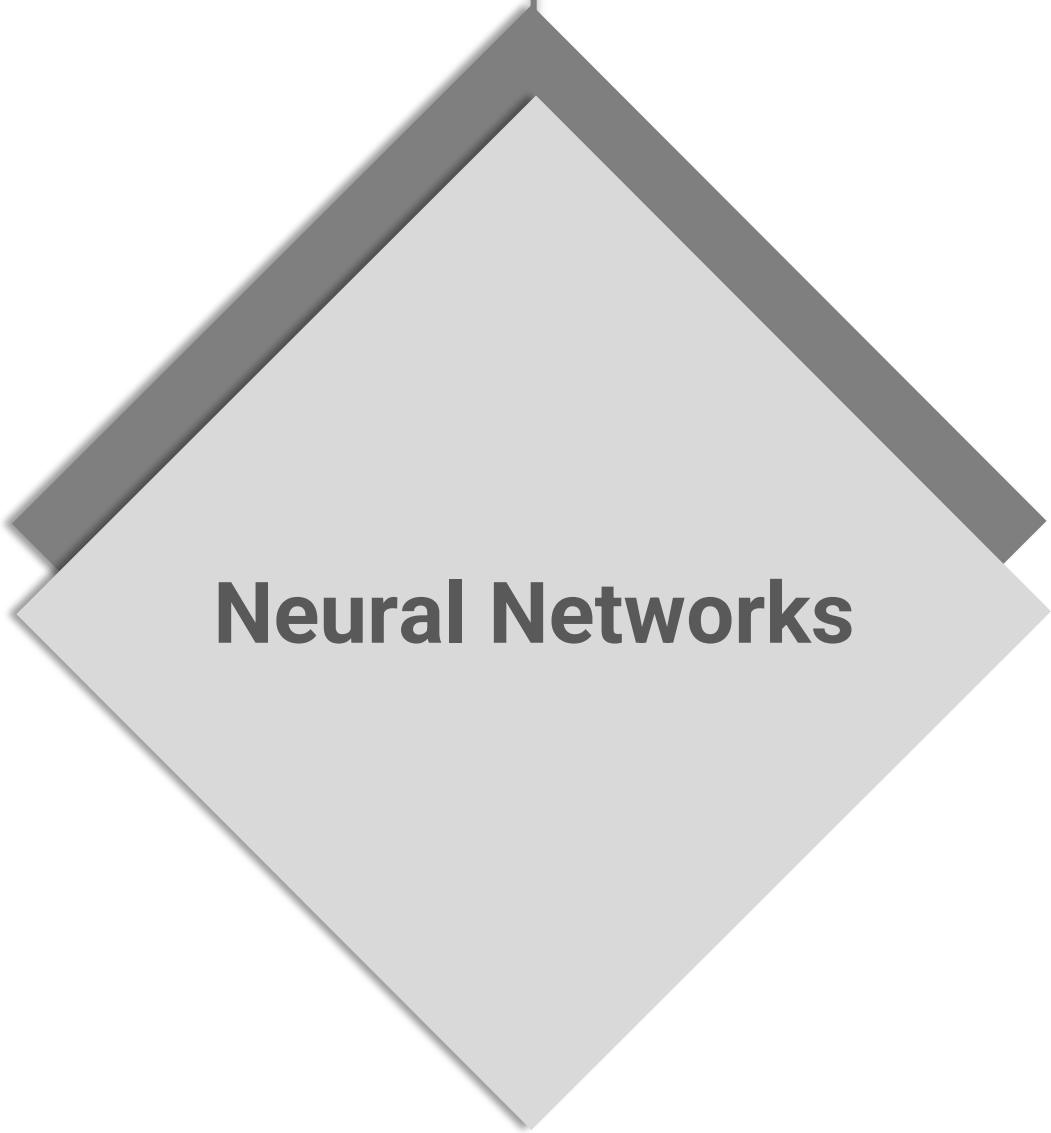
Neural Networks

1. Our brain
2. Neural Networks
3. Voice recognizing
4. Final project



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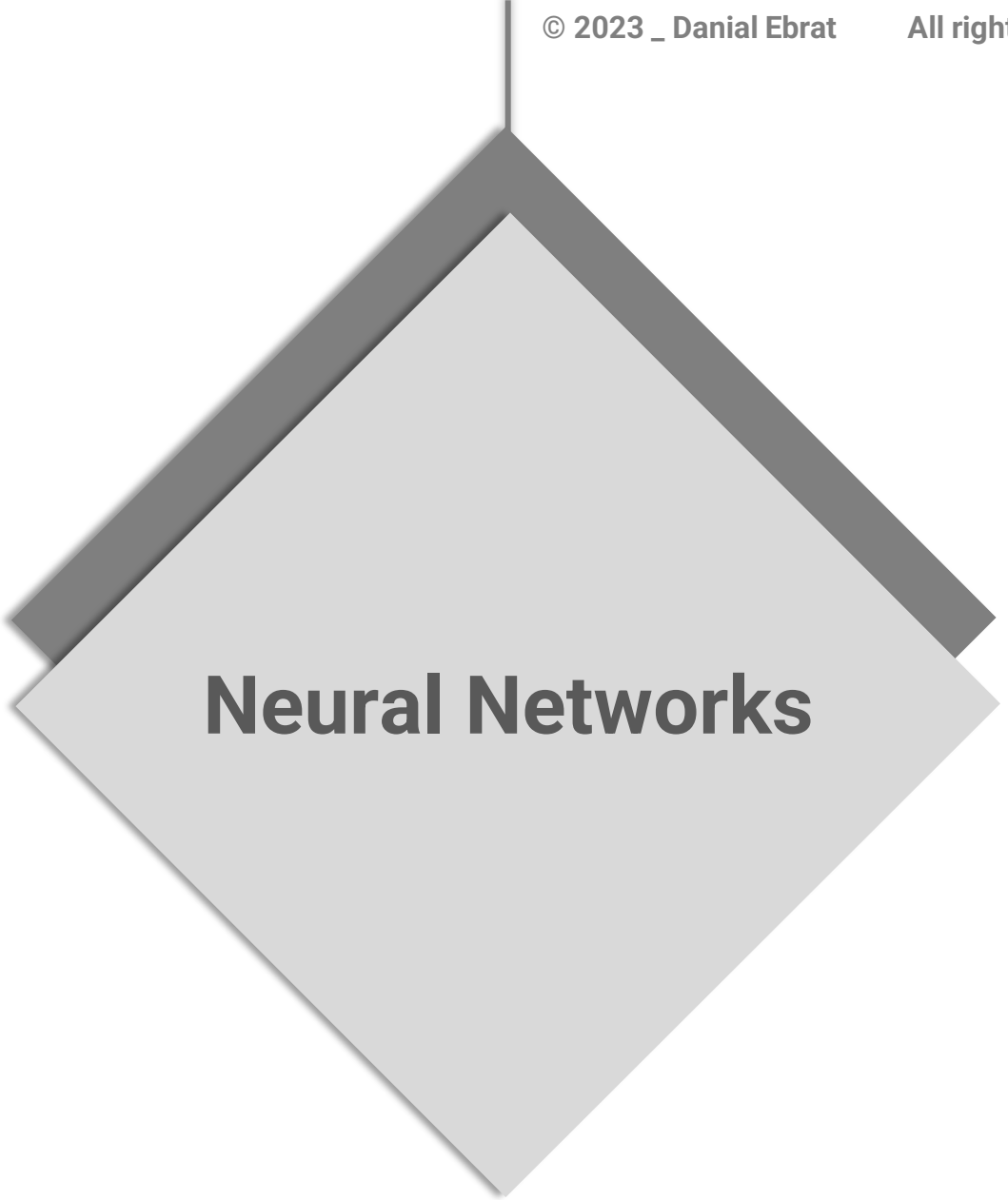
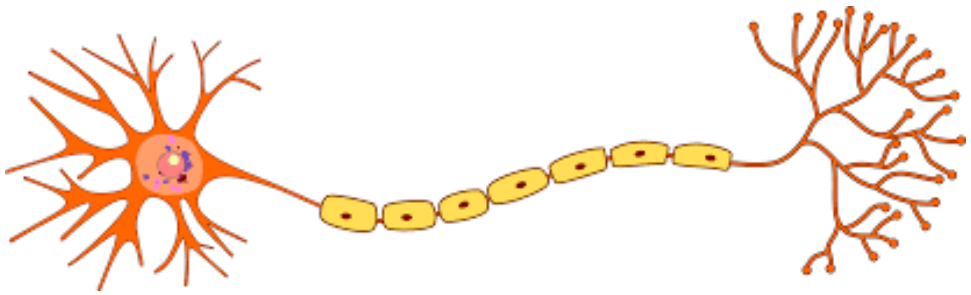


1. Our brain

Sensors
(Get the input)

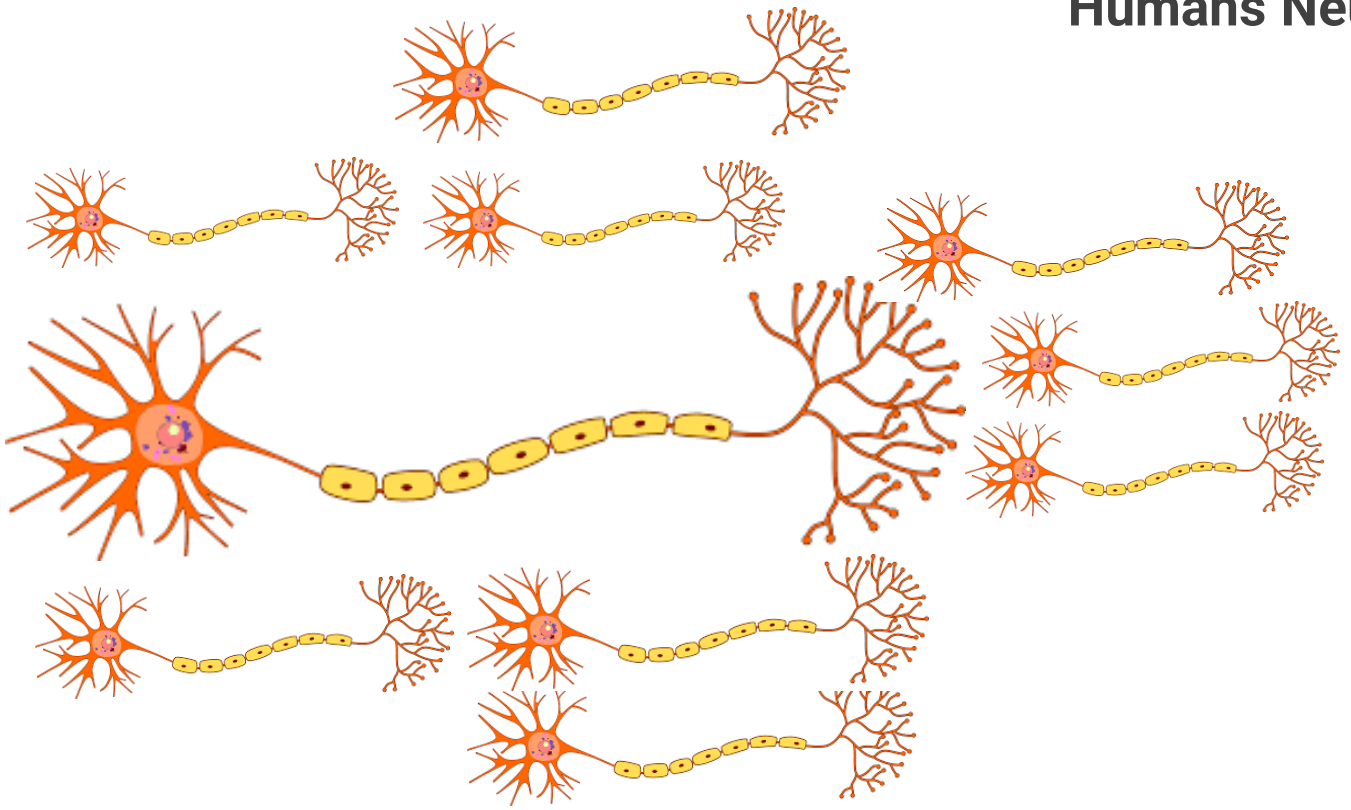
Pass to other neurons
(output)



Neuron

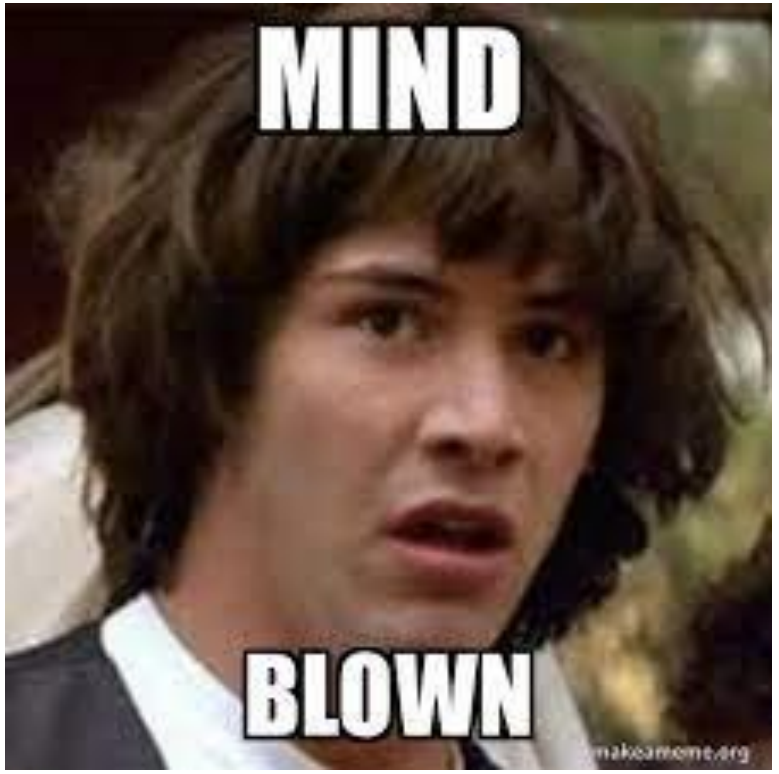
1. Our brain

Humans Neural network



We have somewhere between 200 and 400 billion of them!!!

