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# Introduction to Deep Learning

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# 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
5. Natural Language Processing: Building sequence models



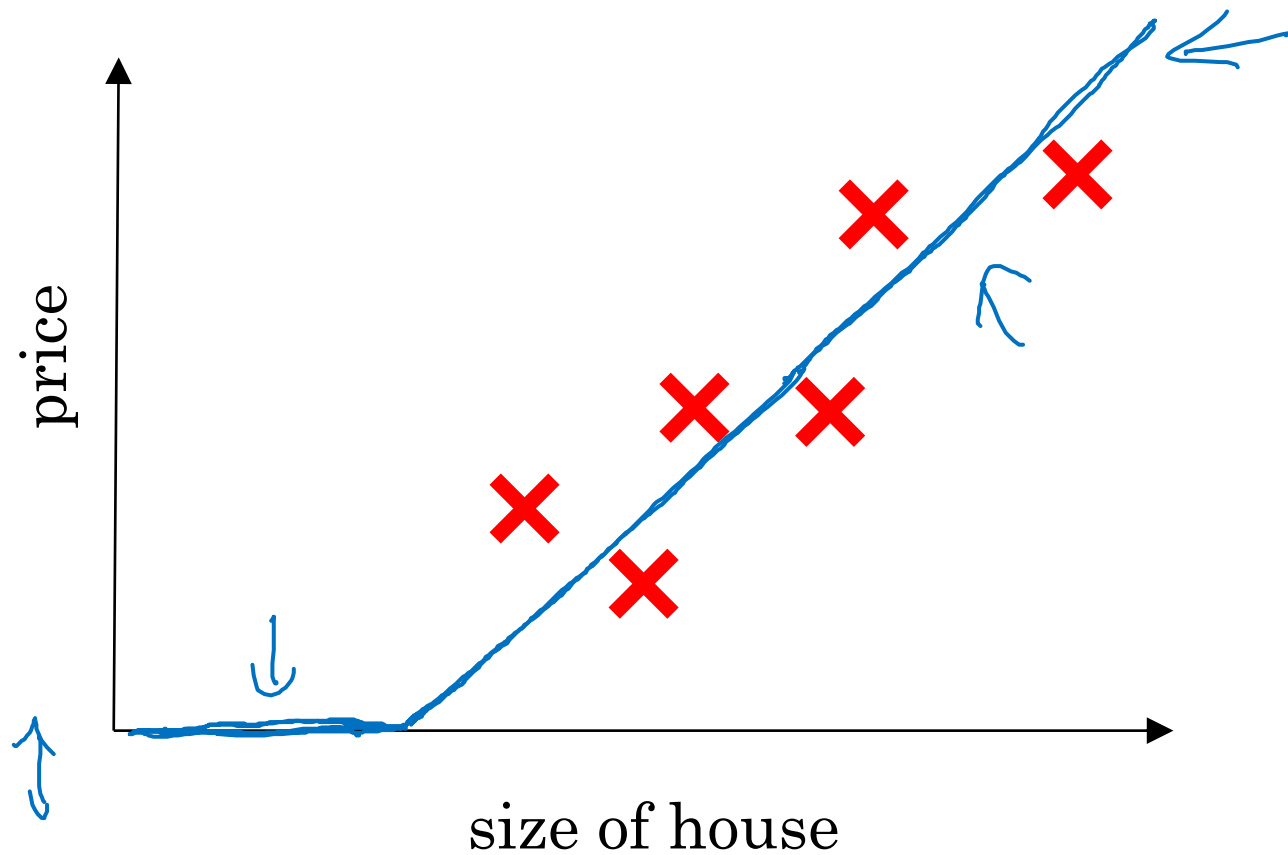
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# Introduction to Deep Learning

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## What is a Neural Network?

