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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.



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 *CNN*
5. Natural Language Processing: Building sequence models
RNN, LSTM

train / dev / test
end-to-end

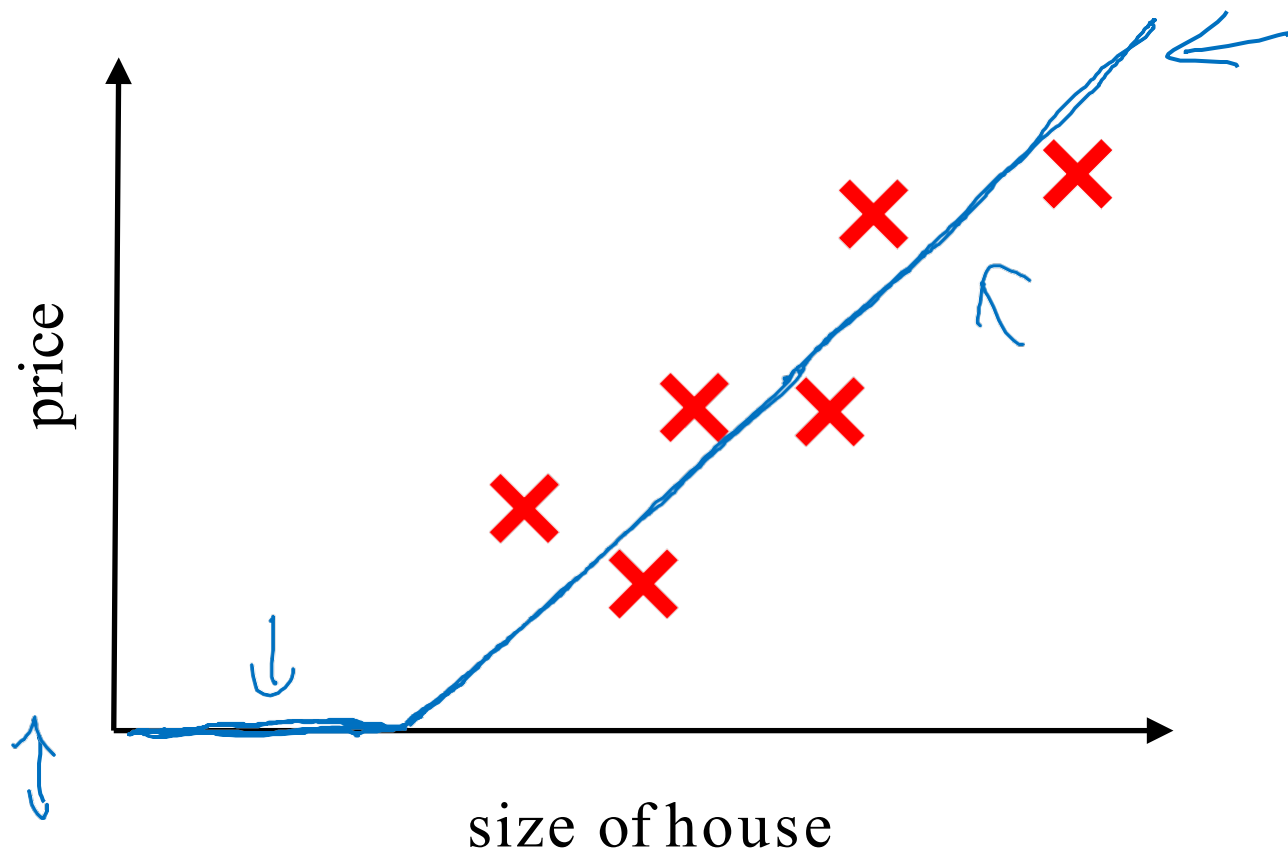


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Introduction to Deep Learning

What is a Neural Network?