1. Our brain



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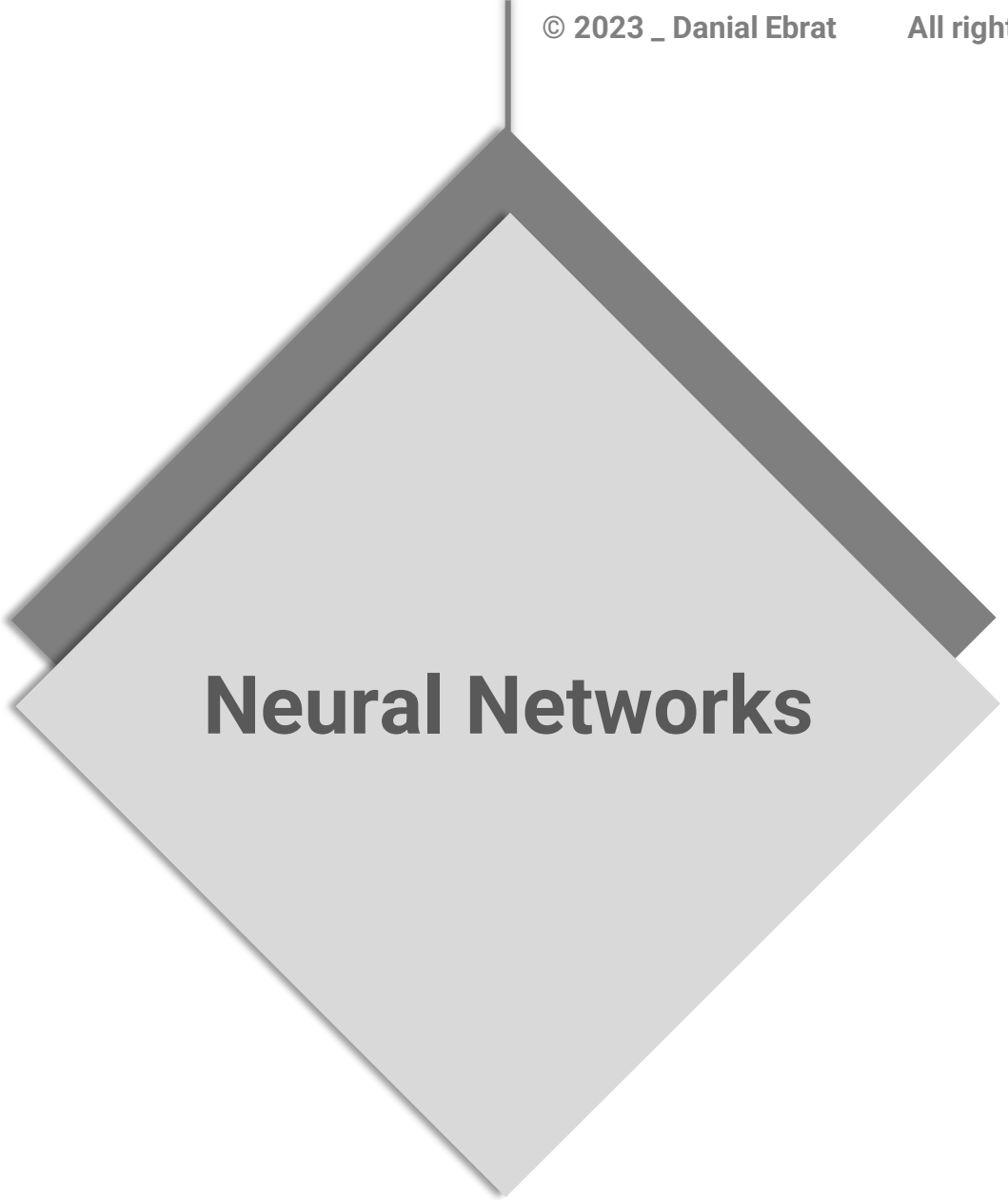

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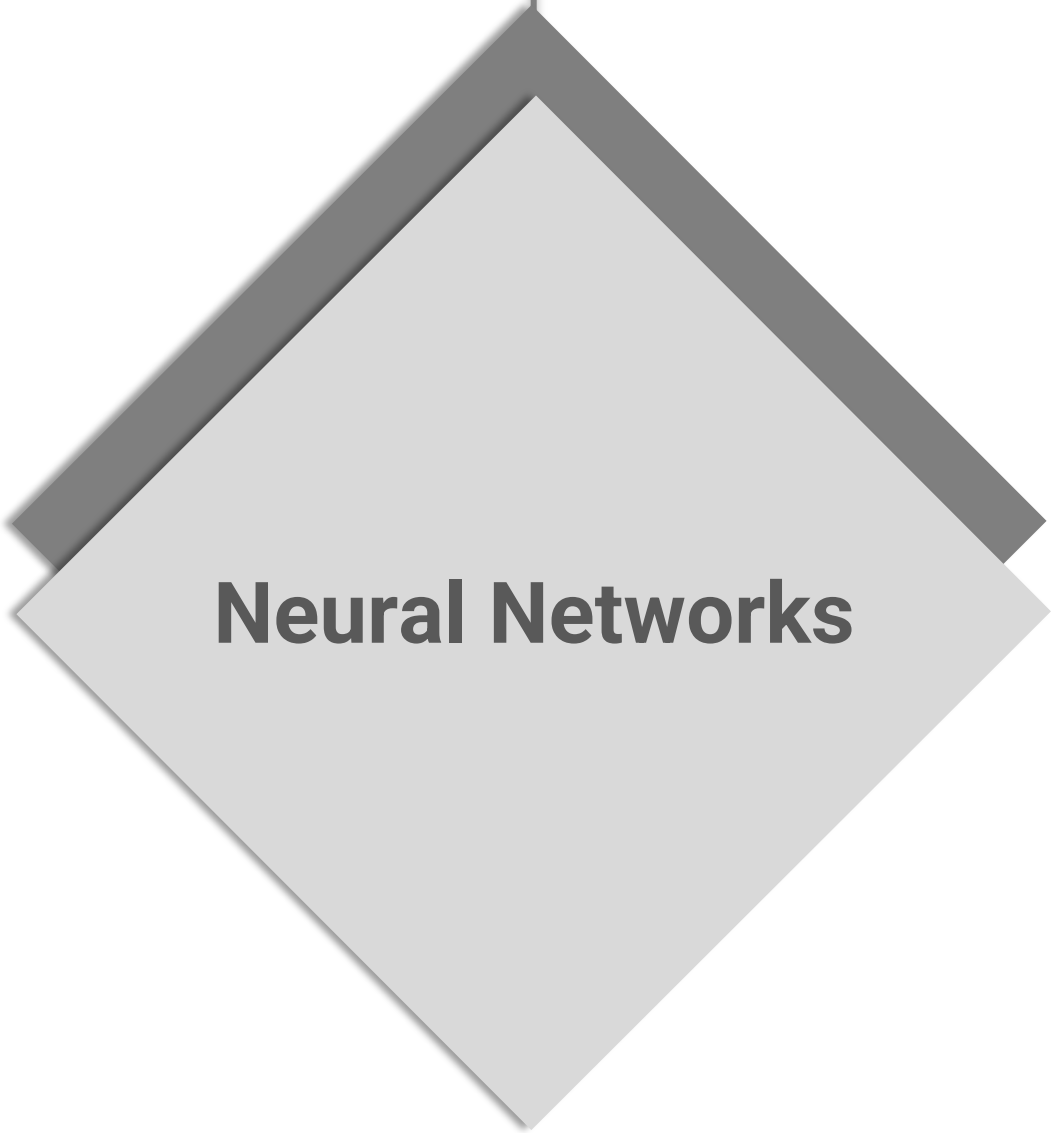

1. Our brain
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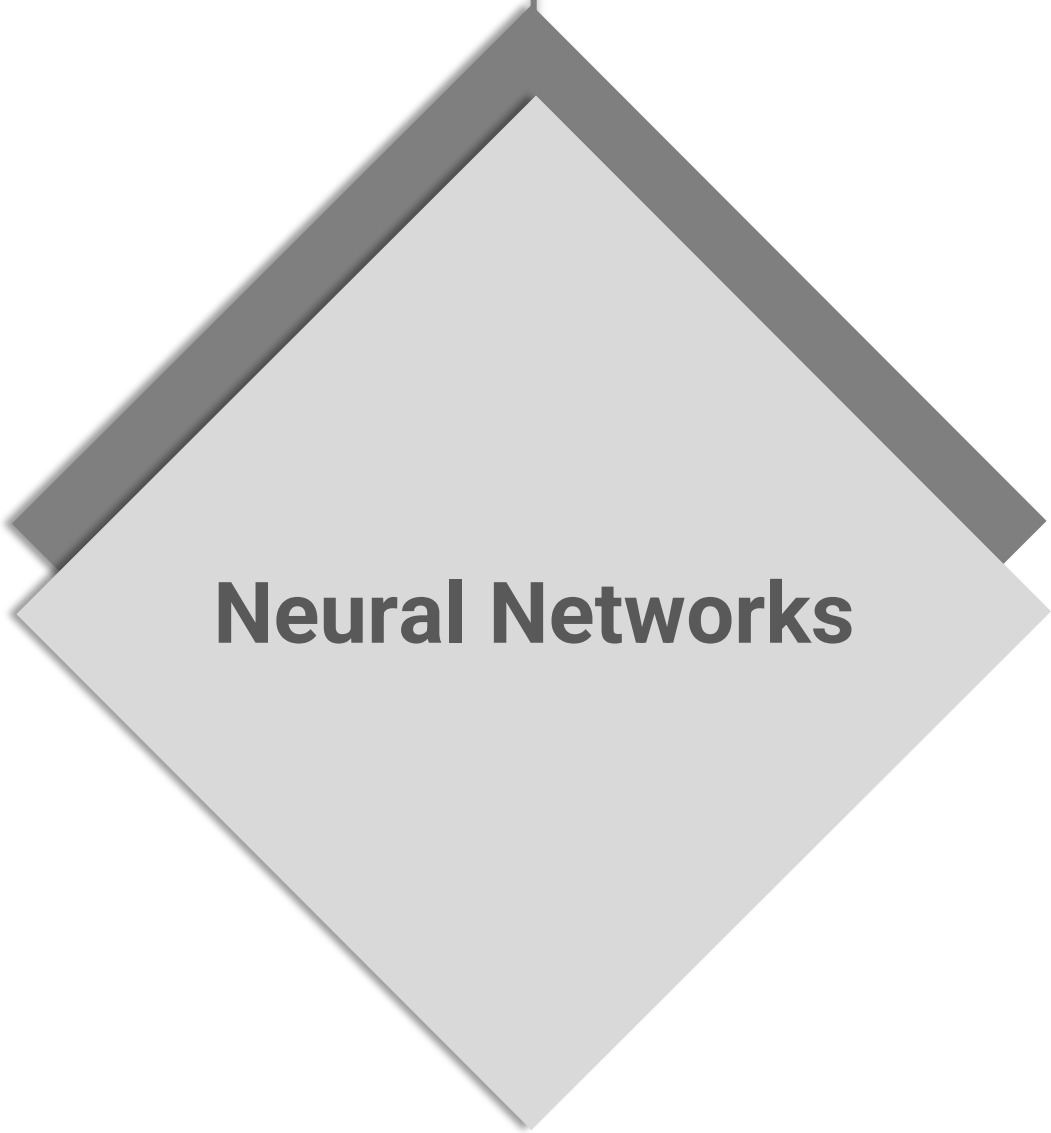
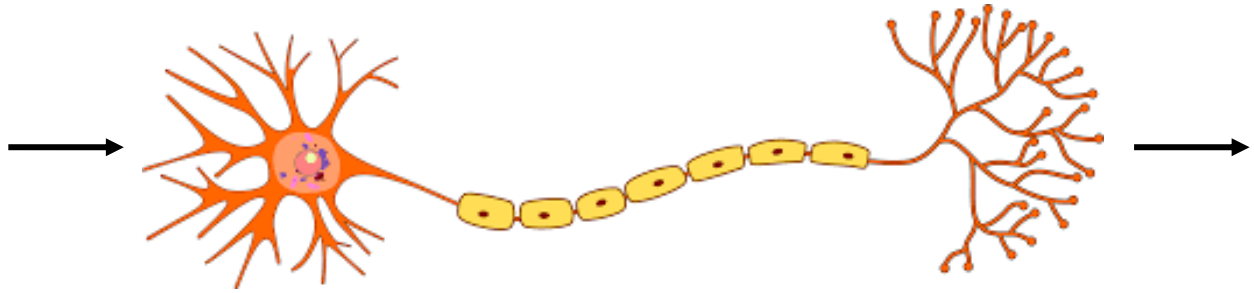
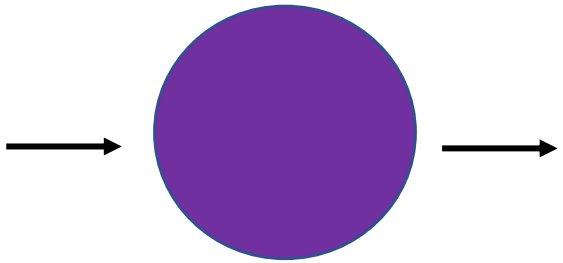


