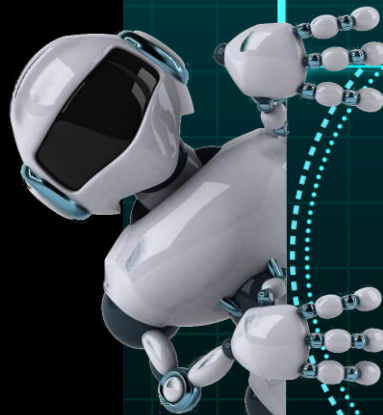


# Aplicações de Processamento De Imagens



**Prof. Dr. Diego Renan Bruno**

Education Tech Lead na DIO

Doutor em Robótica e *Machine Learning* pelo ICMC-USP

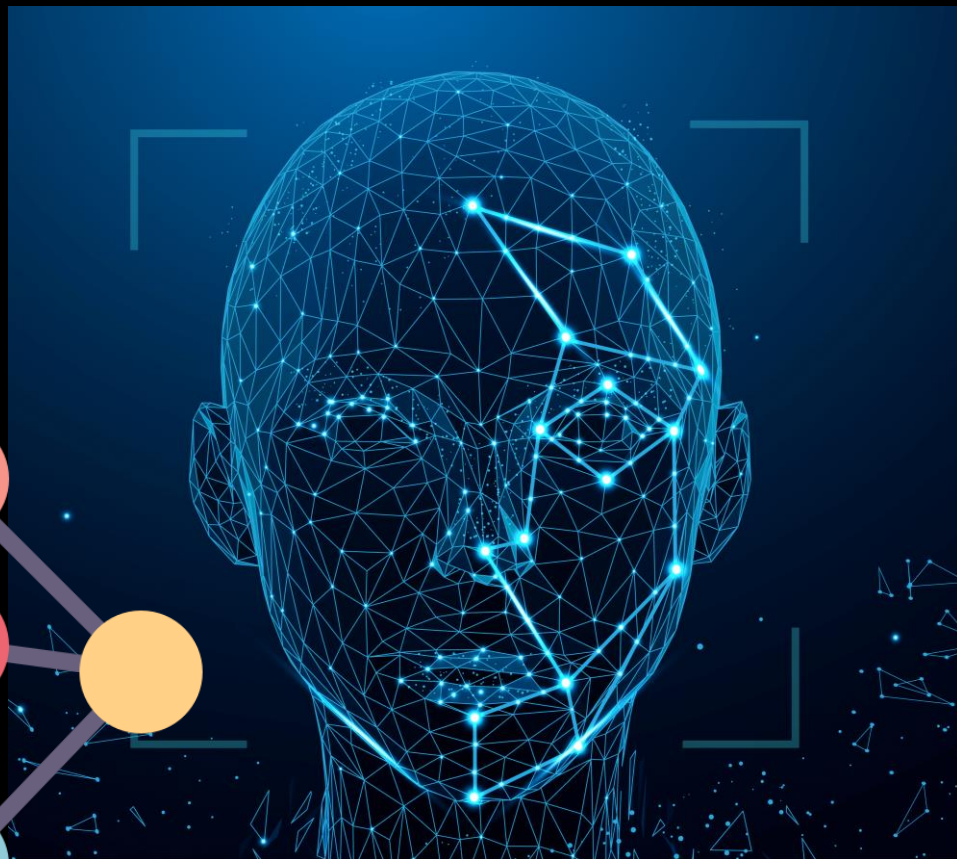


**MACHINE  
LEARNING  
DAY**



# Detecção e Reconhecimento Facial com **Deep Learning**

**Machine Learning**



# O mundo da IA...

IA Geral



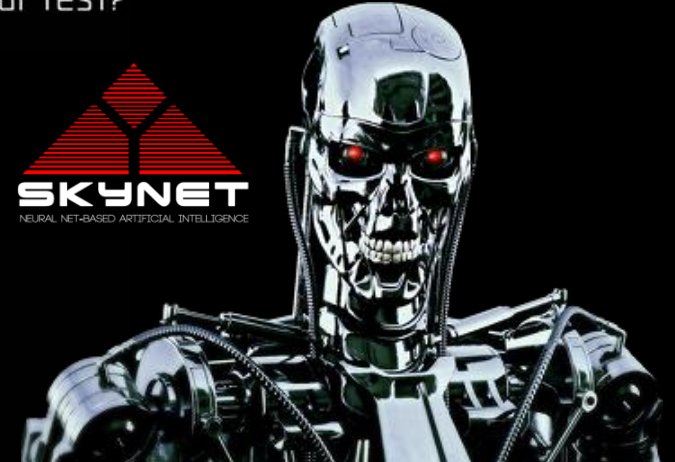
IA Restrita



*Machine Learning*

ex machina

WHAT HAPPENS TO ME IF I FAIL YOUR TEST?



