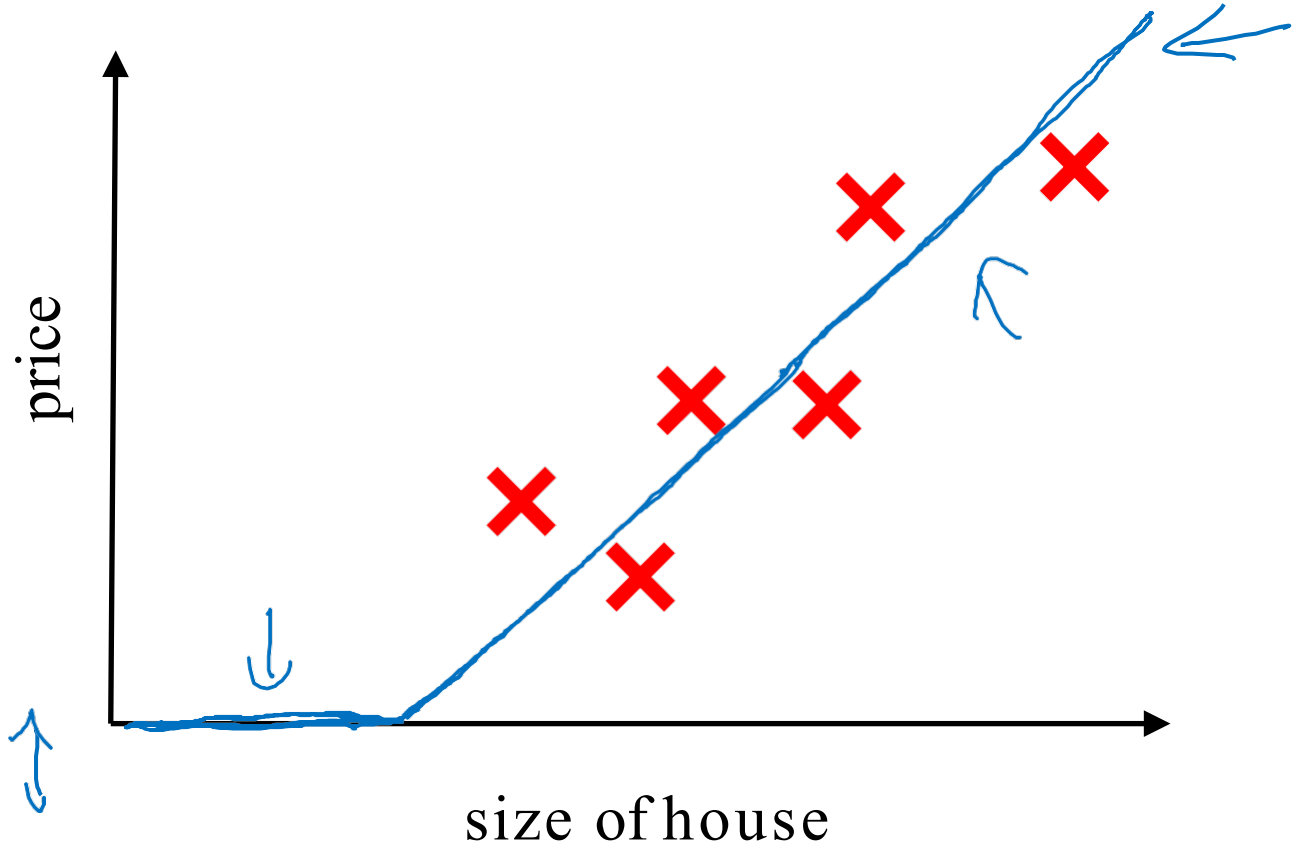
Introduction to Deep Learning

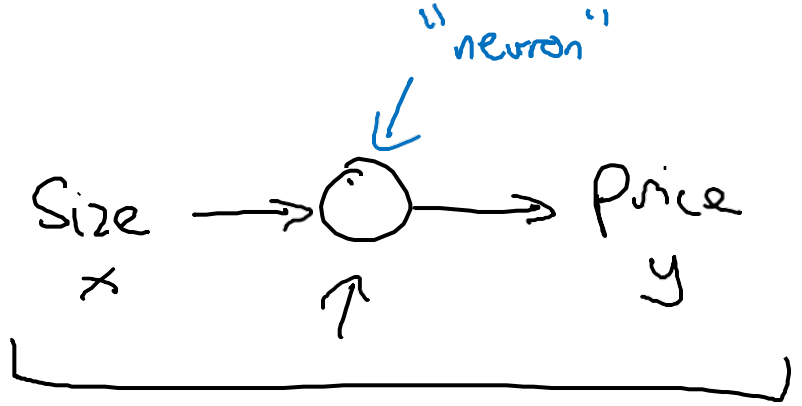
What is a Neural Network?