2. Neural Networks

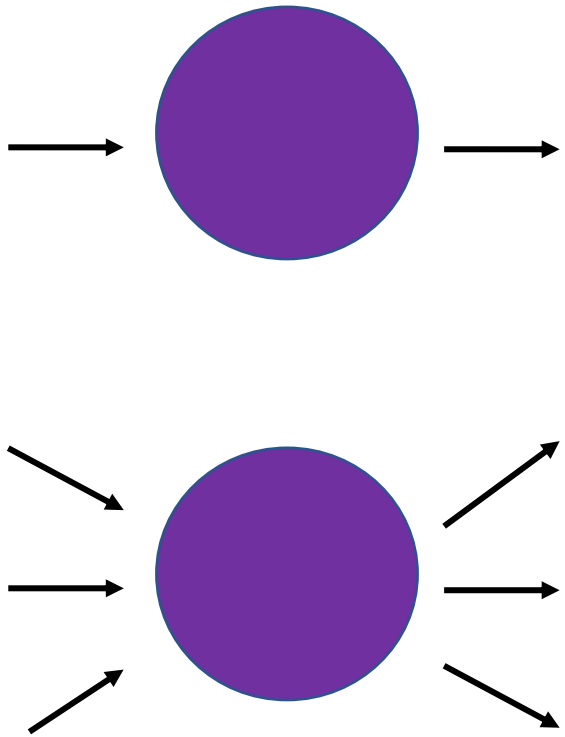


Neuron

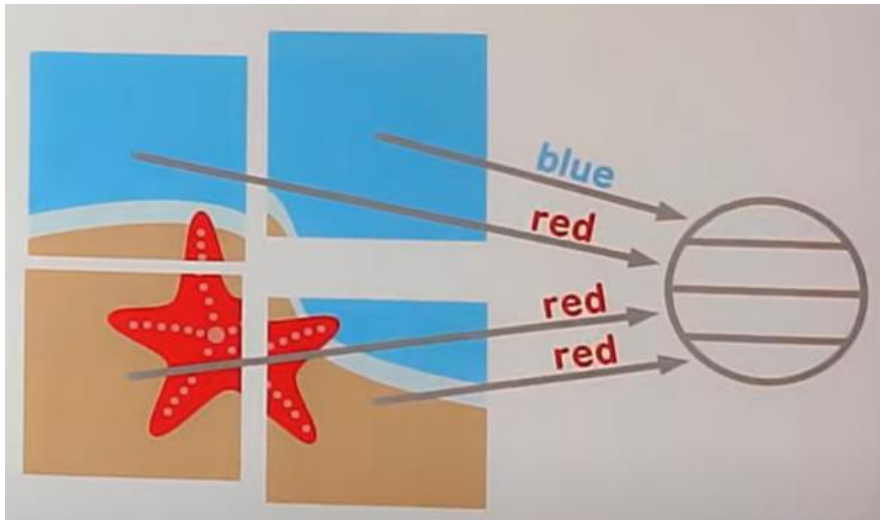


Artificial Neuron

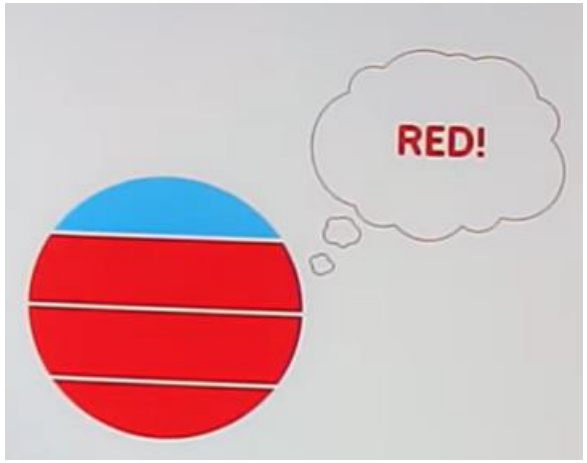
2. Neural Networks

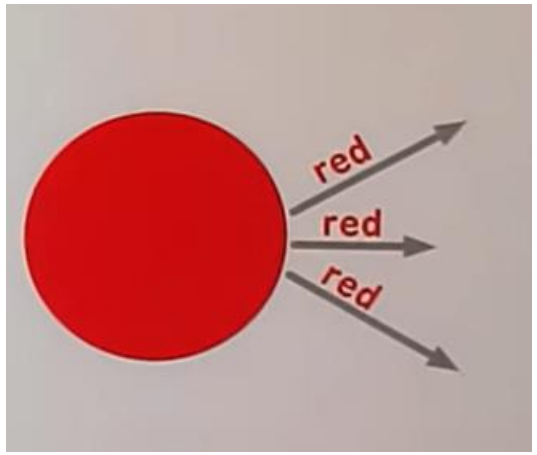


2. Neural Networks



Do we have a red animal in the picture

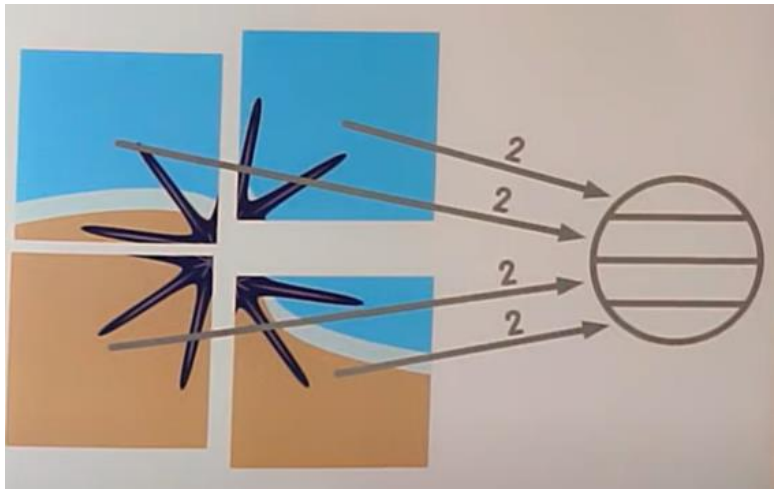


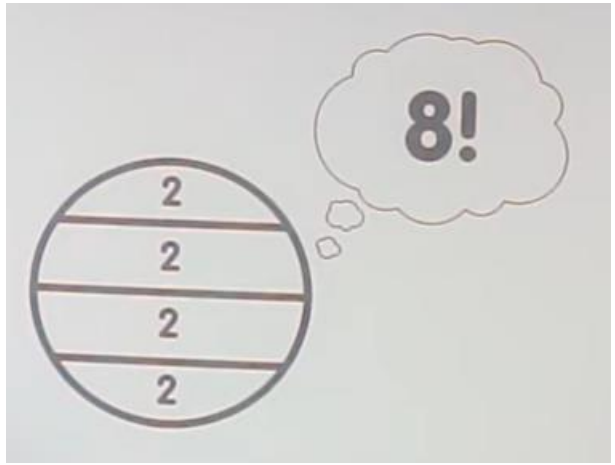


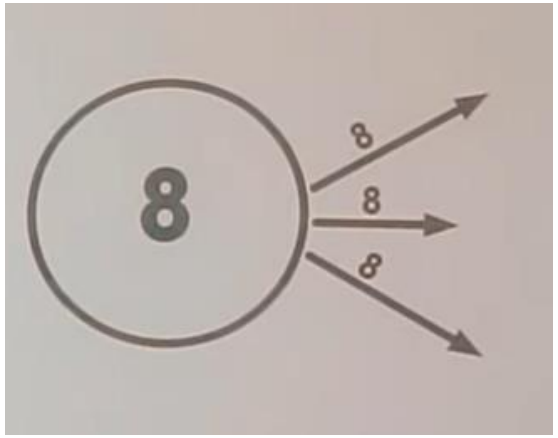
Ferrie, Chris, and Sarah Kaiser. *Neural Networks for Babies*. Sourcebooks Jabberwocky, 2019.

2. Neural Networks

How many legs does the animal have?







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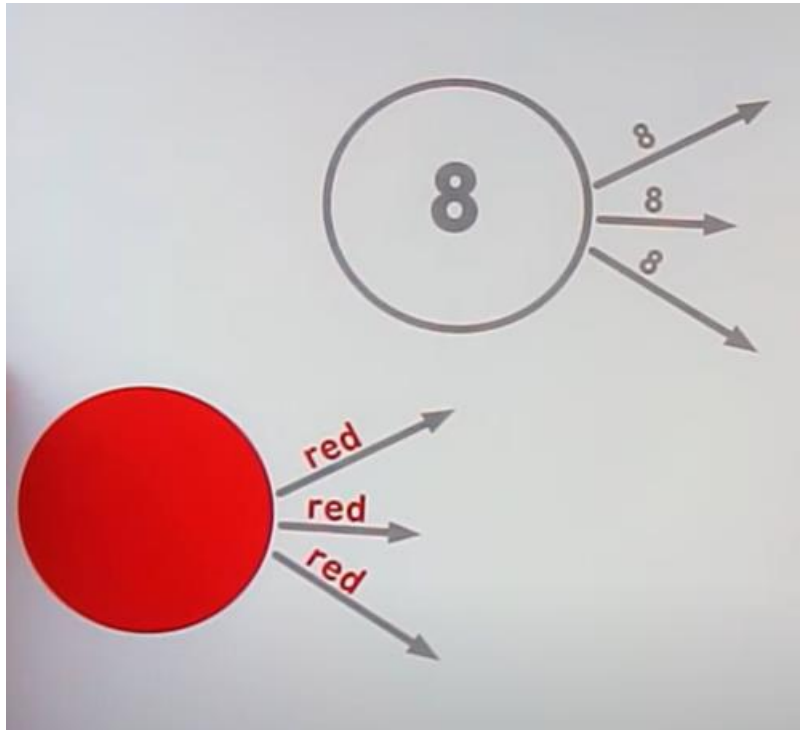
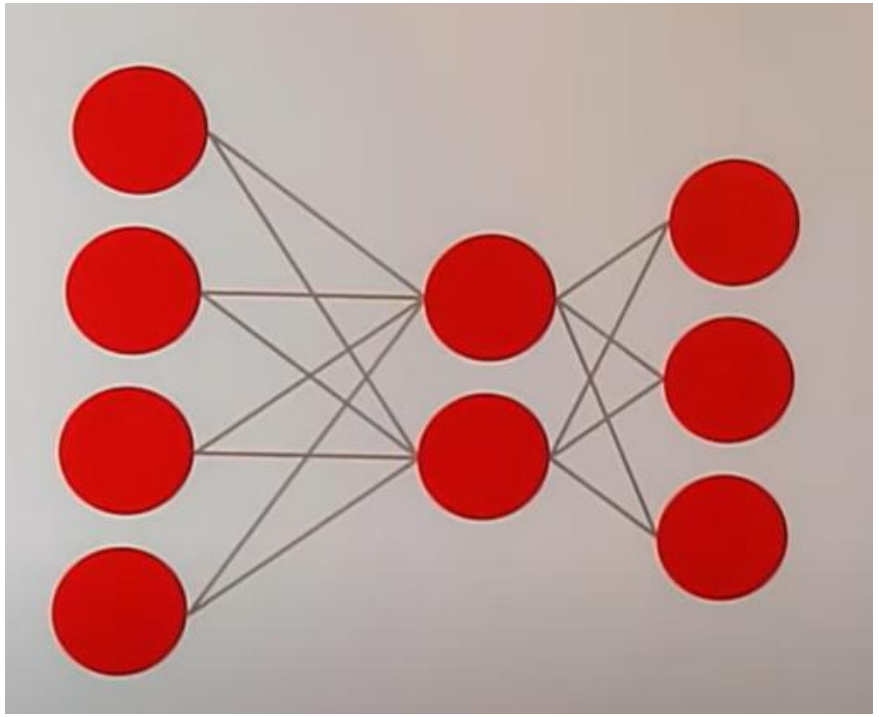
2. Neural Networks

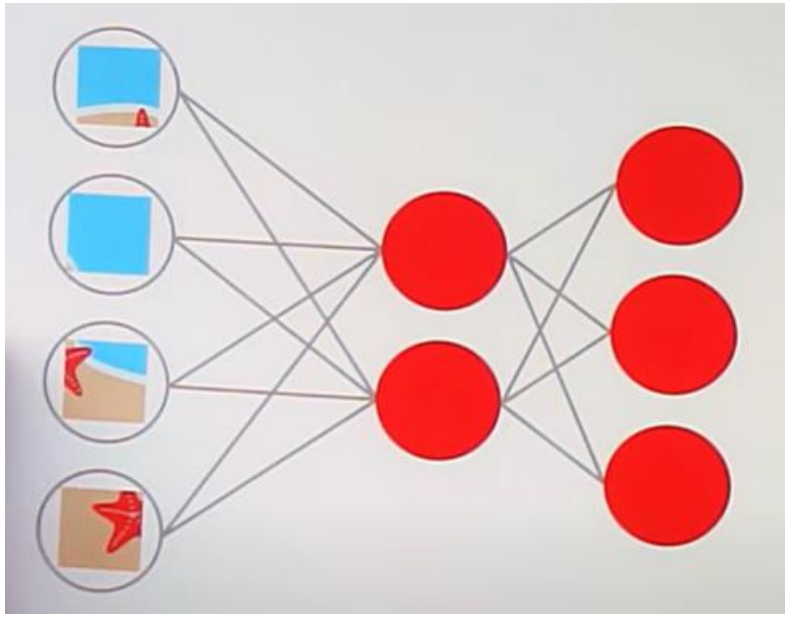




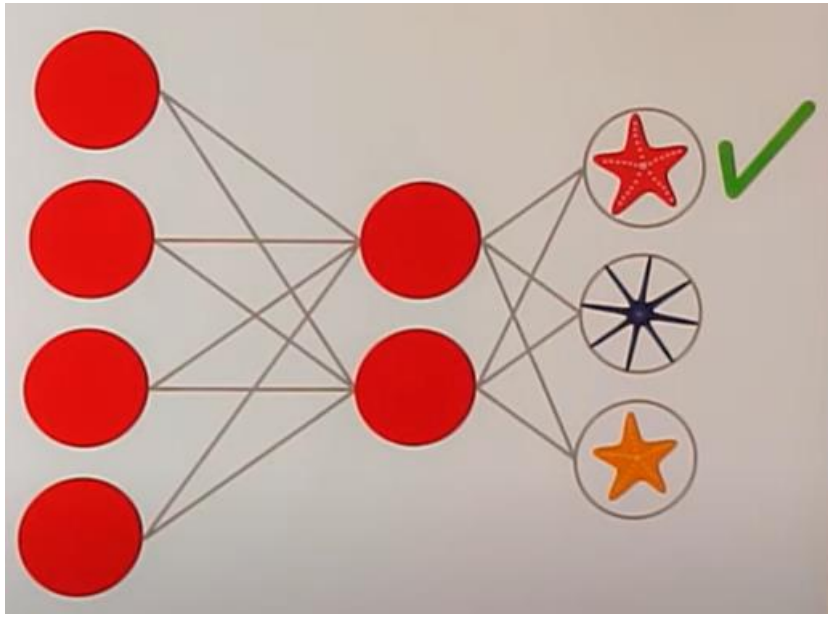
This is what we call, Artificial Neural network

Ferrie, Chris, and Sarah Kaiser. *Neural Networks for Babies*. Sourcebooks Jabberwocky, 2019.