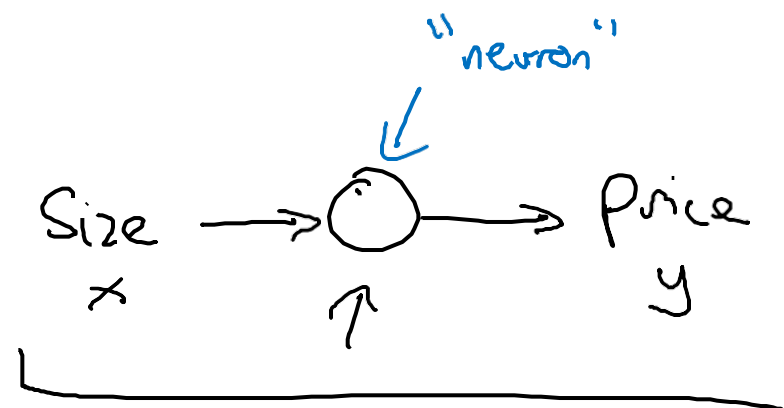
Housing Price Prediction



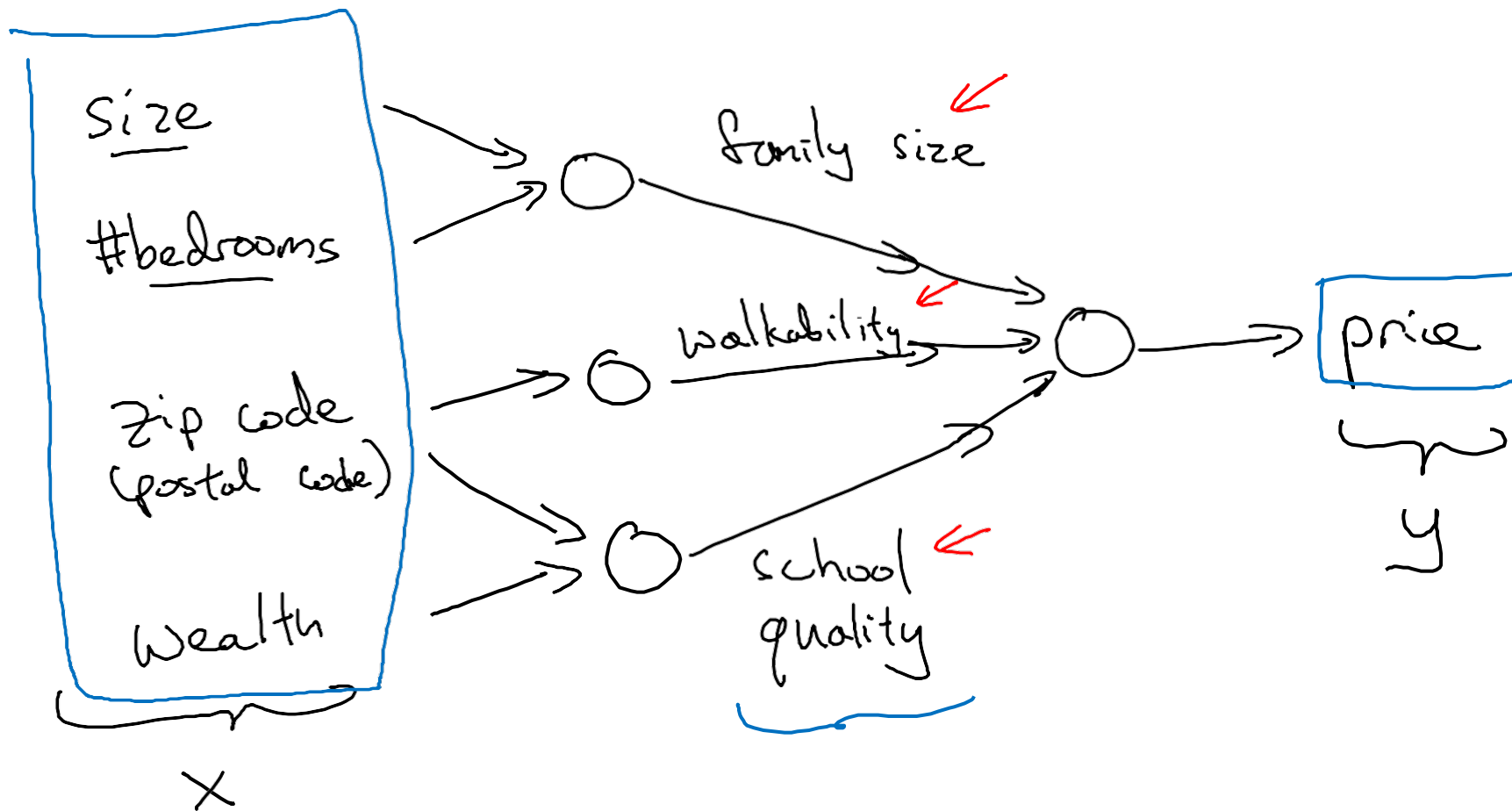
ReLU
Rectified
Linear
Unit



A small graph showing the ReLU function, which is zero for negative inputs and increases linearly for positive inputs. A blue arrow points to the linear portion of the graph.