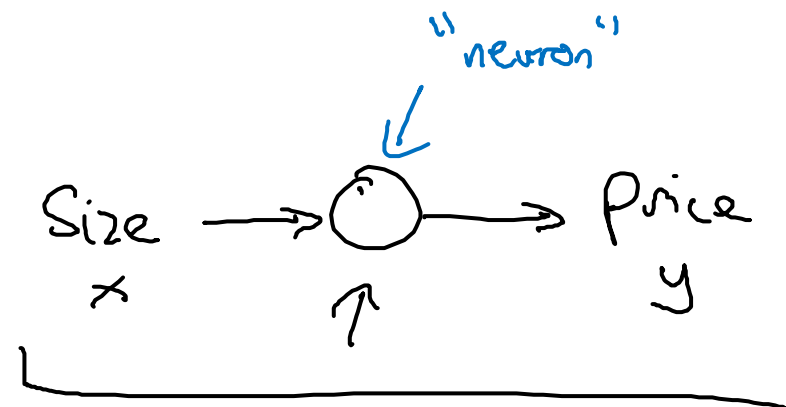
# Housing Price Prediction



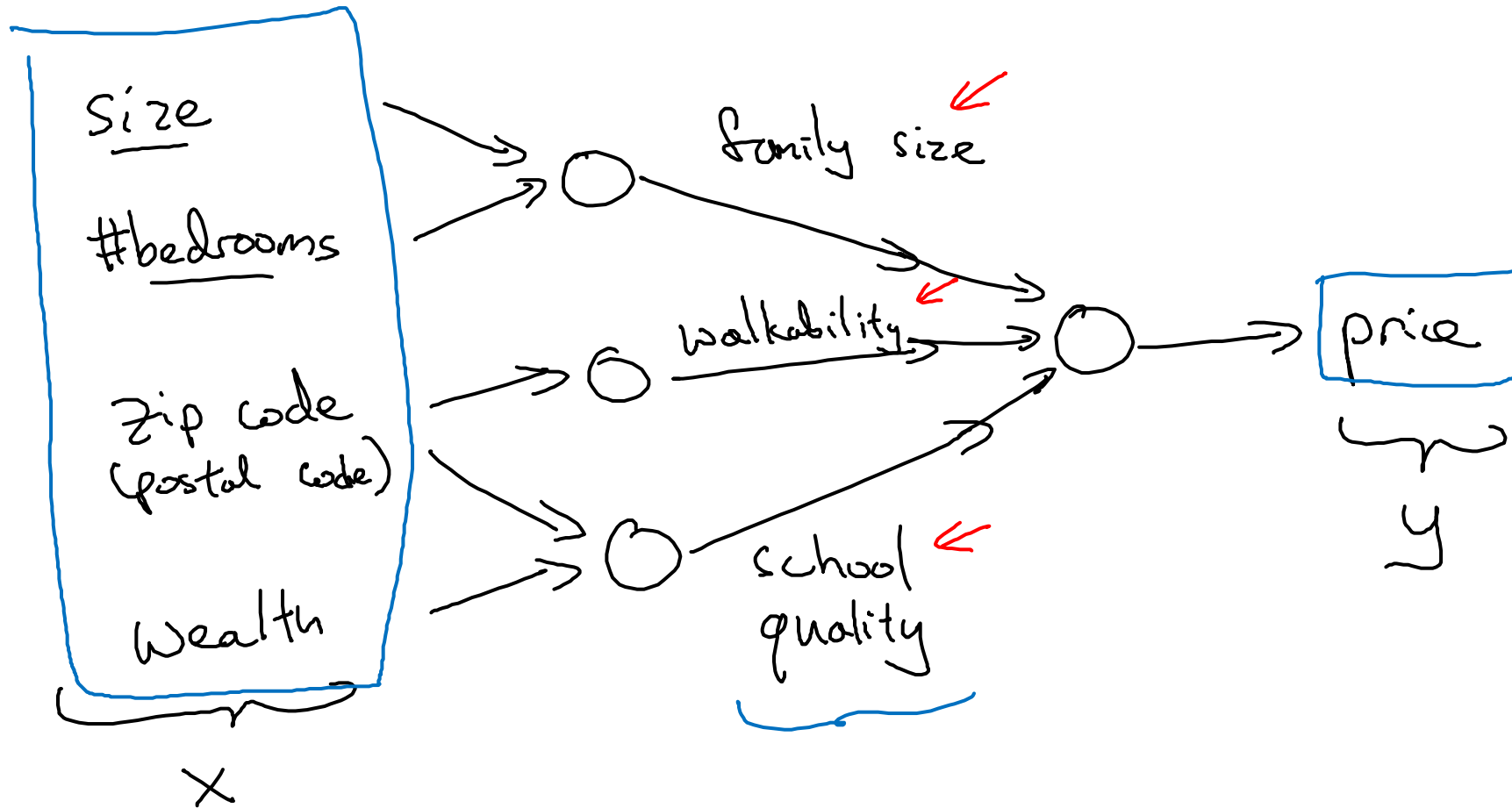
ReLU  
Rectified  
Linear  
Unit



A hand-drawn graph of the ReLU function, showing a horizontal line at zero for negative inputs and a diagonal line with a positive slope for positive inputs. A blue arrow points to the diagonal segment.