2. Neural Networks



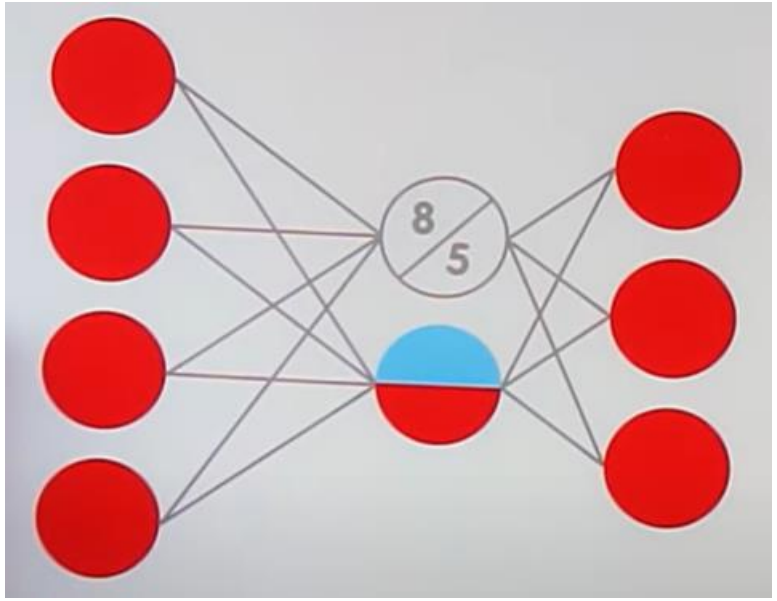
Input neurons look at part of the picture



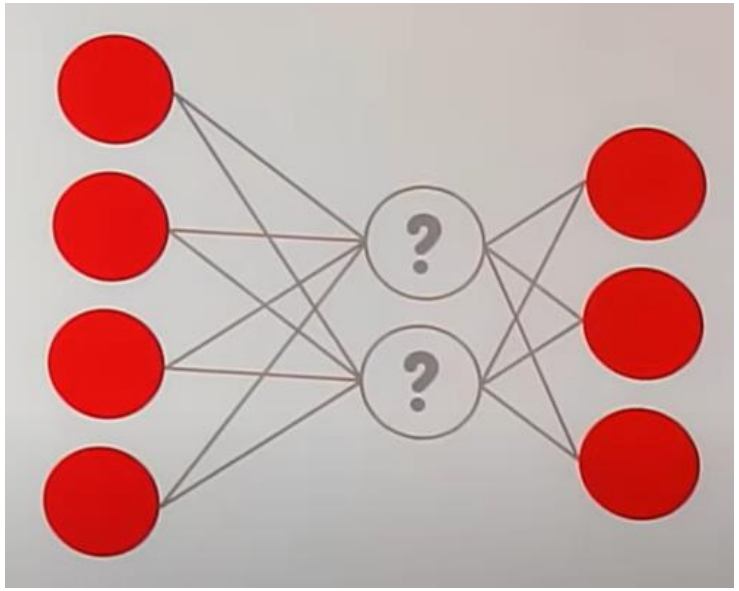
Output neurons have answers about the picture

Ferrie, Chris, and Sarah Kaiser. *Neural Networks for Babies*. Sourcebooks Jabberwocky, 2019.

2. Neural Networks



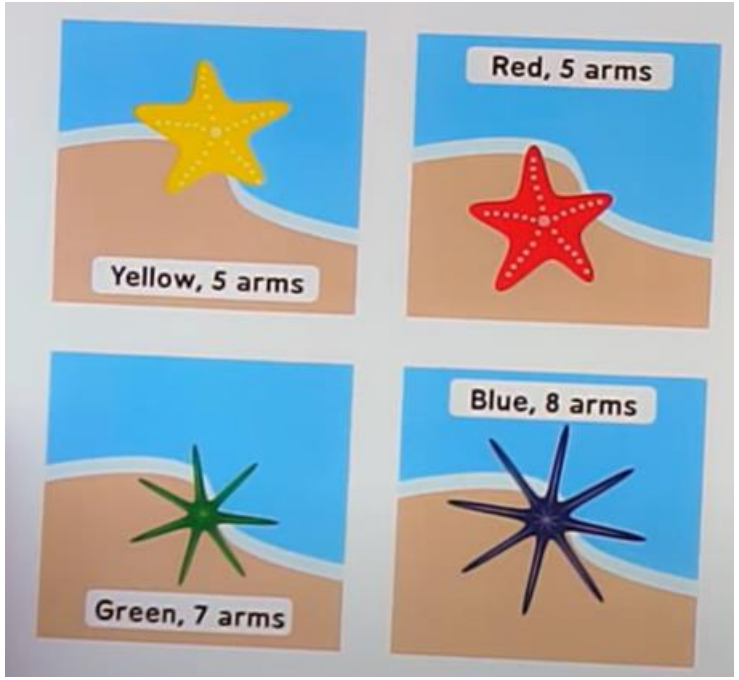
Neurons in between don’t see the pictures, or give answers



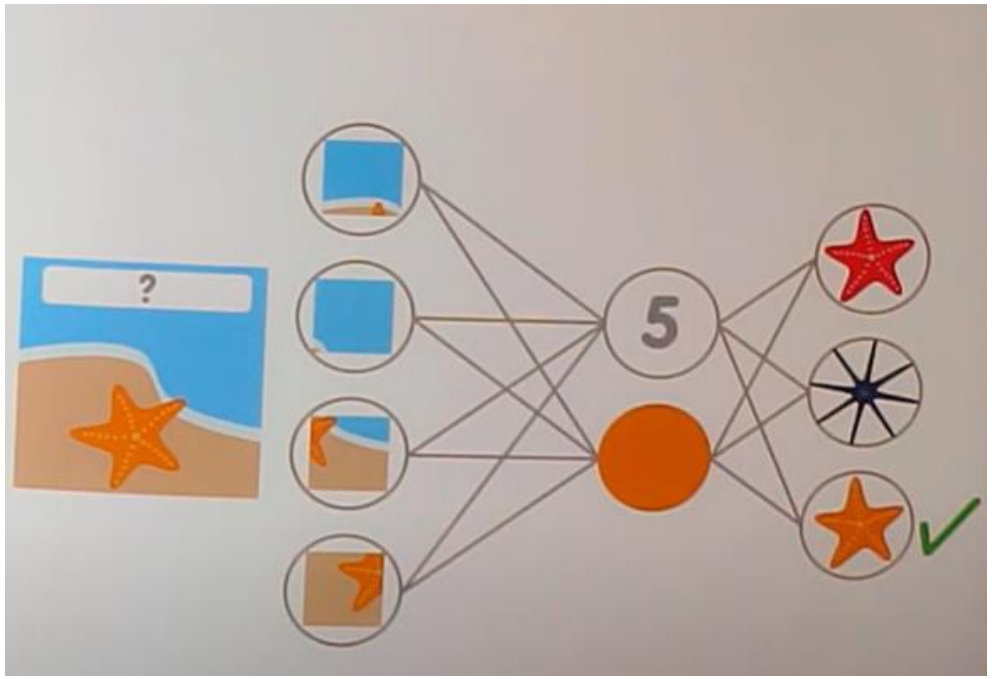
How do the hidden neurons learn to decide

Ferrie, Chris, and Sarah Kaiser. *Neural Networks for Babies*. Sourcebooks Jabberwocky, 2019.

2. Neural Networks



Training data can have correct labels on them



After learning, the network has learned

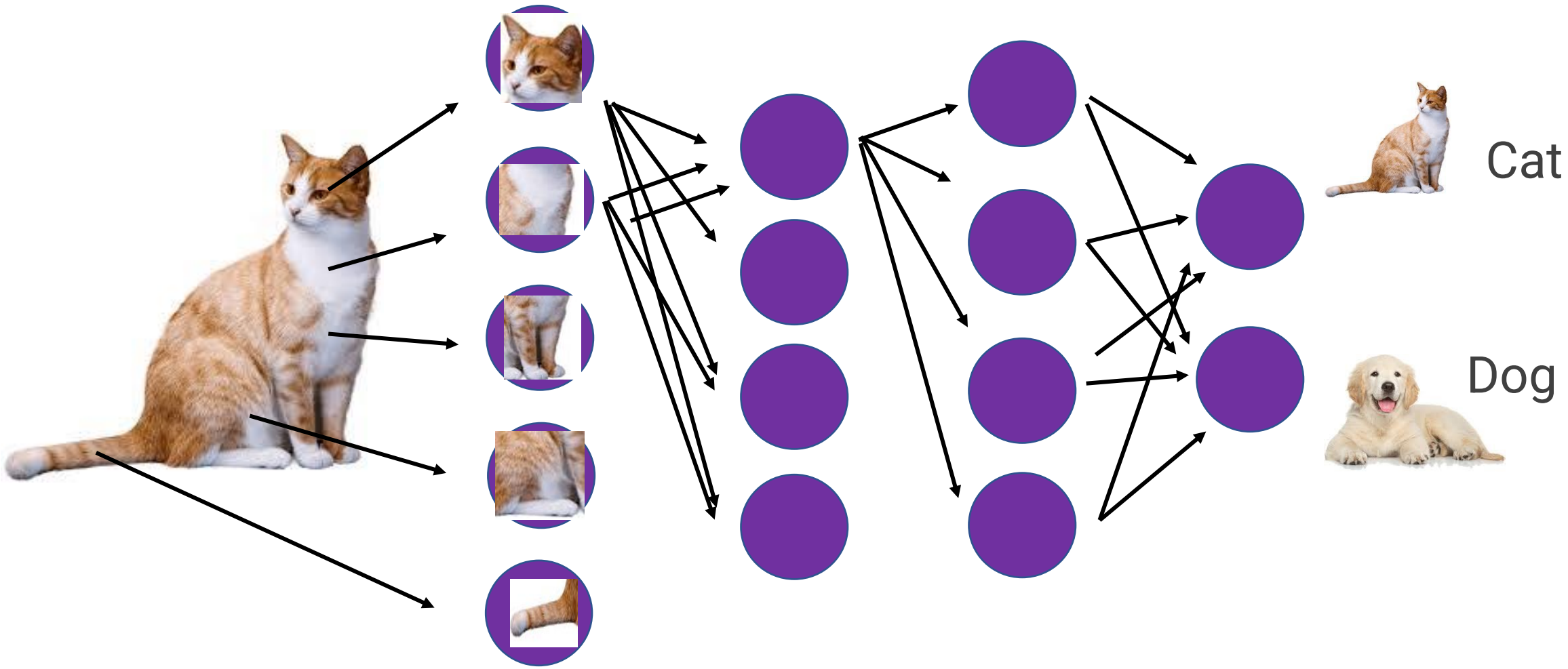
Ferrie, Chris, and Sarah Kaiser. *Neural Networks for Babies*. Sourcebooks Jabberwocky, 2019.

2. Neural Networks

Let’s get back to our old question!

Dog or Cat?

2. Neural Networks



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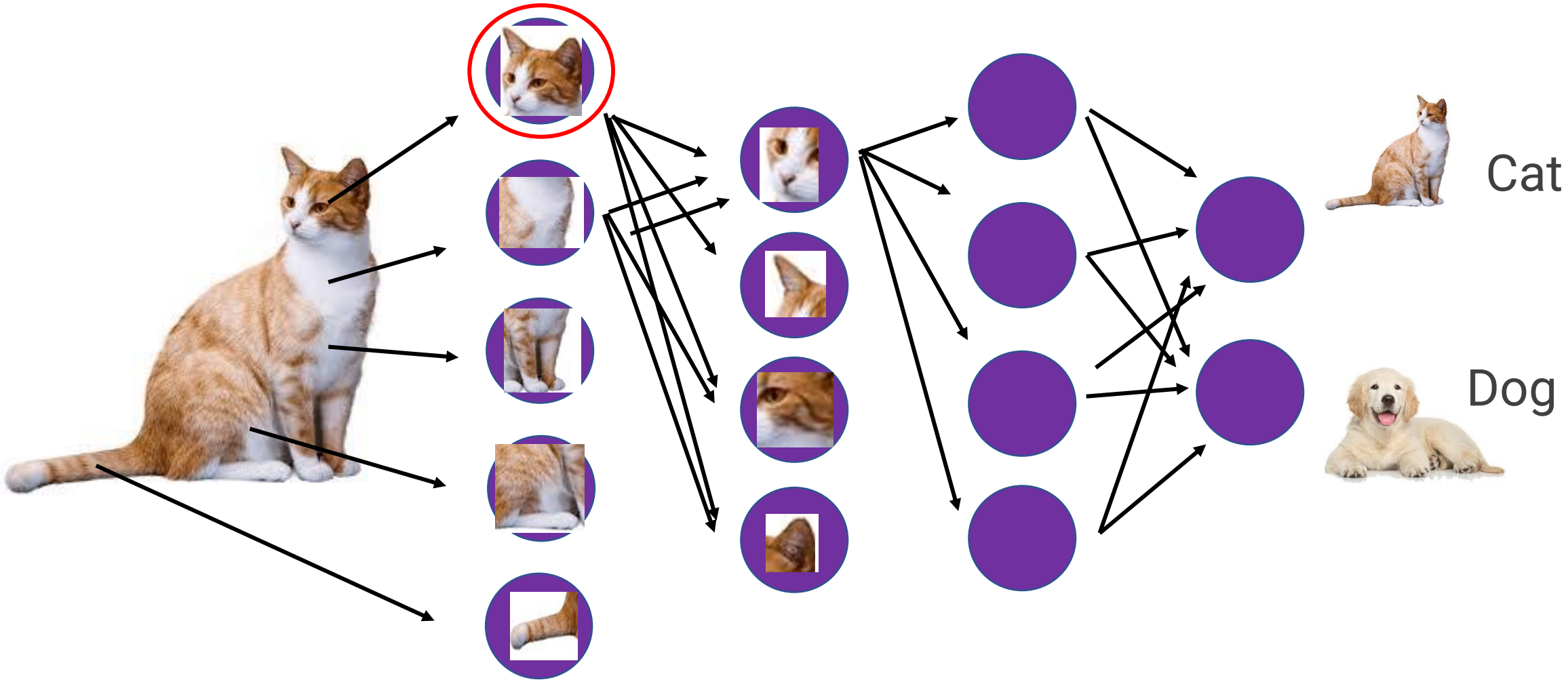