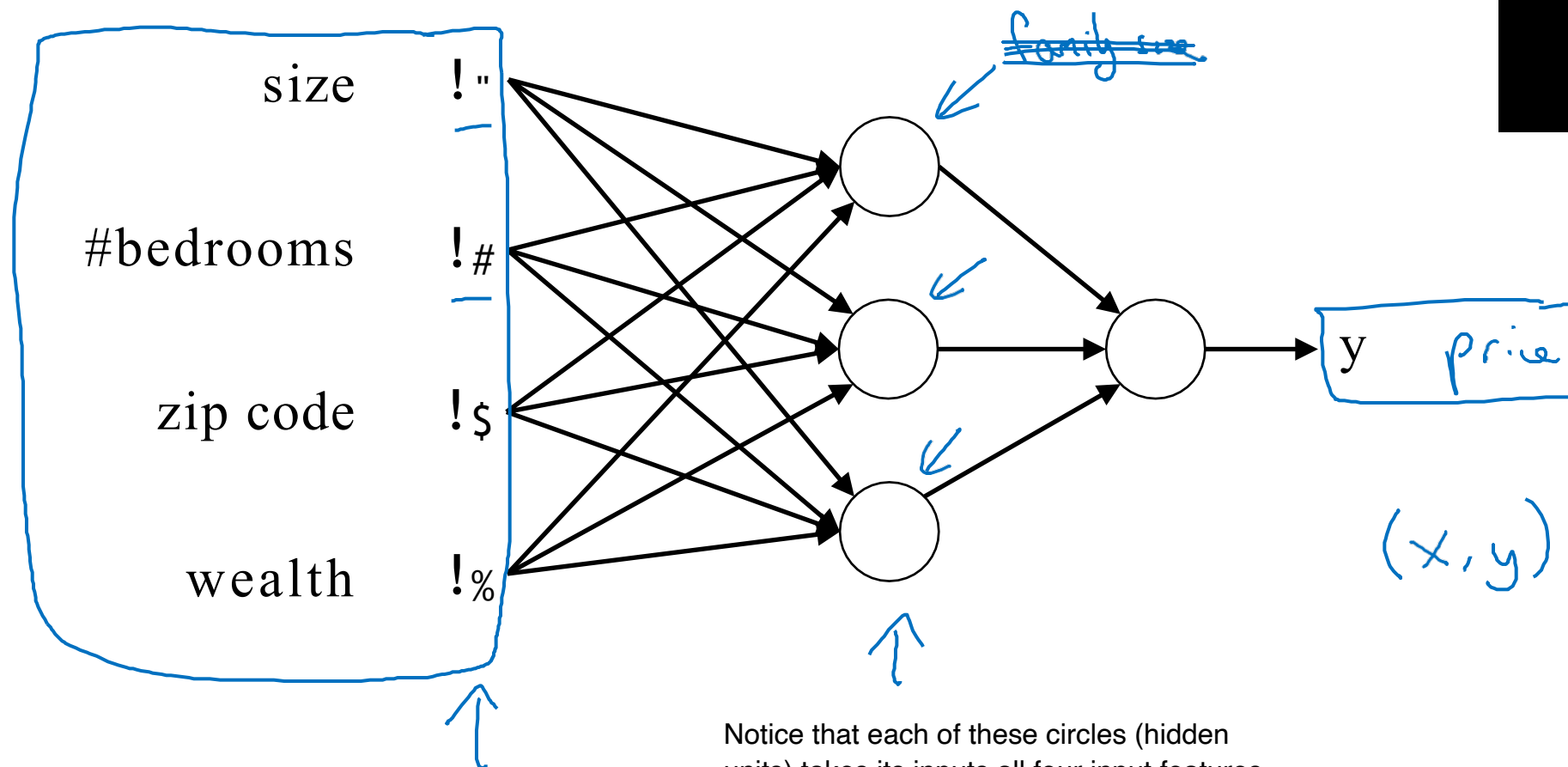


Housing Price Prediction



Housing Price Prediction

**Drawing of
previous Image**



Notice that each of these circles (hidden units) takes its inputs all four input features.








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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
<u>English</u>	Chinese	Machine translation
<u>Image</u> , <u>Radar info</u> 	Position of other cars 	Autonomous driving