Housing Price Prediction

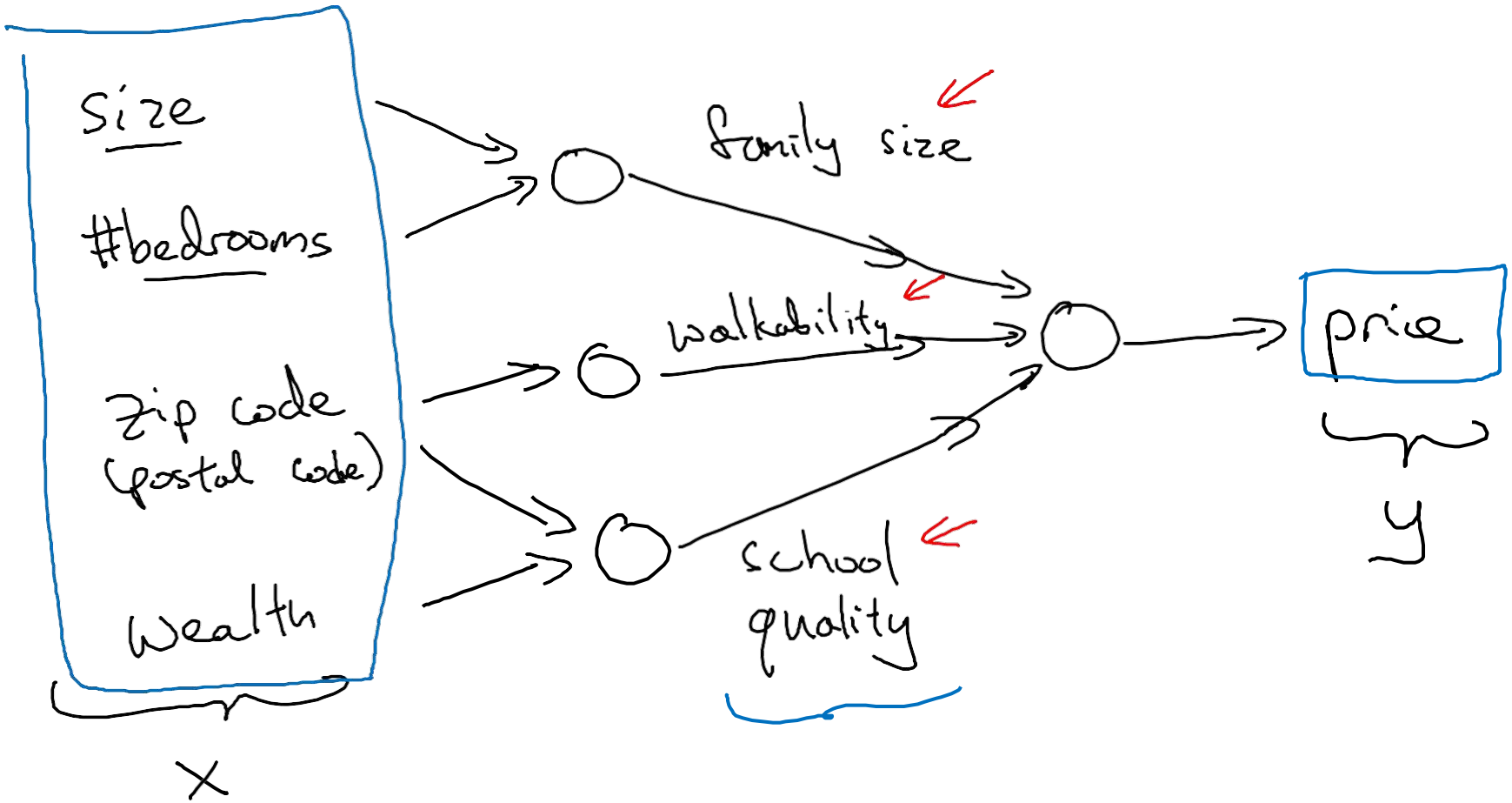


ReLU
Rectified
Linear
Unit



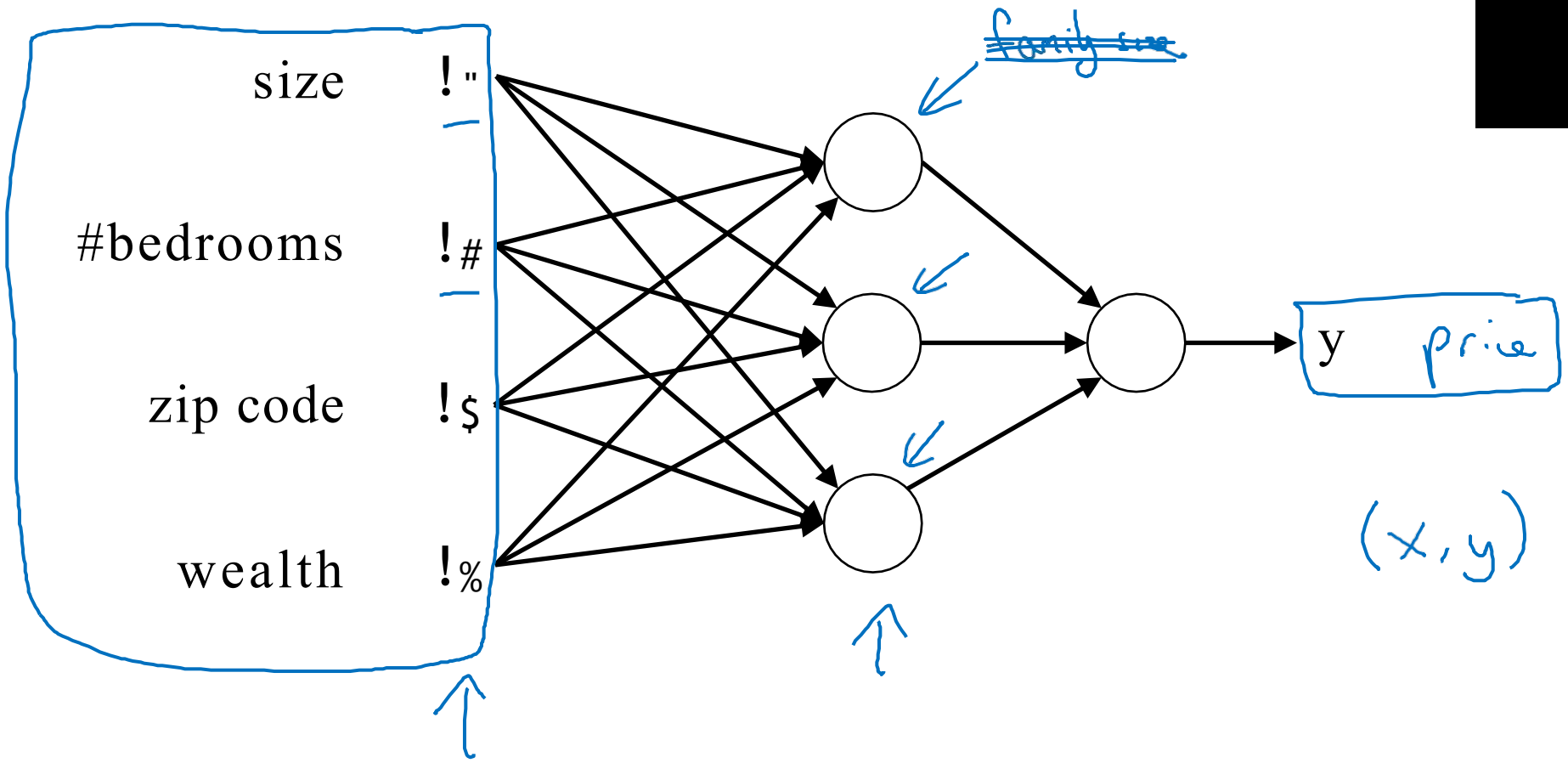


Housing Price Prediction



Housing Price Prediction

Drawing of previous Image





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Introduction to Deep Learning