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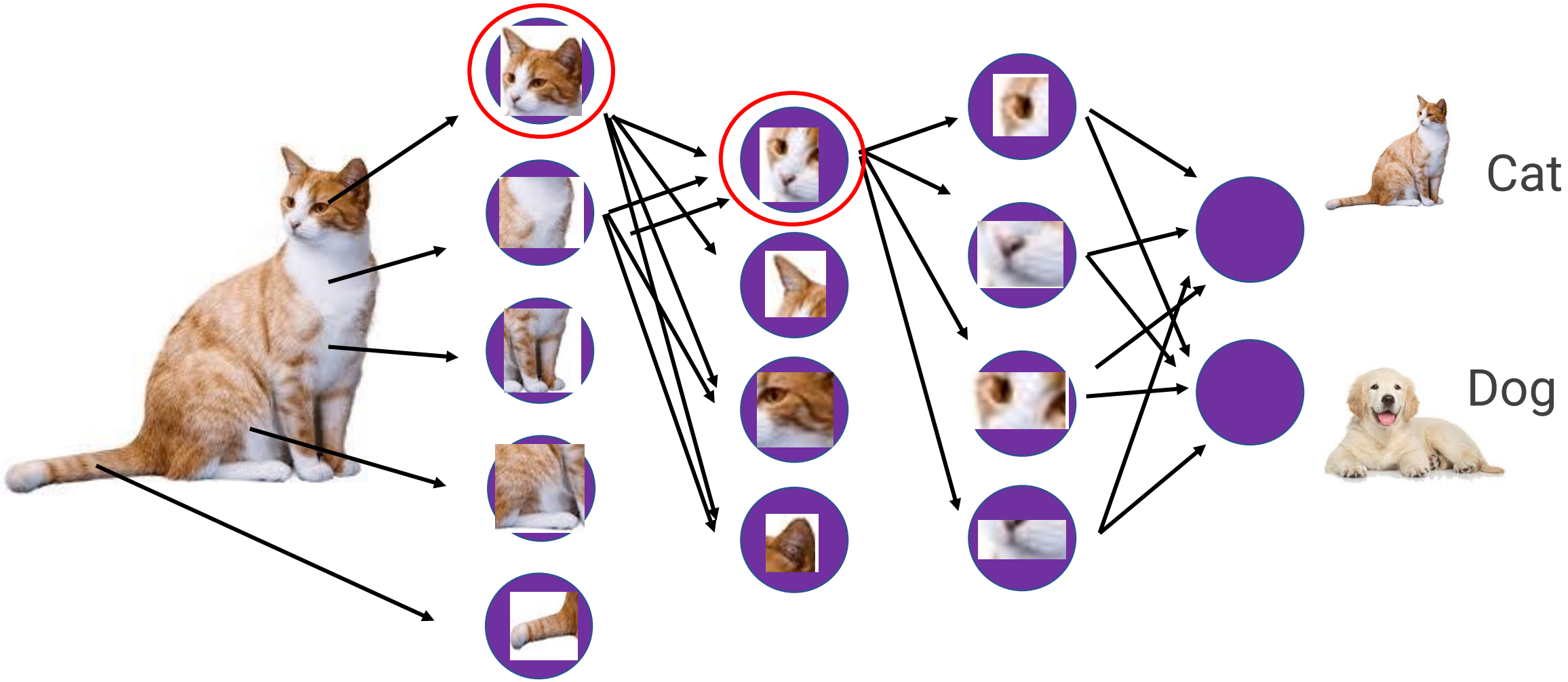

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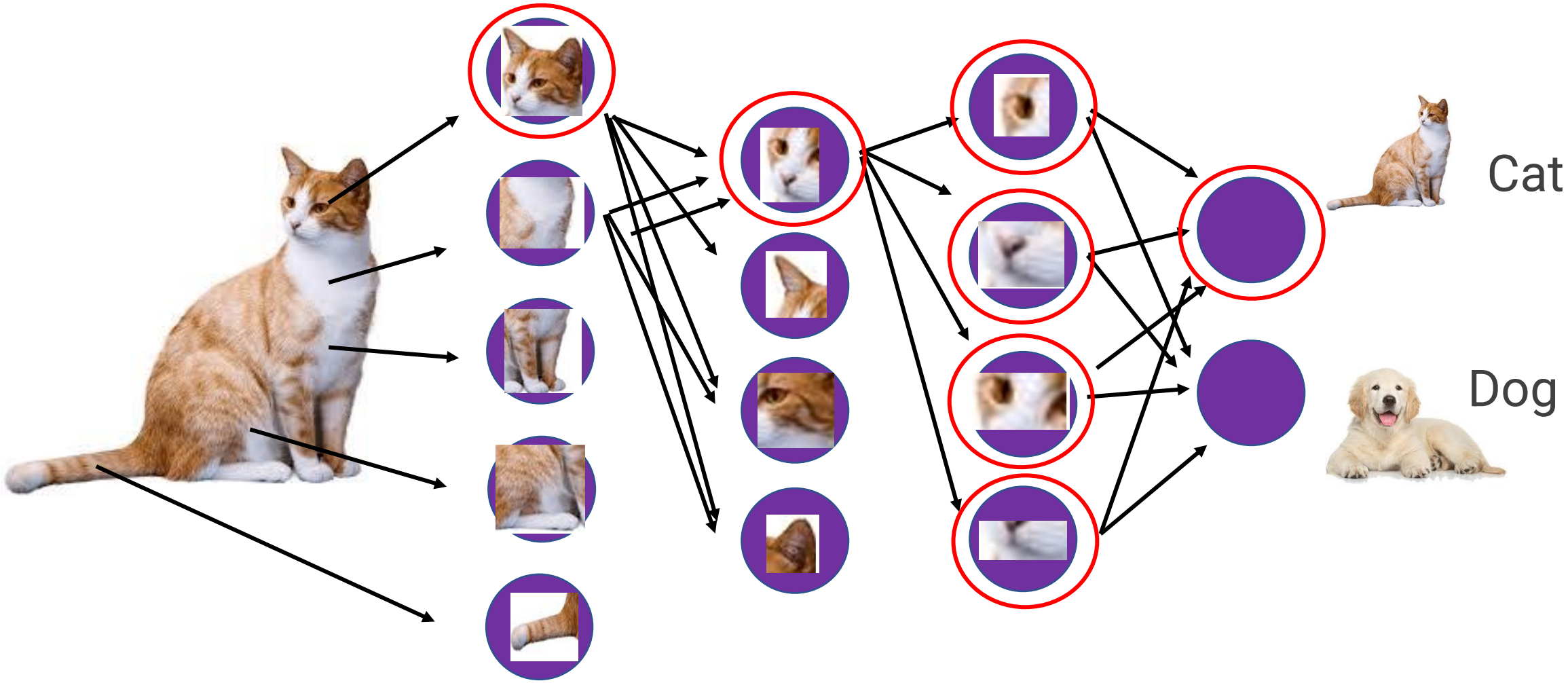

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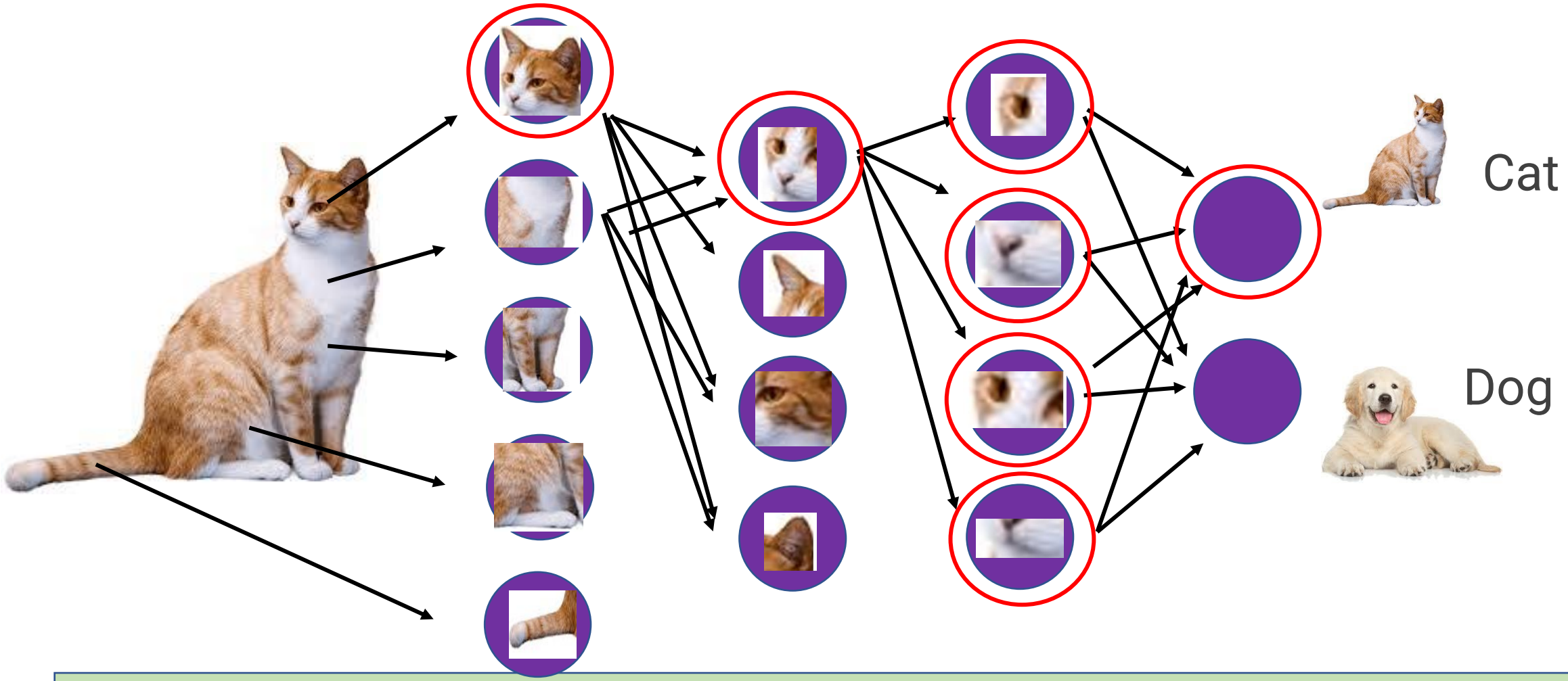
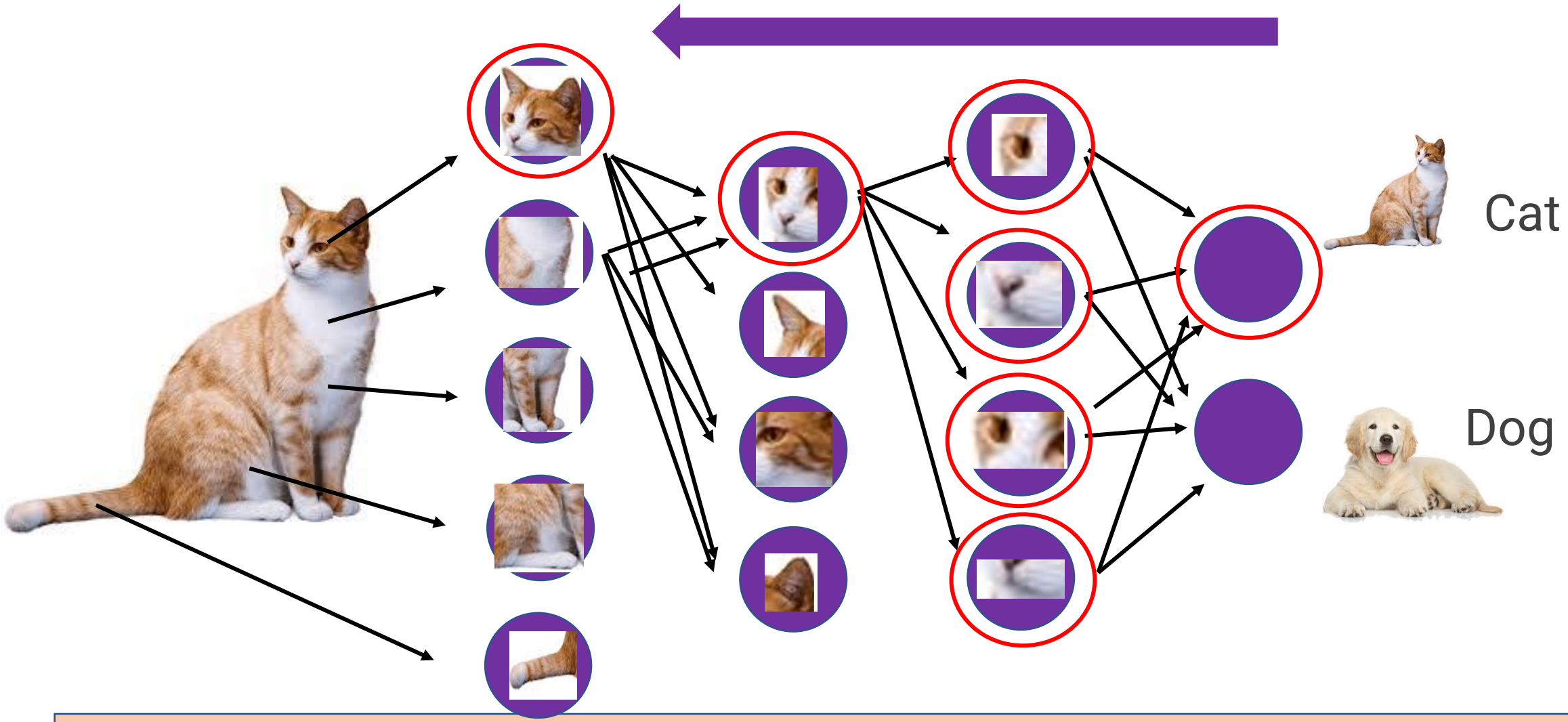


I was right!!!
Let’s pay more attention to those neurons and connections that send me the good information

2. Neural Networks



I was wrong!!!
Let’s pay less attention to those neurons and connections sending not valuable information

2. Neural Networks

After Seeing so many pictures of Cats

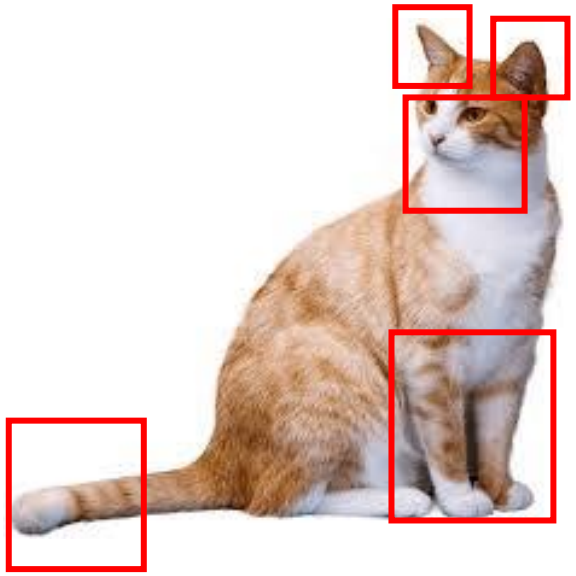
It learns what to look for!