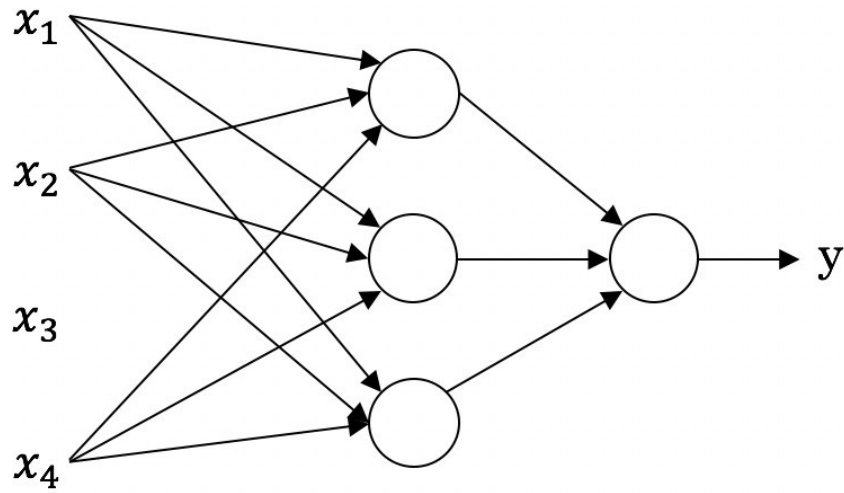
} Standard NN

} CNN

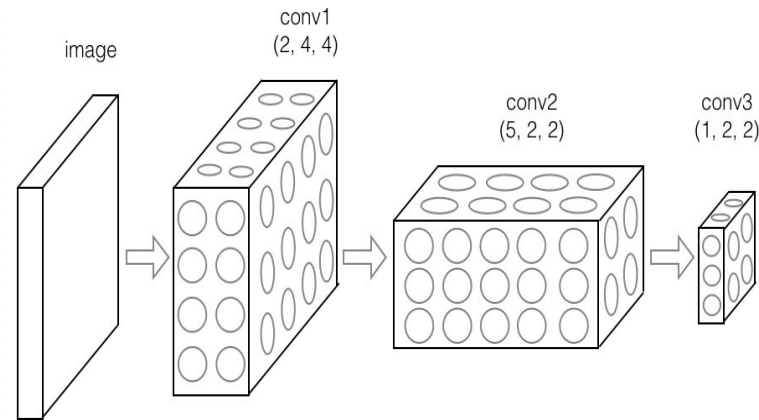
} RNN

} Custom/ Hybrid

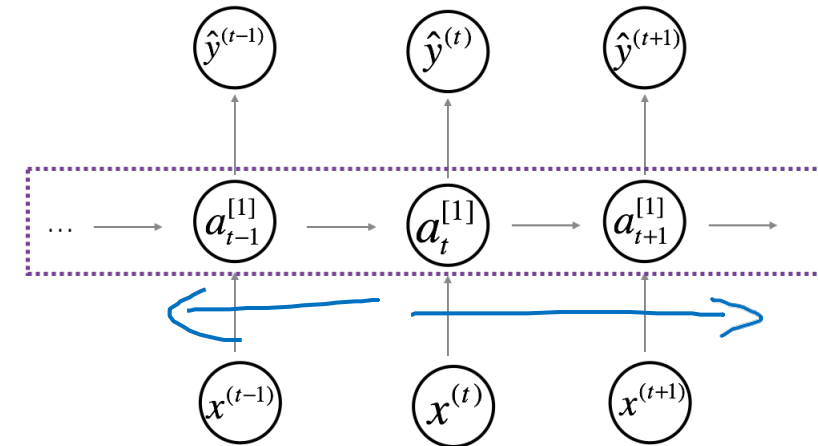
Neural Network examples



Standard NN



Convolutional NN



Recurrent NN

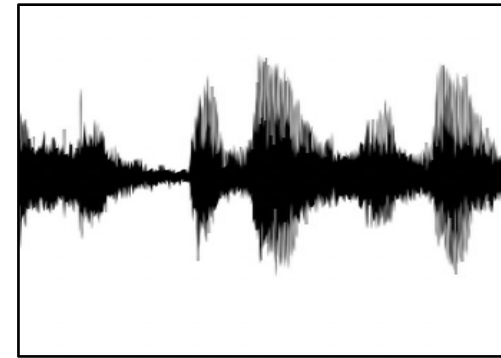
Supervised Learning

Structured Data

Size	#bedrooms	...	Price (1000\$)
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