Supervised Learning with Neural Networks

Supervised Learning

Input(x)	Output (y)	Application
Home features	Price	Real Estate
Ad, user info	Click on ad? (0/1)	Online Advertising
Image	Object (1,…,1000)	Photo tagging
Audio	Text transcript	Speech recognition
English	Chinese	Machine translation
Image, Radar info	Position of other cars	Autonomous driving

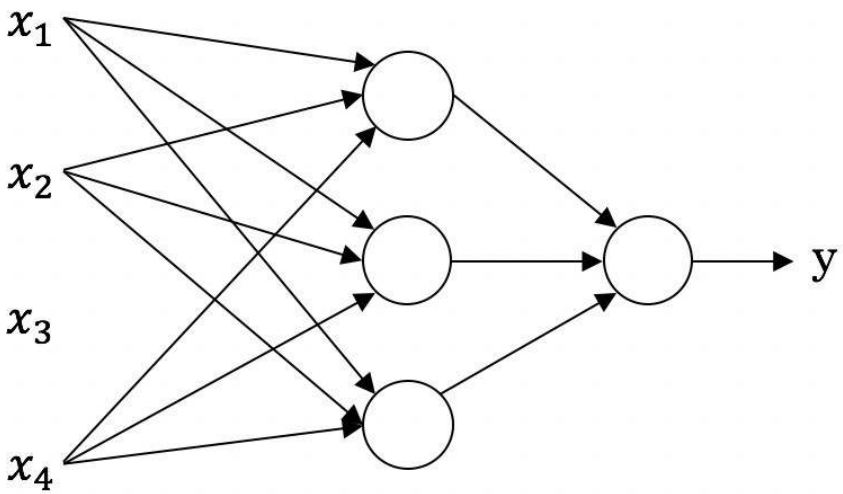
Standard NN

CNN

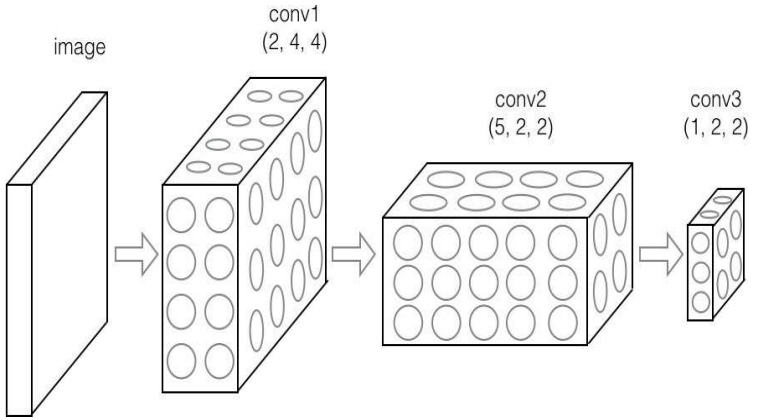
RNN

Custom/ Hybrid

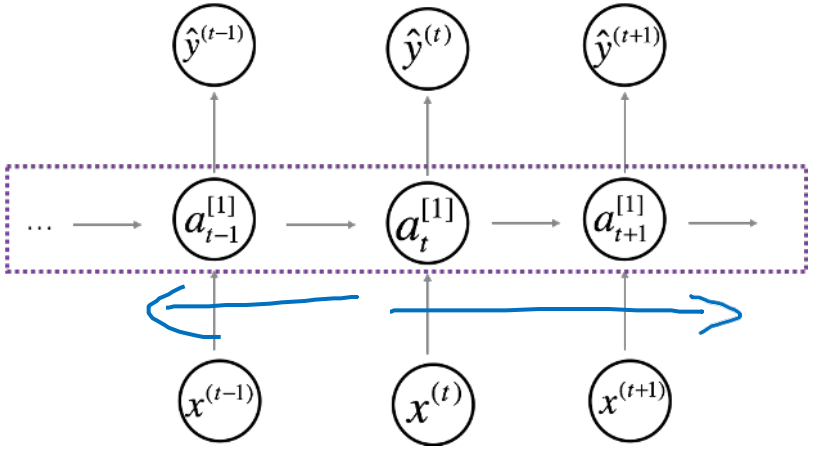
Neural Network examples



Standard NN



Convolutional NN



Recurrent NN

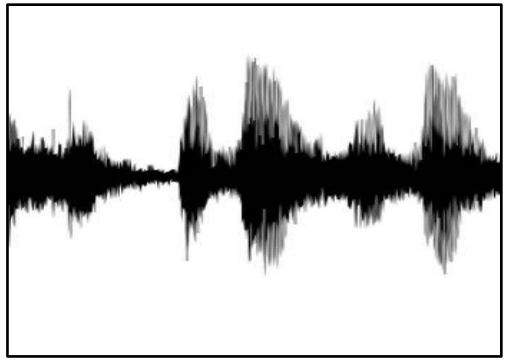
Supervised Learning

Structured Data

Size	#bedrooms	…	Price (1000$s)
2104	3		400
1600	3		330
2400	3		369
…	…		…
3000	4		540