It learns which features are more important

It learns to put more attention to the neurons and connections that pass more valuable information

Then, for new pictures, it focuses on those features to decide whether it is a Cat or not

2. Neural Networks



Deep Learning!

Using deep Artificial neural networks to Teach computers

2. Neural Networks

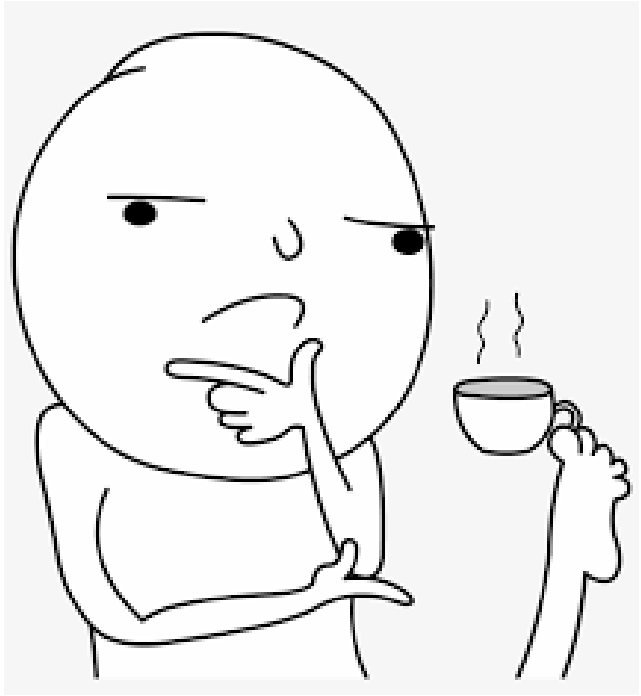
Now, let’s see the final example in a story !

2. Neural Networks

You went to a restaurant with your family

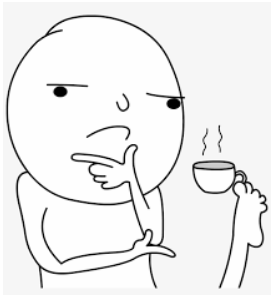
You had a great soup and you all enjoyed it

2. Neural Networks

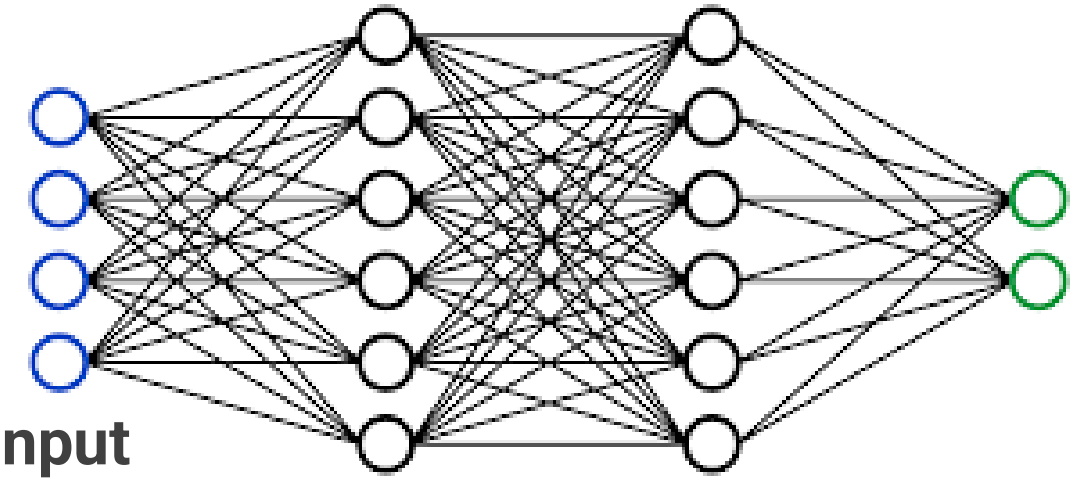


I have to make that soup

2. Neural Networks



You try the combination of recipe
You give it to your parents to taste it
You start taking their feedback
You make changes each time

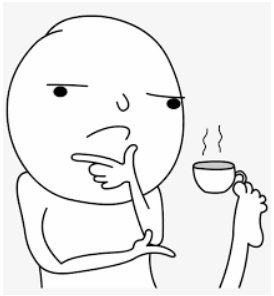


Input

It was Good!

Not like it!

2. Neural Networks



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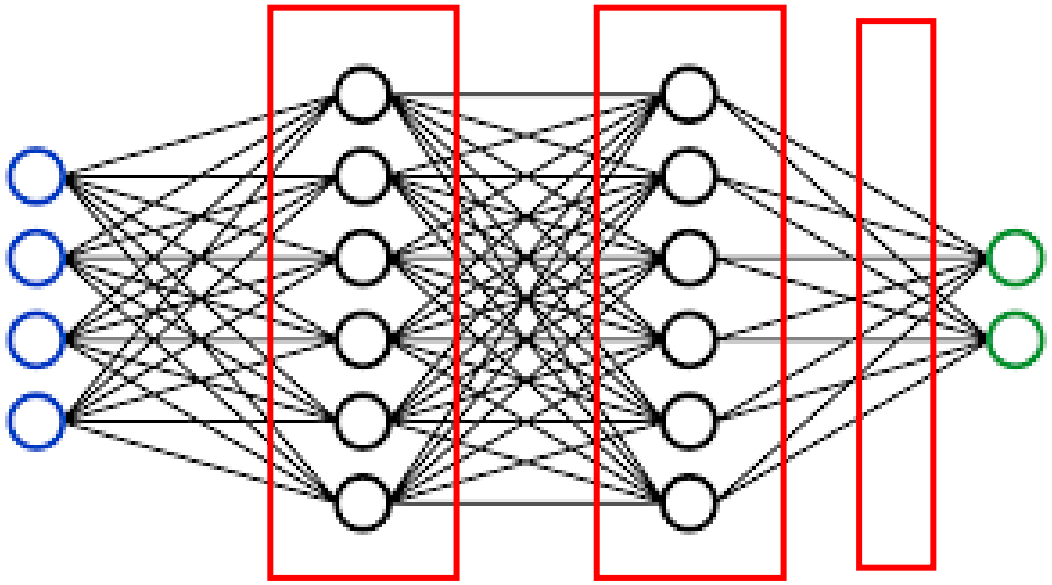
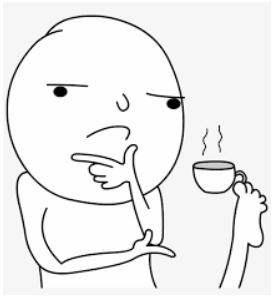


How much? Duration? more?

It was Good!

Not like it!

2. Neural Networks



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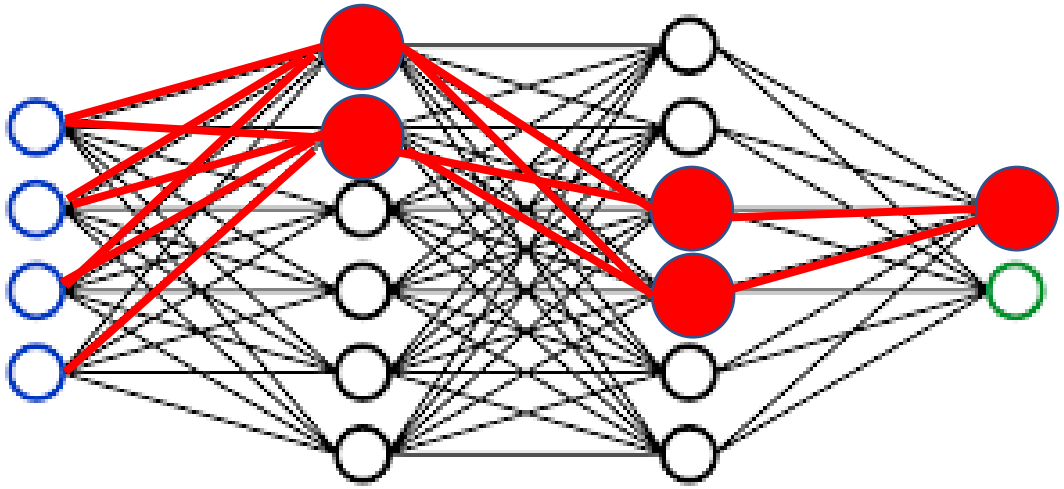


It was Good!

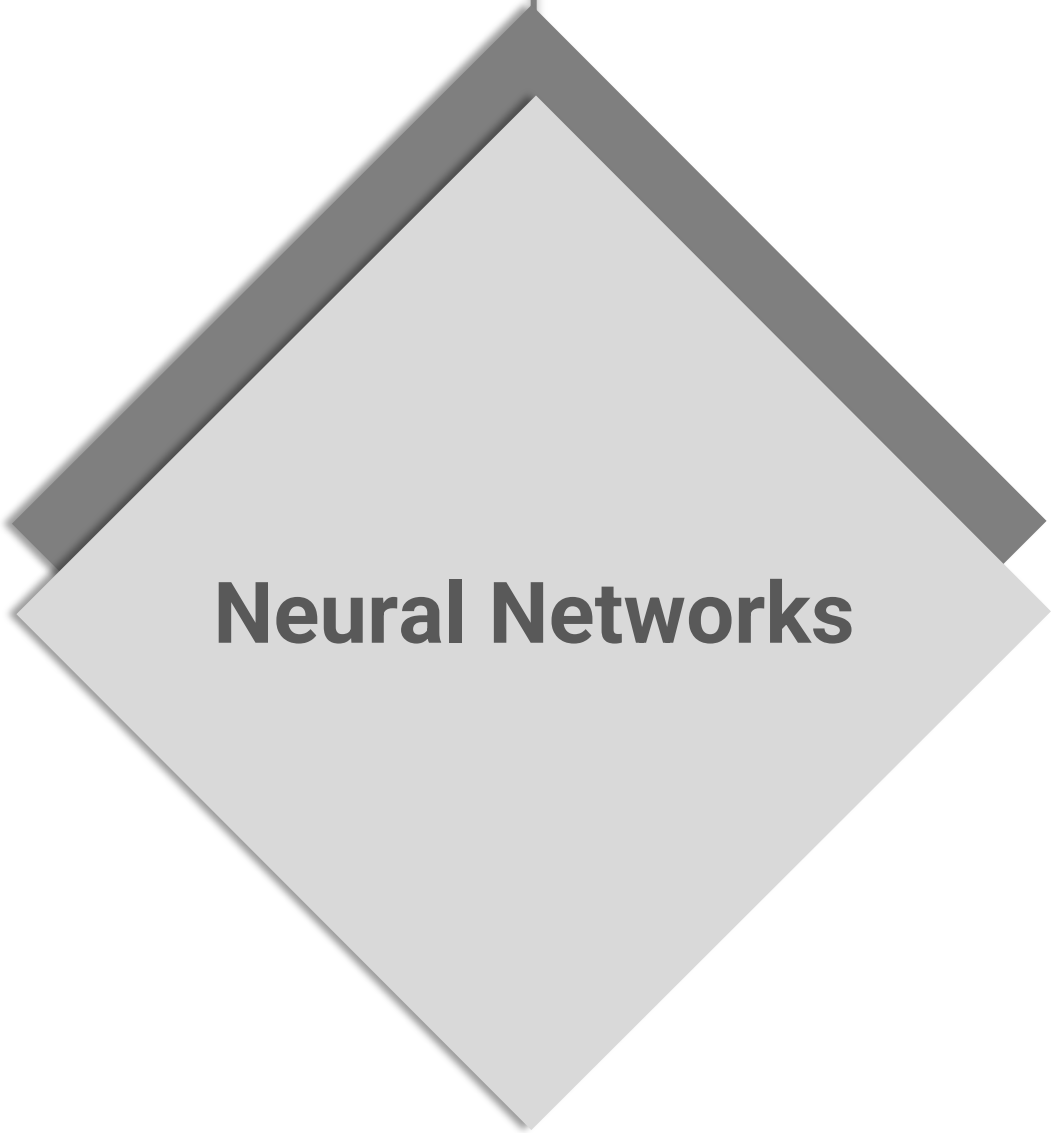
Not like it!

How much? Duration? more?