# O que é Visão Computacional?



Sensoriamento:  
Imagens



Processamento  
De Imagens



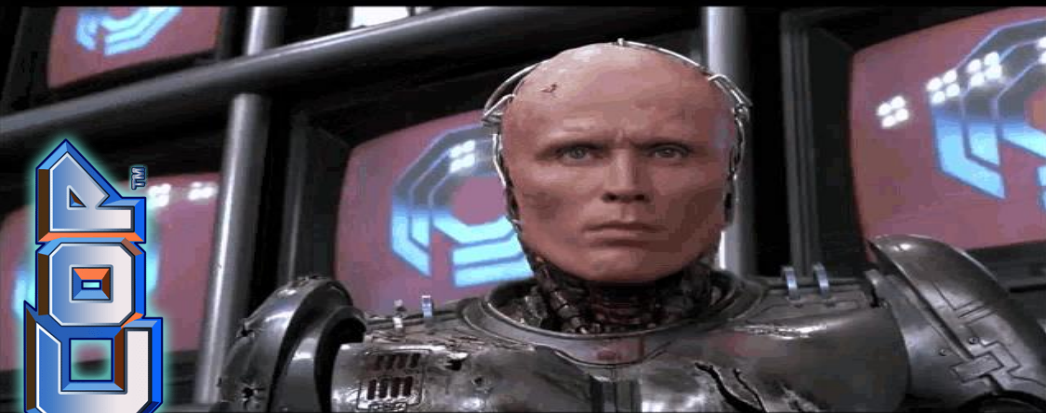
Análise: *Machine Learning*



- road
- sidewalk
- building
- wall
- fence
- pole
- traffic light
- traffic sign
- vegetation
- terrain
- sky
- person
- rider
- car
- truck
- bus
- train
- motorcycle
- bicycle



# Reconhecimento de Pessoas



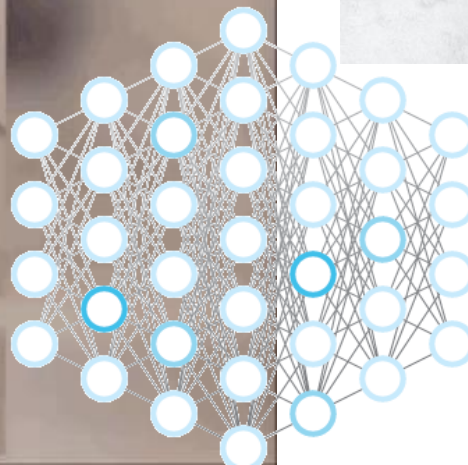
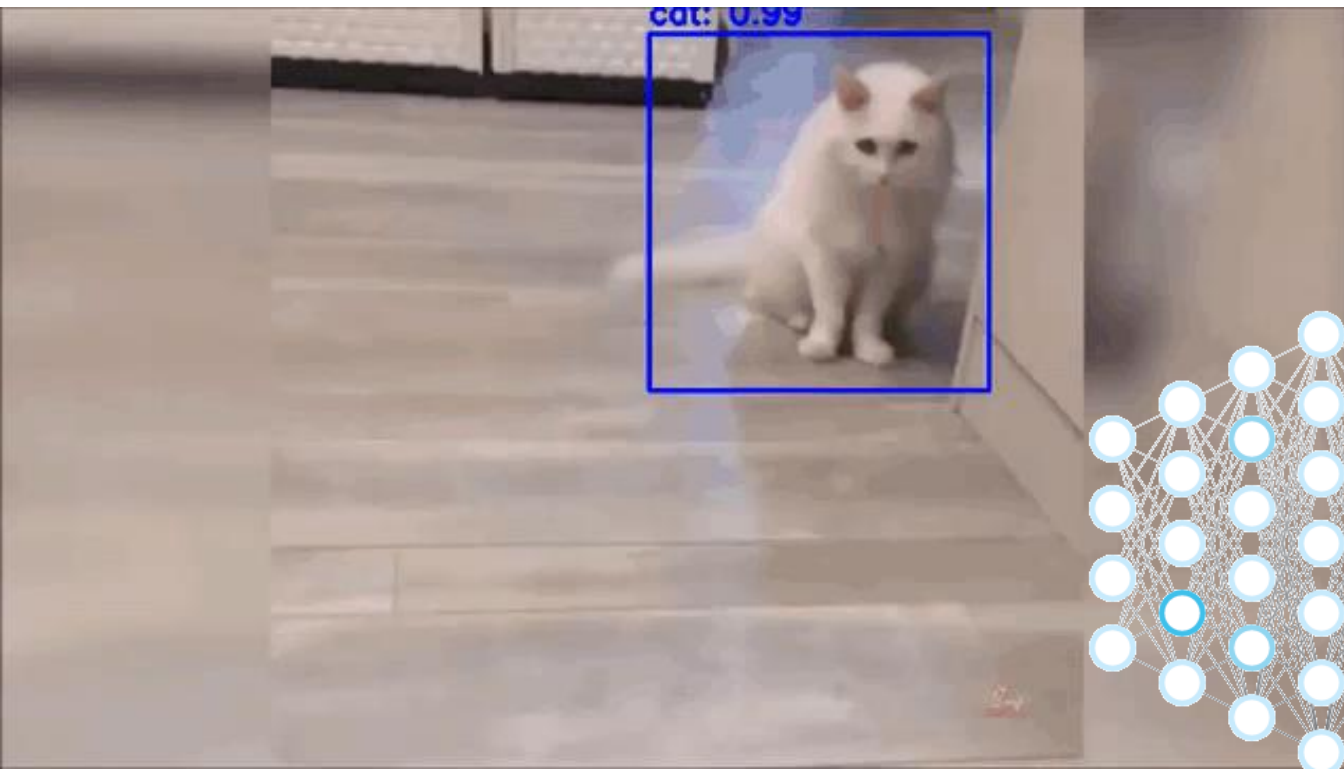
# Posicionamento da câmera