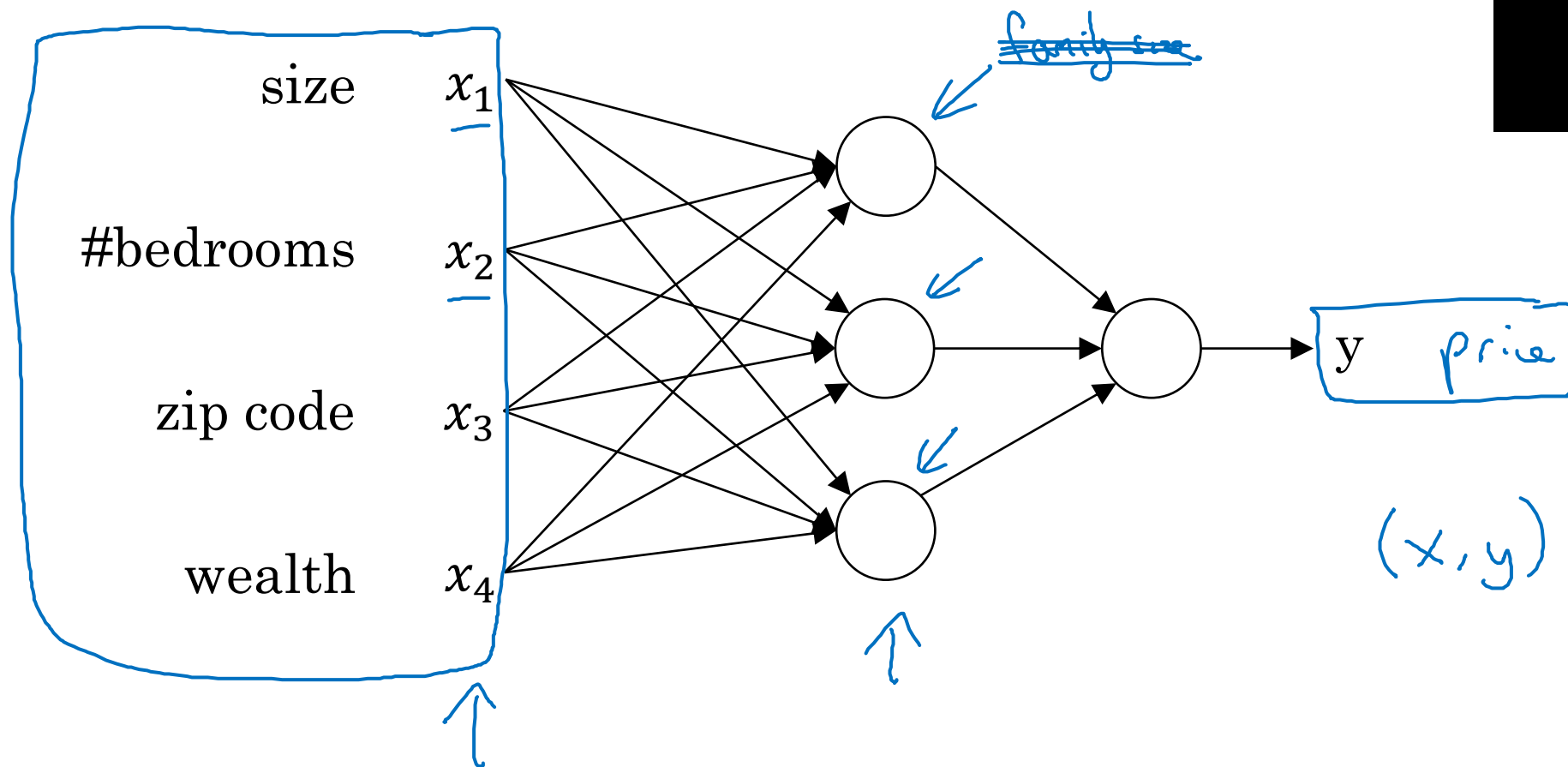


# Housing Price Prediction



# Housing Price Prediction

**Drawing of  
previous Image**





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# Introduction to Deep Learning

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## 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 
<u>Audio</u>	Text transcript	Speech recognition 
<u>English</u>	Chinese	Machine translation
<u>Image</u> , <u>Radar info</u> 	Position of other cars 	Autonomous driving 