2. Neural Networks

Here is the perfect soup

1. Our brain
2. **Neural Networks**
3. Voice recognizing
4. Final project



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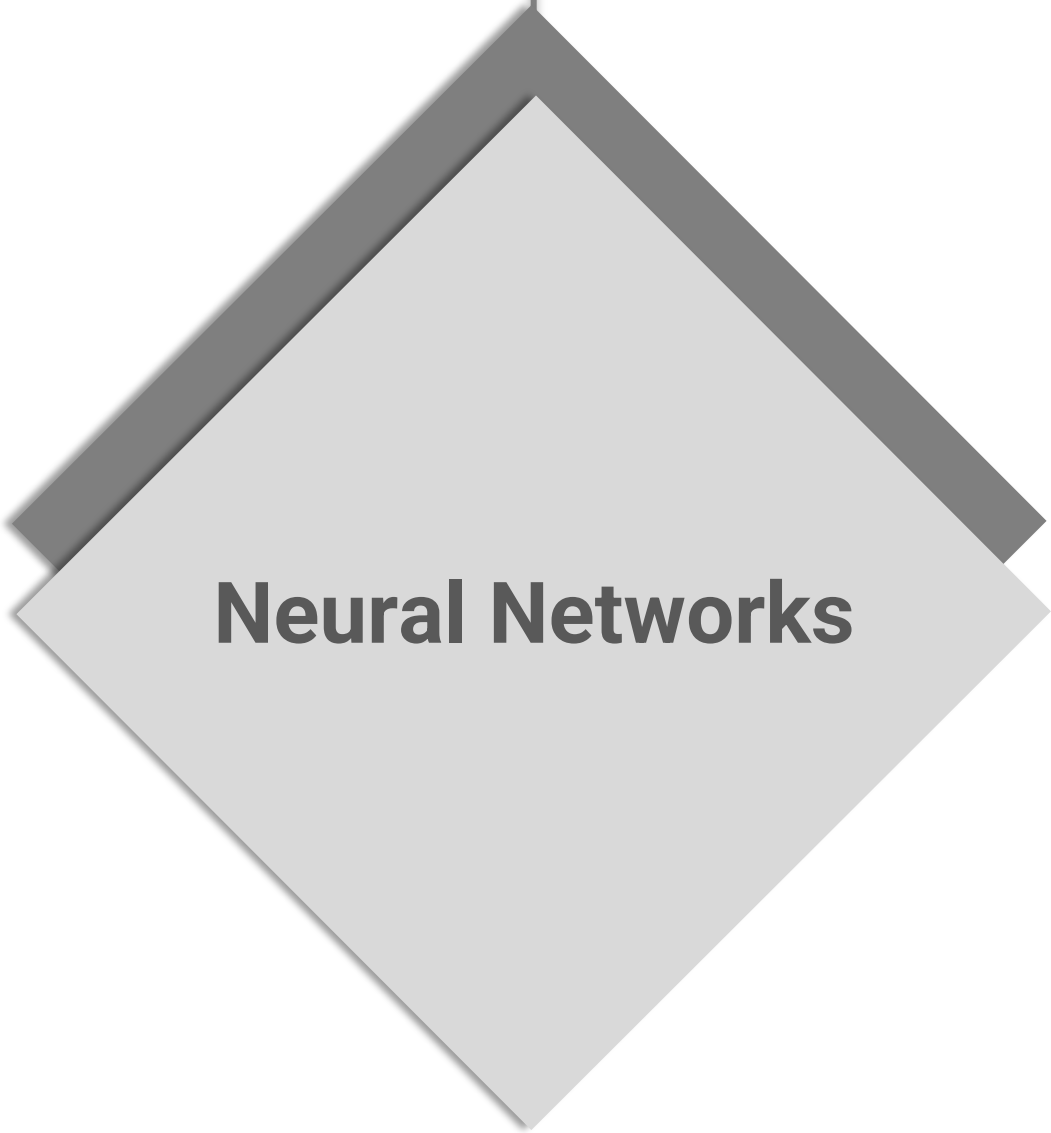

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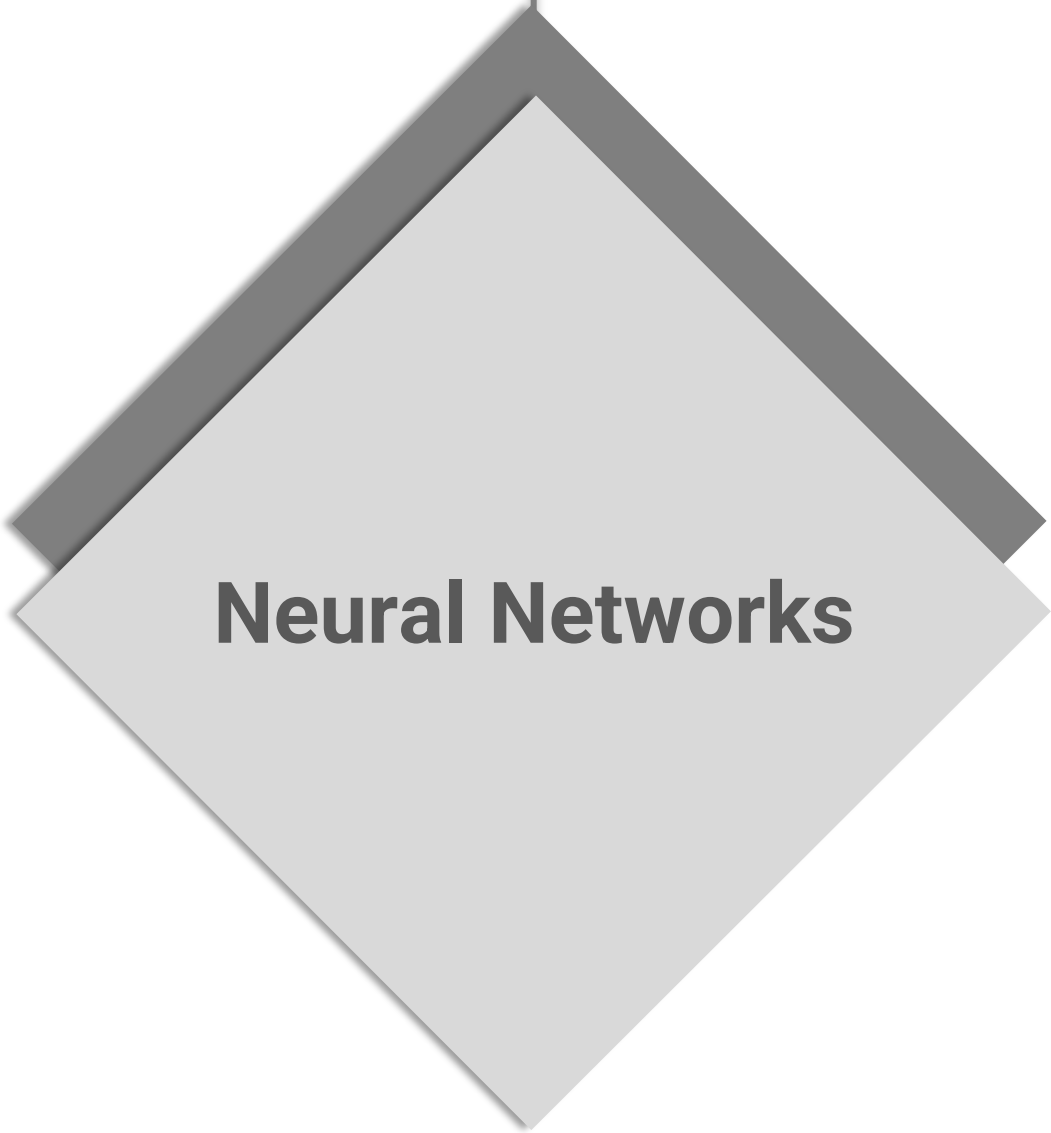
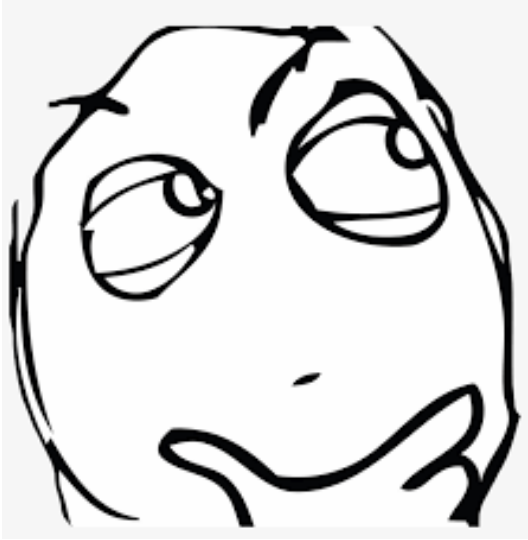


3. Voice recognizing

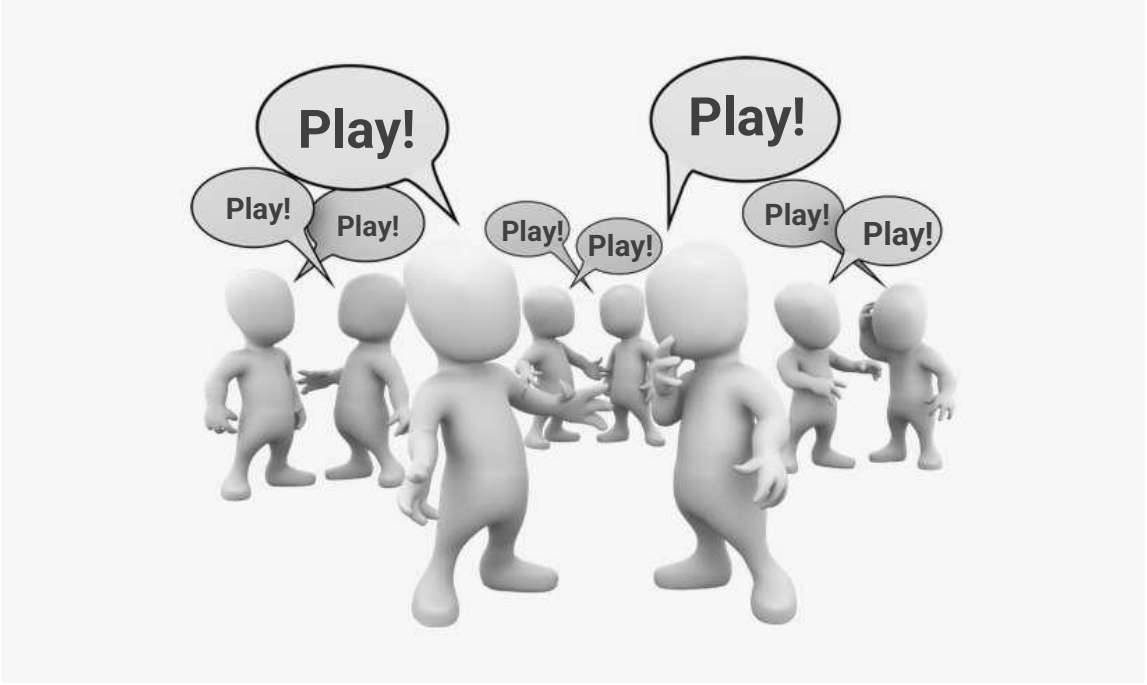
Now that you know how ANN works (ish)

How can AI systems recognize our voice using Artificial neural networks?

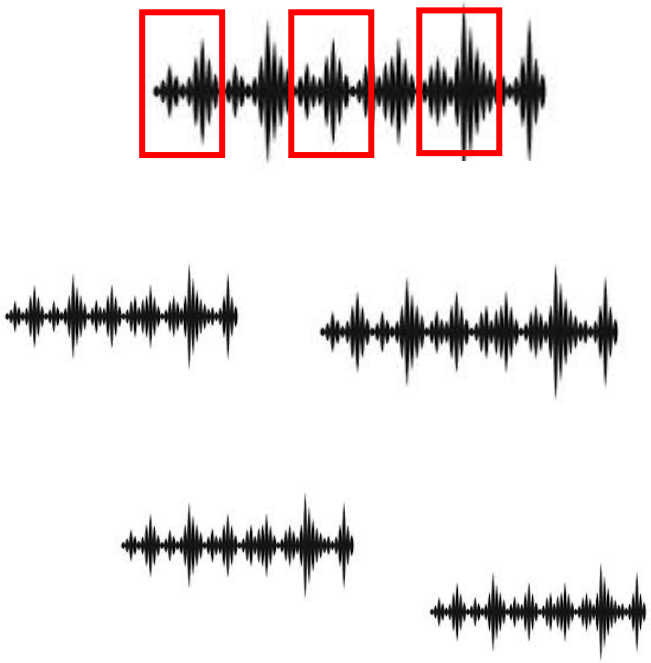


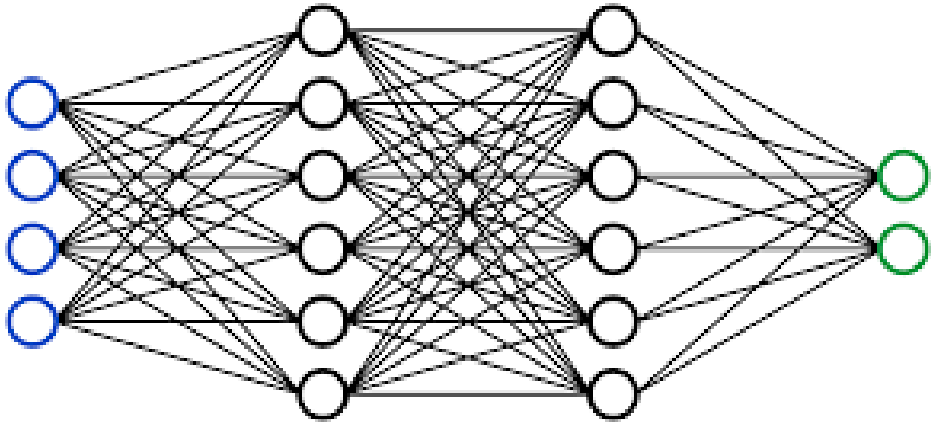
3. Voice recognizing

How can Alexa know when we say “Play” music



3. Voice recognizing





Play

3. Voice recognizing

Do we do this for every single word in the entire world???

3. Voice recognizing

Yes, we do !!!

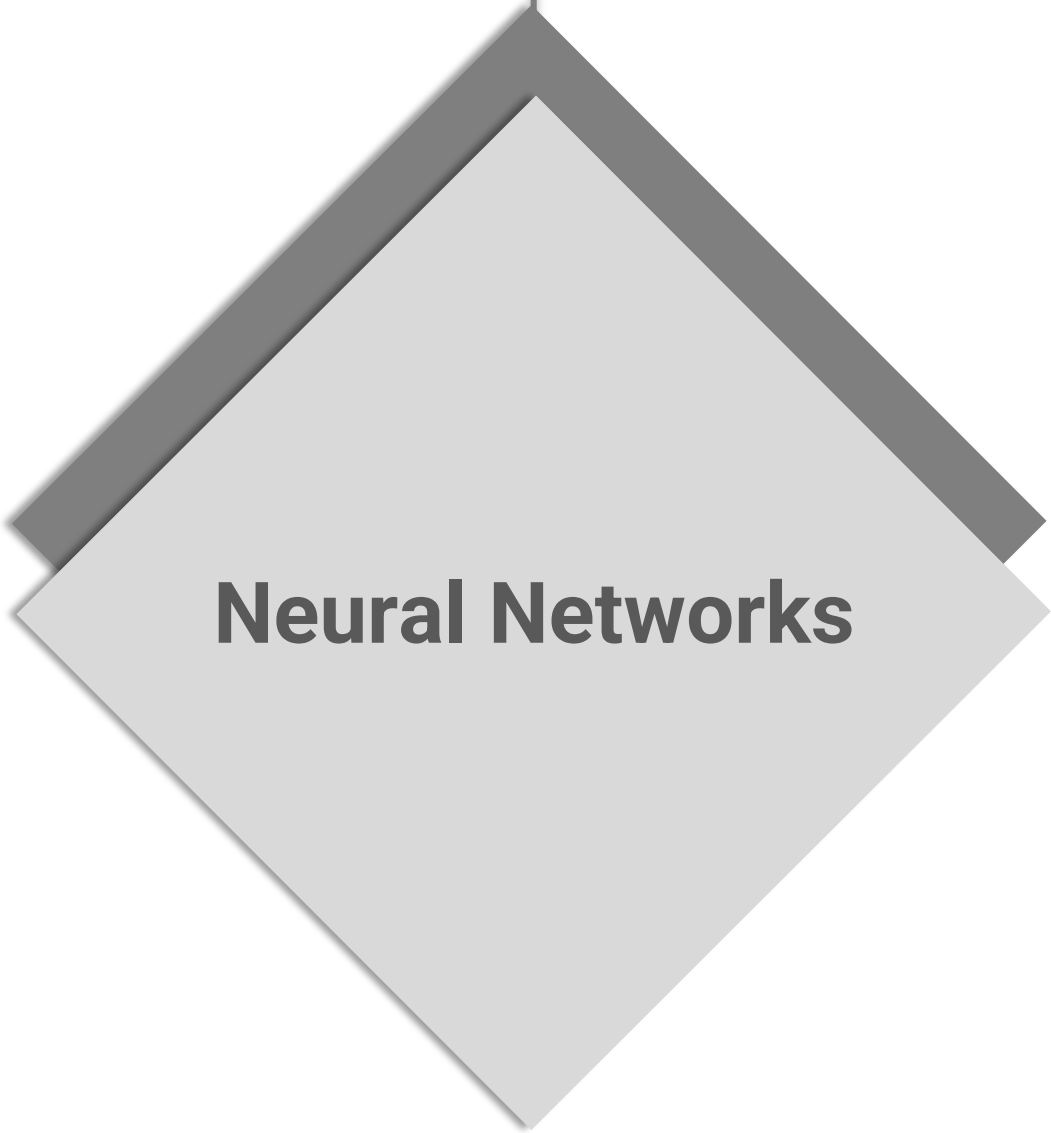
It may take a couple of years for an infant to understand the voices and their meaning

But computers can learn so much faster, maybe in a couple of days!