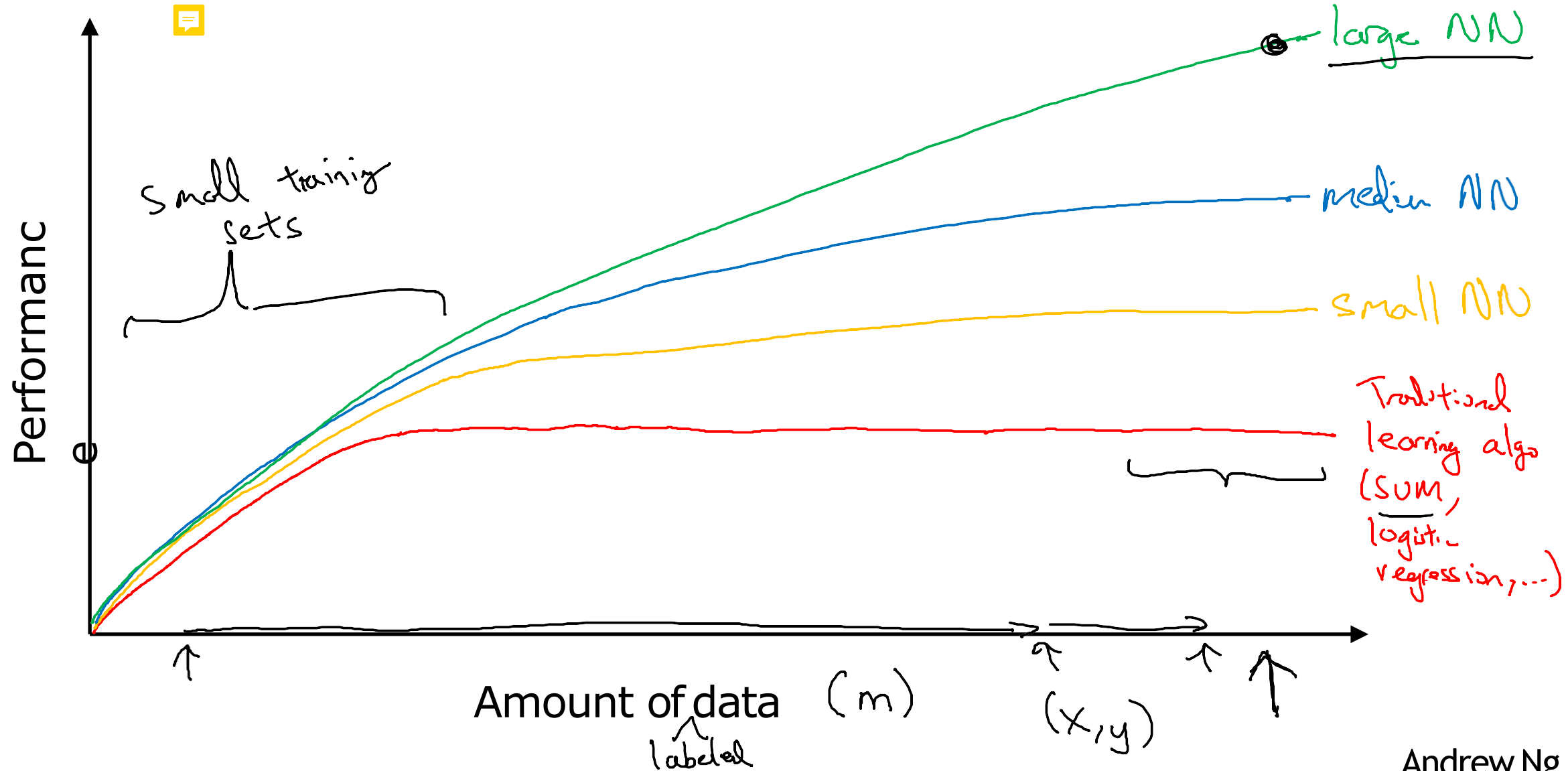


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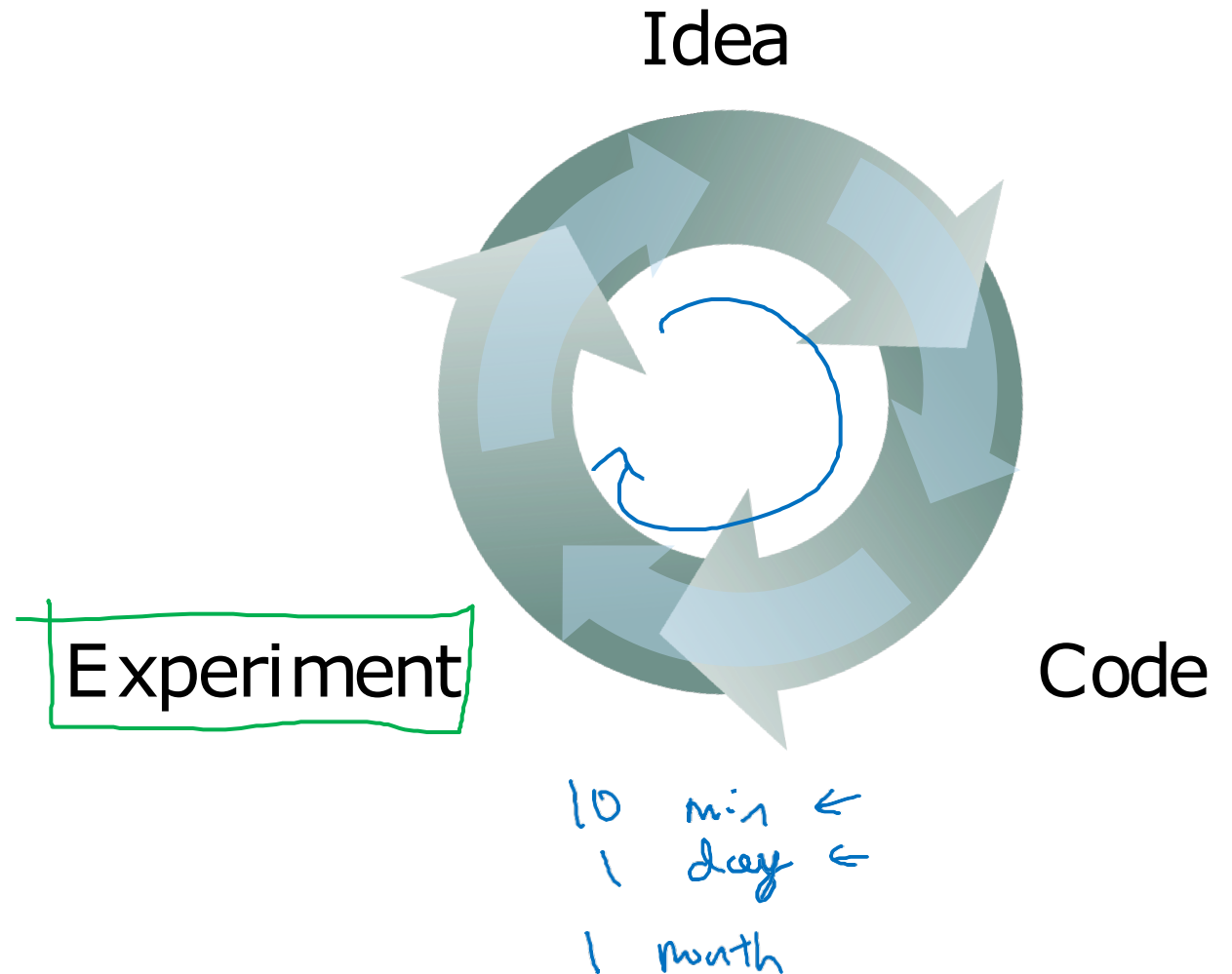