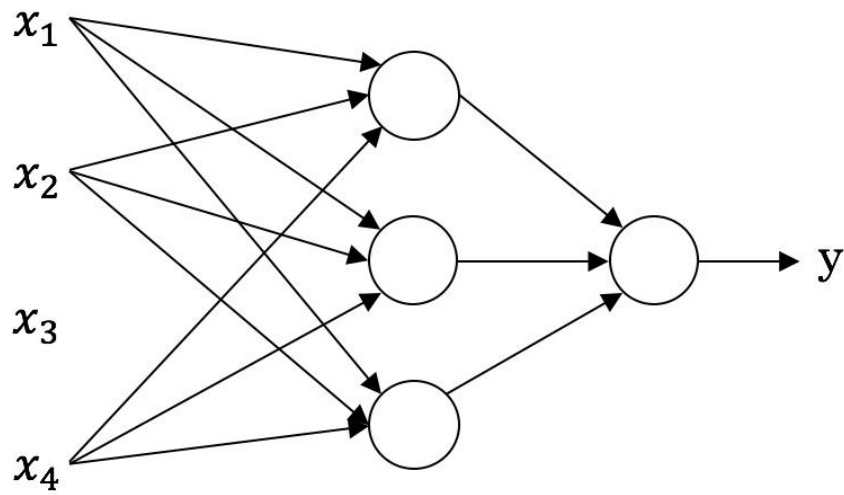
Standard  
NN

CNN

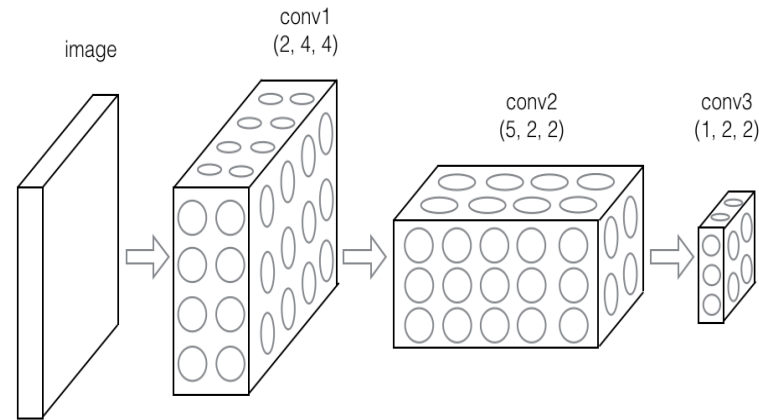
RNN

Custom/  
Hybrid

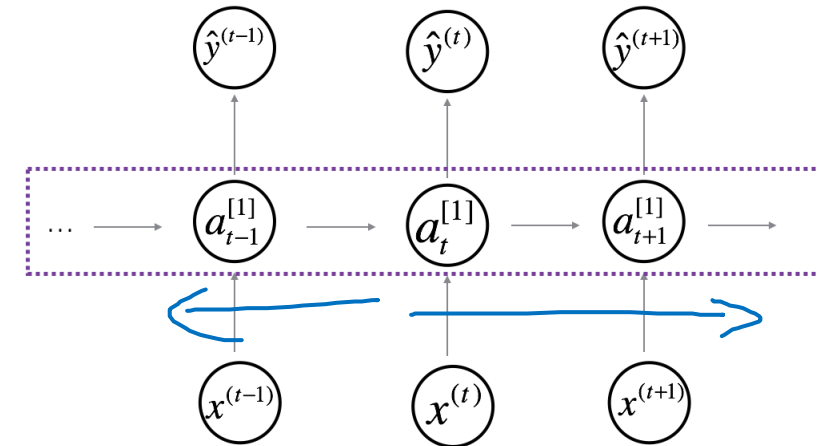
# Neural Network examples



Standard NN



Convolutional NN



Recurrent NN

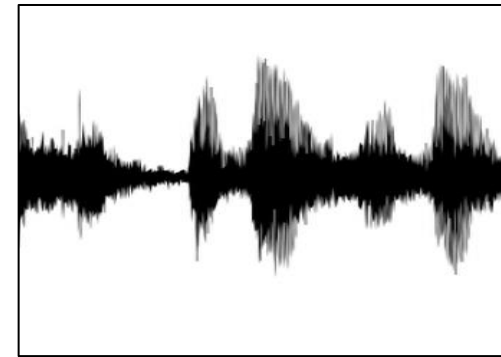