3. Voice recognizing

But computers can learn so much faster,
maybe in a couple of days!

1. Our brain
2. Neural Networks
3. **Voice recognizing**
4. Final project



1. Our brain
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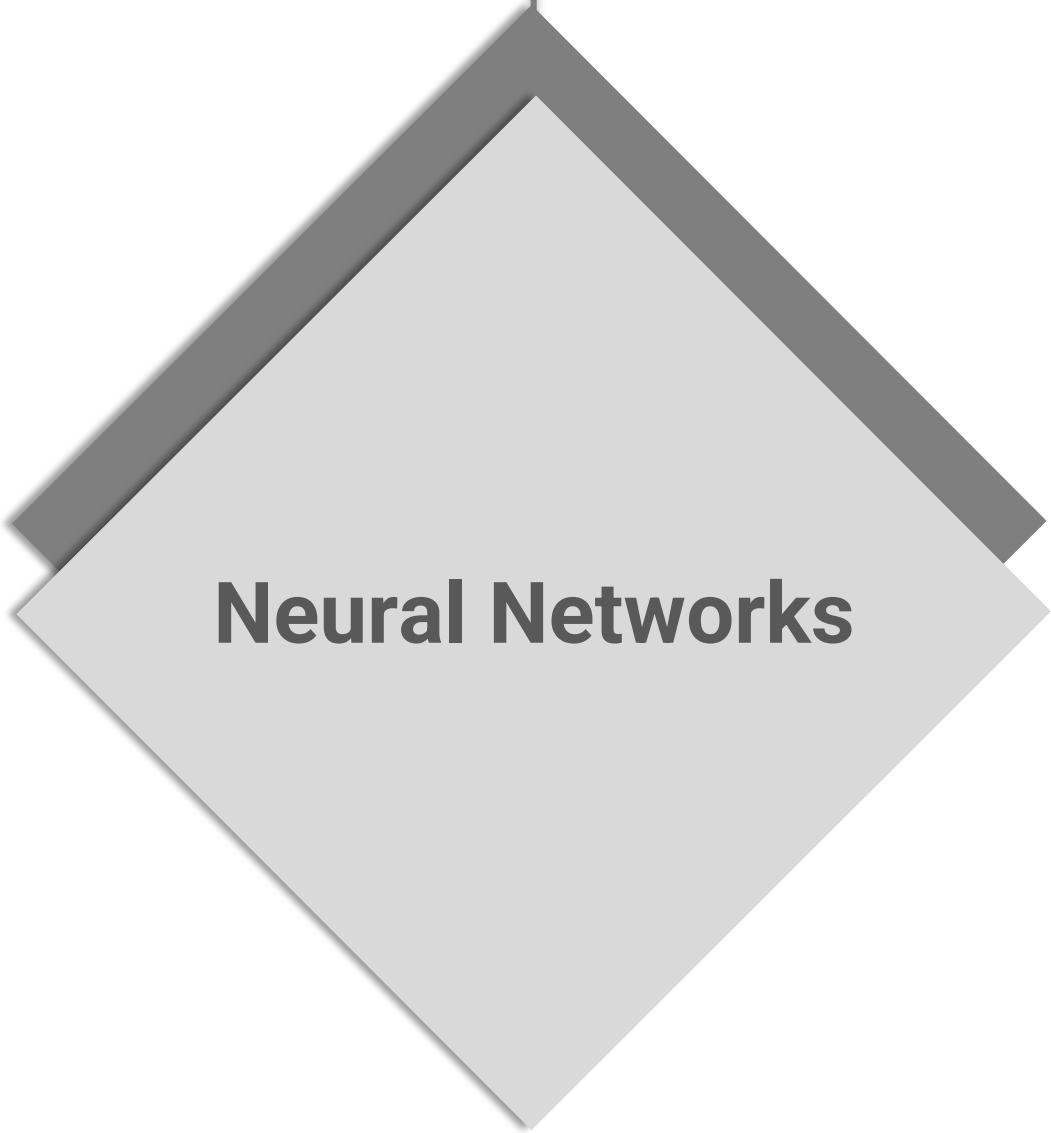
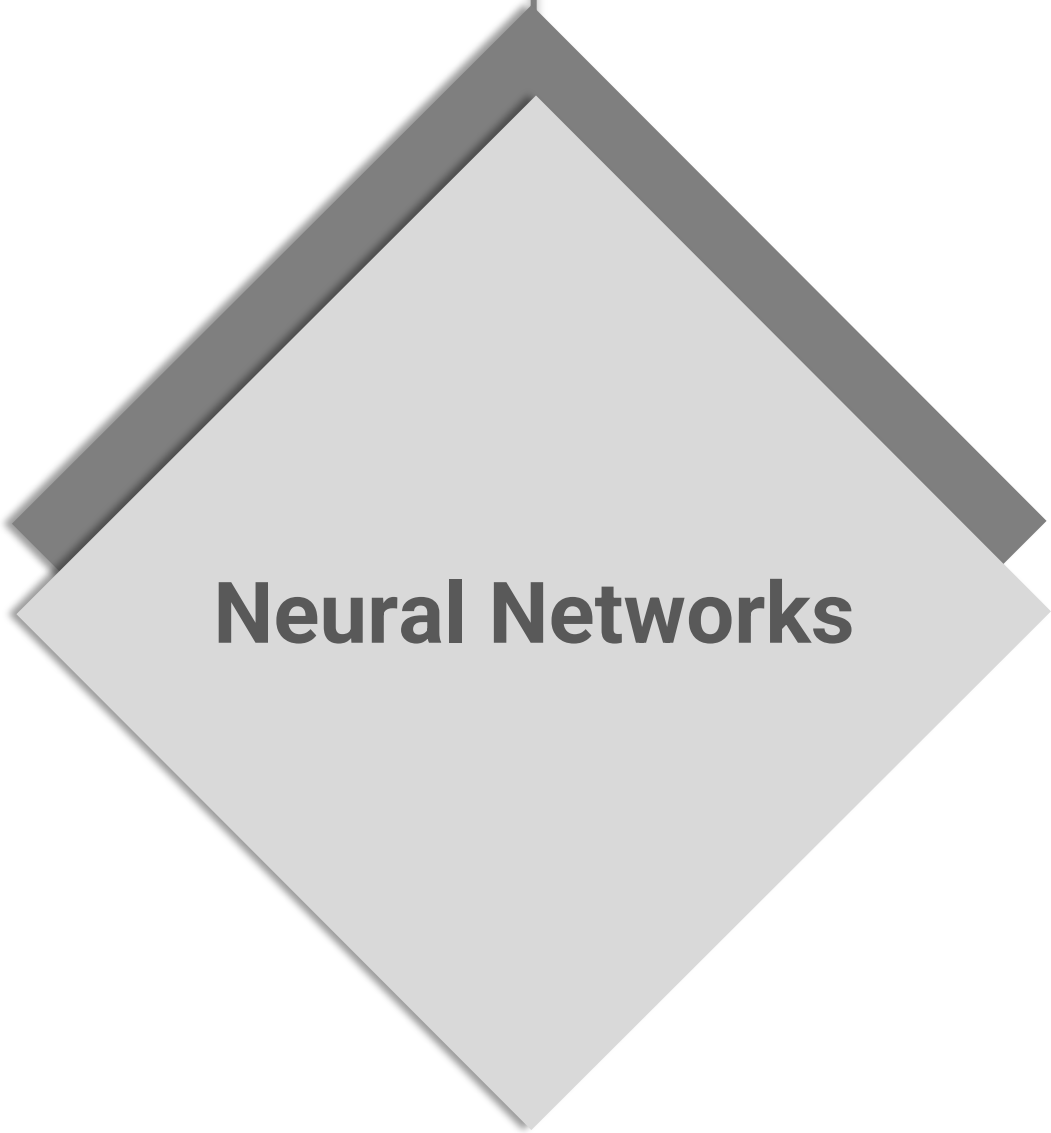


1. Our brain
2. Neural Networks
3. Voice recognizing
4. **Final project**



4. Final project

Virtual Voice Assistant (Alexa)

We will call it Alex

4. Final project

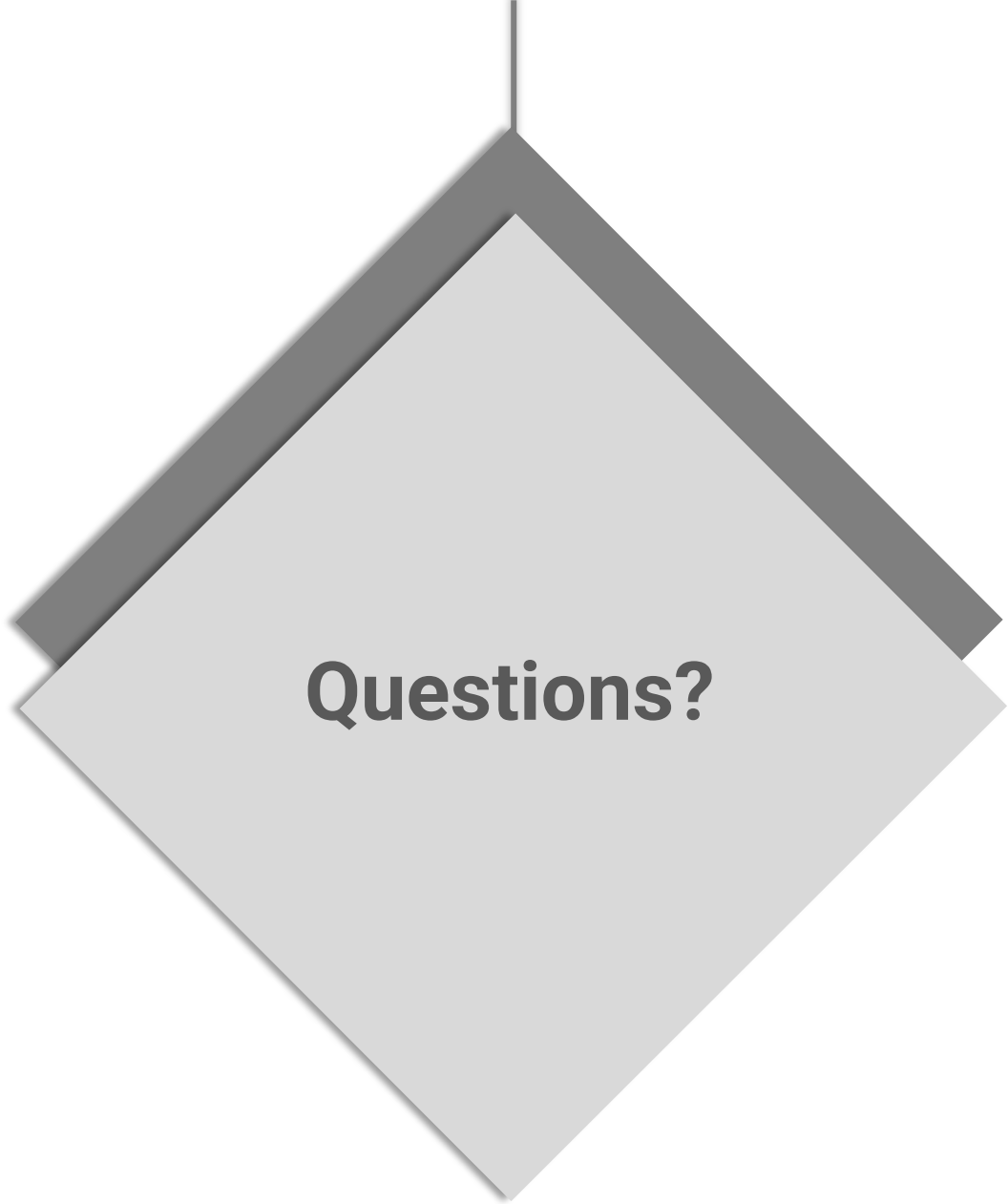
What we want to do:

- Able to listen to us and take commands
- Able to talk to us and gives us answers
- Able to play music
- Able to give us the time
- Able to give us some basic information like Wikipedia
- Able to search something in google or youtube
- Able to tell us some Dad jokes
- What more? Think about it add it to your own project

4. Final project

What we will learn:

- Functions
- Some cool libraries in python
- How to implement a program in higher level
- The combination of rule-based AI and deep learning



Homework

- Install the Pycharm community edition on your computers for the project, I'll send YouTube videos that show you how. Send me an email in case of any questions.
- Next week, we will have an exam about what we have learned through this course, so be prepared for that. Don't worry, it will be easy and everything you need is in the slides or in your mind! So, review the slides and ask questions if needed.
  - Rule-based AI and Machine learning (not neural networks)
- Considering what we learned from "stroke prediction" project. What should the data look like if we want to teach an AI to learn how to recognize words? What should we consider in the case of the data?