User Age	Ad Id	…	Click
41	93242		1
80	93287		0
18	87312		1
…	…		…
27	71244		1

Unstructured Data



Audio



Image

Four scores and seven years ago…

Text

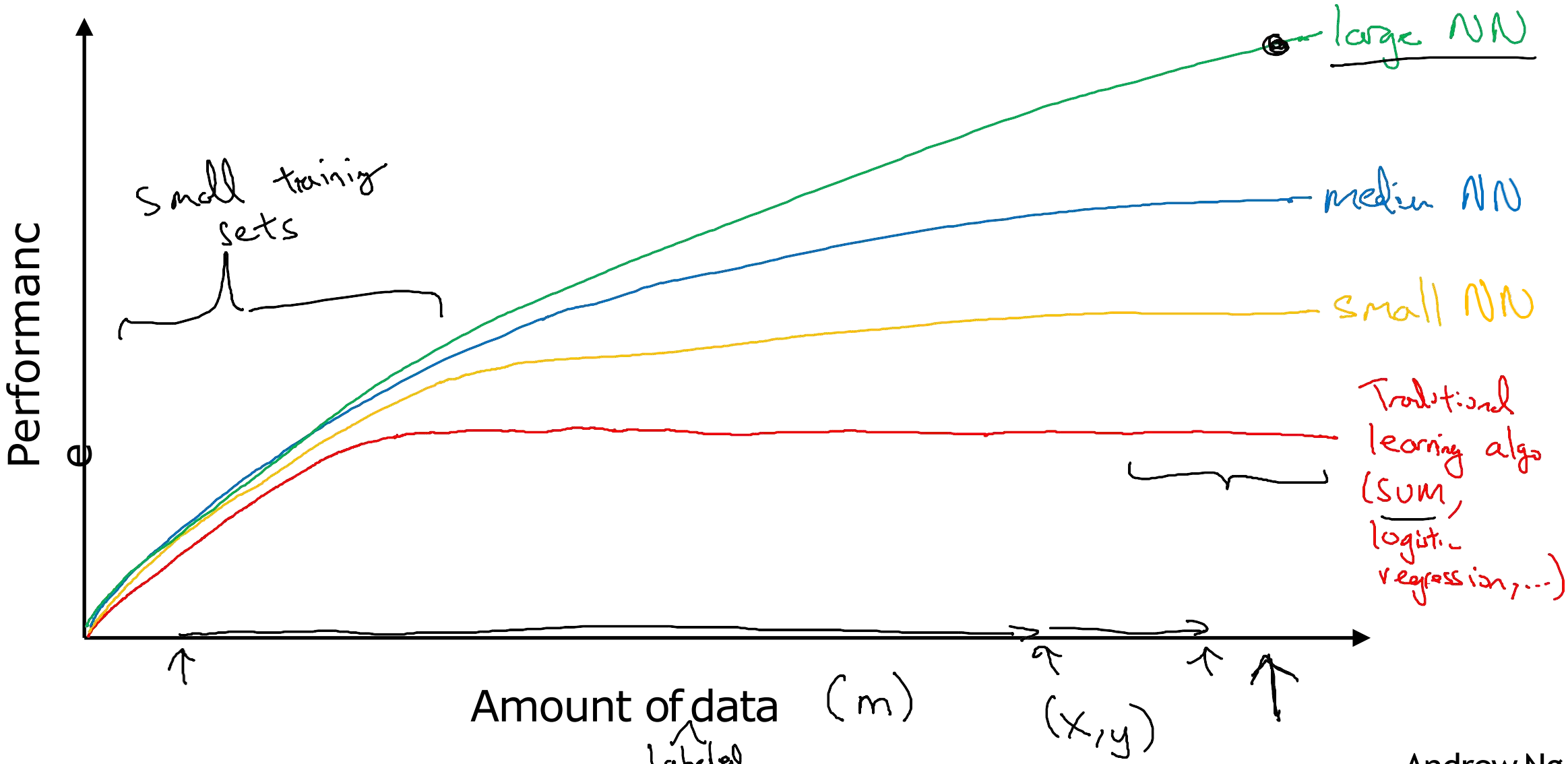


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Introduction to Neural Networks

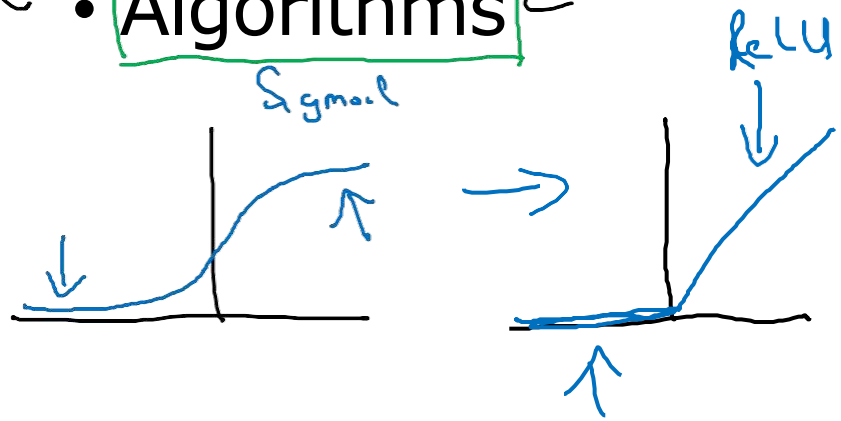
Why is Deep Learning taking off?

Scale drives deep learning progress

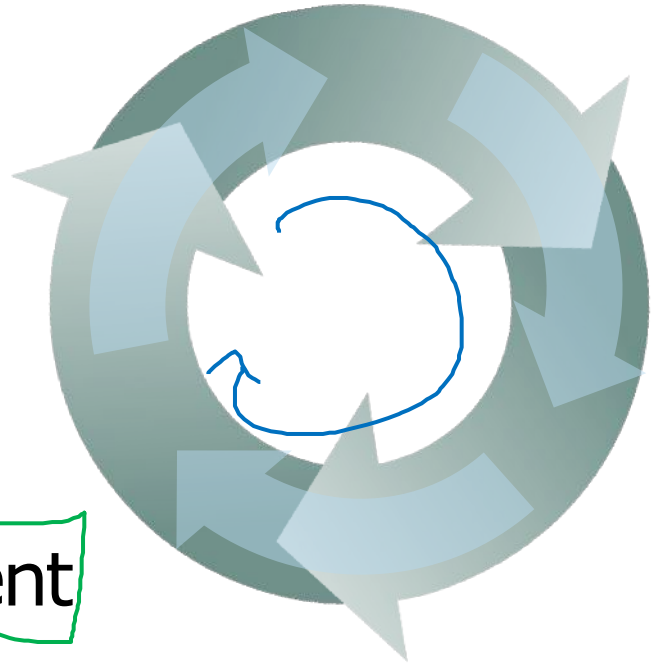


Scale drives deep learning progress

- Data
- Computation
- Algorithms



Idea



Experiment

Code

10 min
1 day
1 month

Andrew Ng



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Introduction to Neural Networks

About this Course

Courses in this Specialization

1. Neural Networks and Deep Learning
2. Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization
3. Structuring your Machine Learning project
4. Convolutional Neural Networks
5. Natural Language Processing: Building sequence models

Outline of this Course

Week 1: Introduction

Week 2: Basics of Neural Network programming

Week 3: One hidden layer Neural Networks

Week 4: Deep Neural Networks