# Supervised Learning

## Structured Data

Size	#bedrooms	...	Price (1000\$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



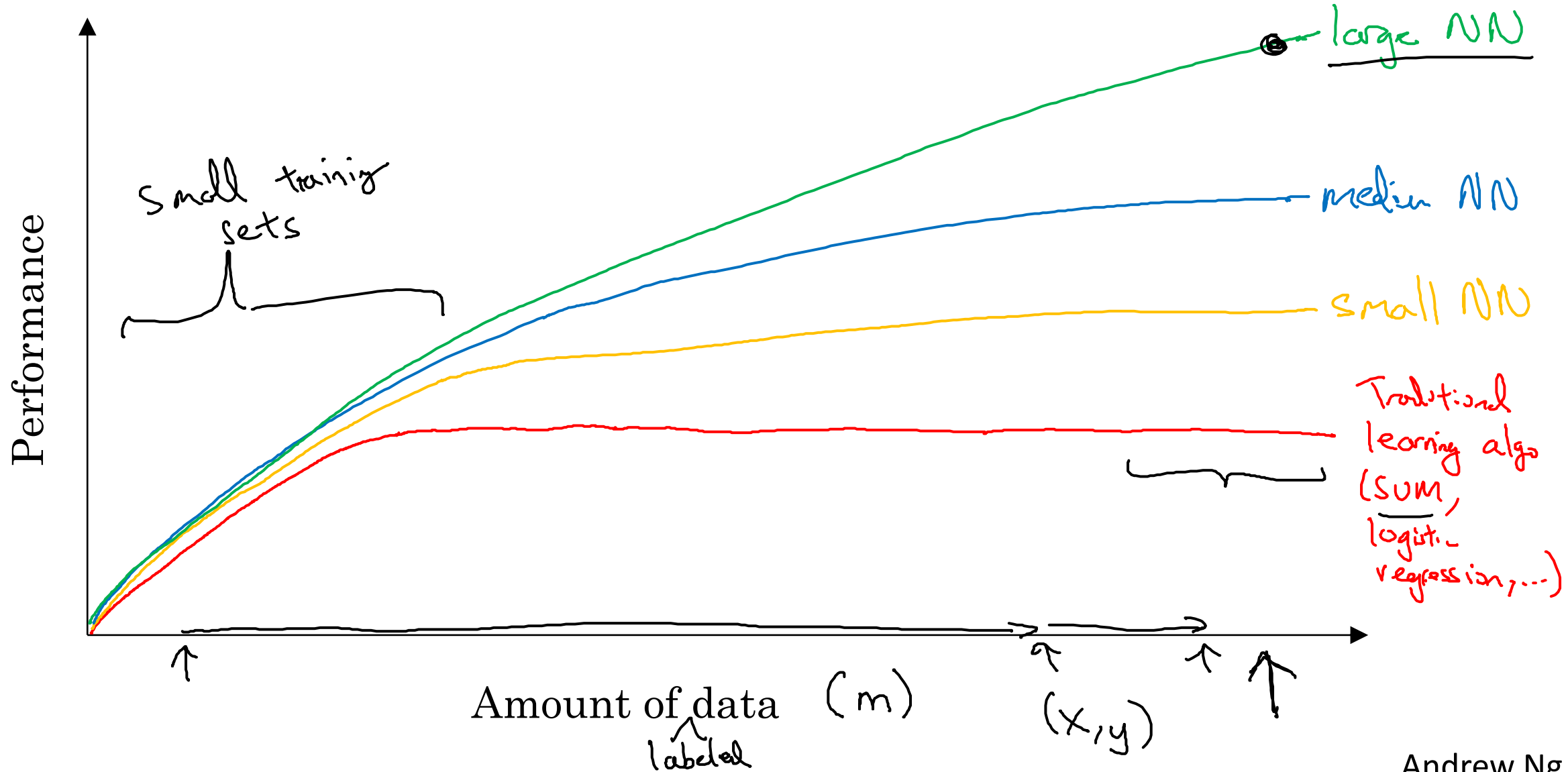
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# Introduction to Neural Networks