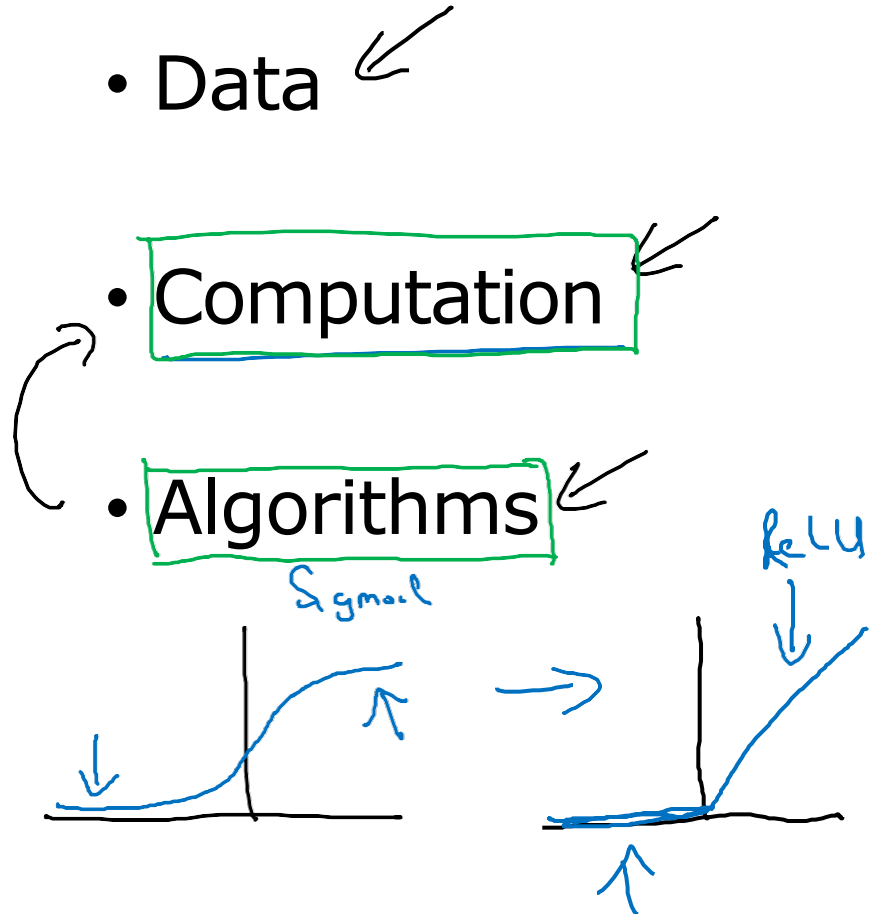
Introduction to Neural Networks

Why is Deep Learning taking off?

Scale drives deep learning progress



Scale drives deep learning progress






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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