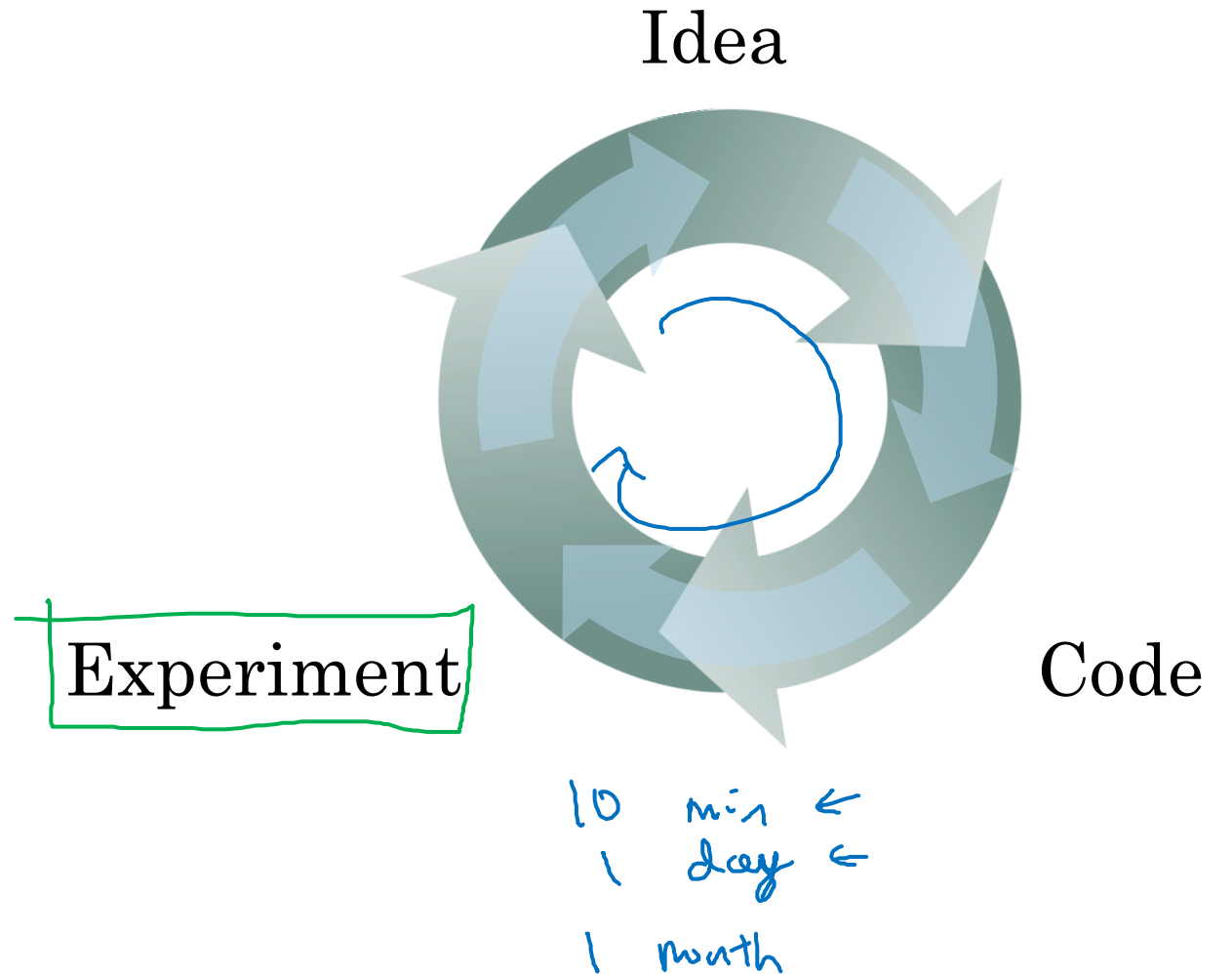
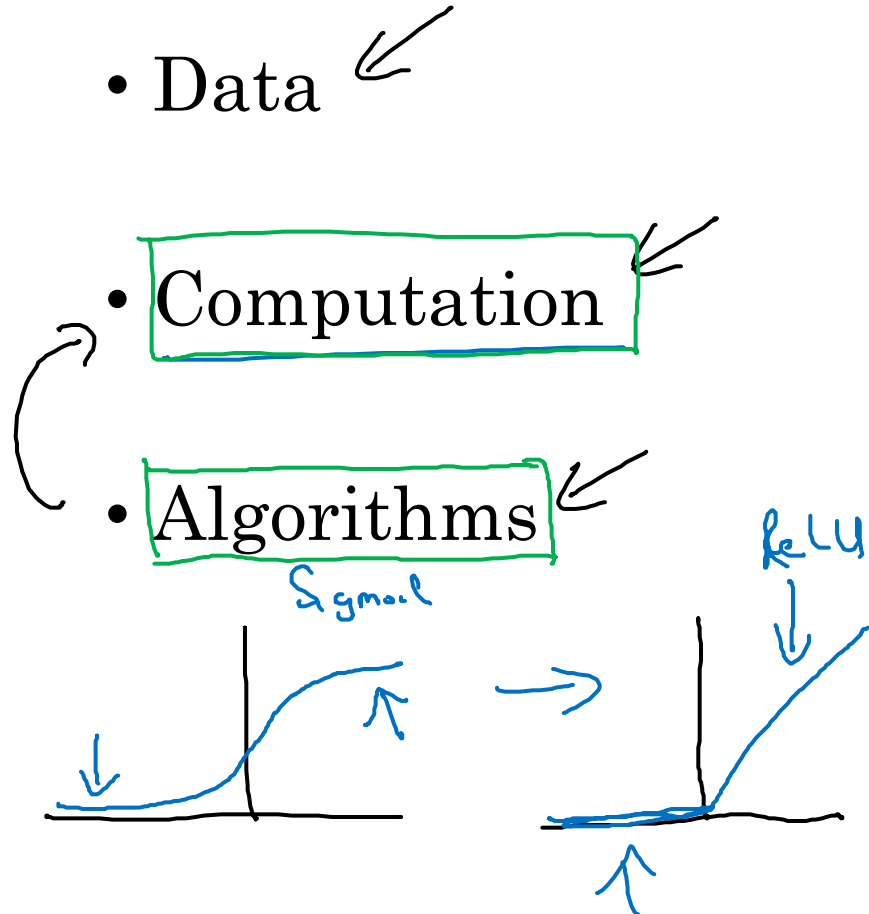
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## Why is Deep Learning taking off?

# Scale drives deep learning progress



# Scale drives deep learning progress






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# Introduction to Neural Networks

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## 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
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# 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



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# Introduction to Neural Networks

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## Course resources

# Course Resources

## Discussion forum

- Questions, technical discussions, bug reports, etc.

## Wiki (in-progress lecture notes)

- [deeplearning.ai/wiki](https://deeplearning.ai/wiki)

Contact us: [feedback@deeplearning.ai](mailto:feedback@deeplearning.ai)

Companies: [enterprise@deeplearning.ai](mailto:enterprise@deeplearning.ai)

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