Posição da captura da imagem:



# Detecção em imagens

→ Detecção de objetos:



# Detecção em imagens

→ Detecção de objetos:

**Classification**



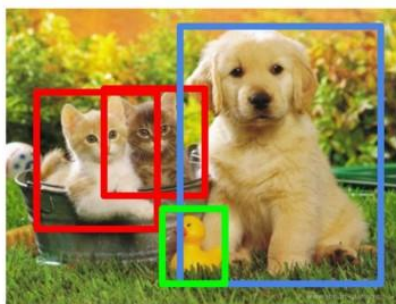
CAT

**Classification  
+ Localization**



CAT

**Object Detection**



CAT, DOG, DUCK

**Instance  
Segmentation**



CAT, DOG, DUCK

Single object

Multiple objects





# Detecção de objetos em imagens

→ O objeto deve ser detectado e classificado:



**FACE RECOGNITION IS UNDER WAY...**

# Extração de *Features* da face humana



Imagem Original

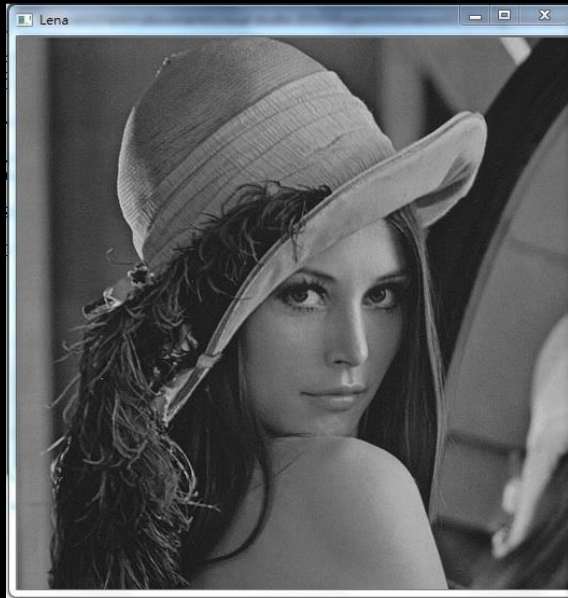
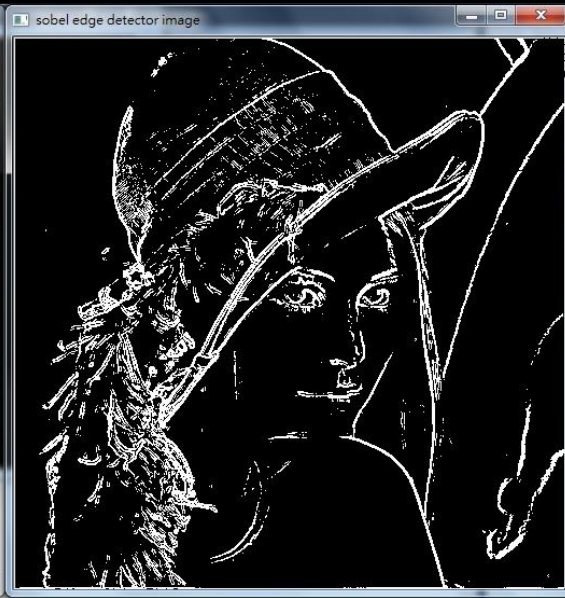


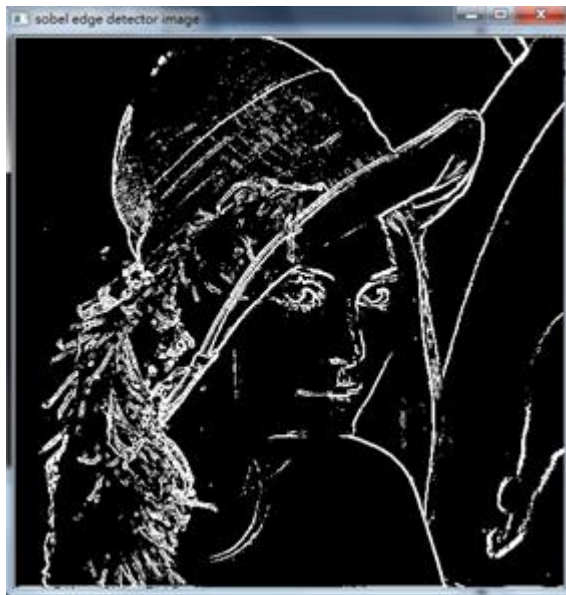
Imagem em tons de cinza



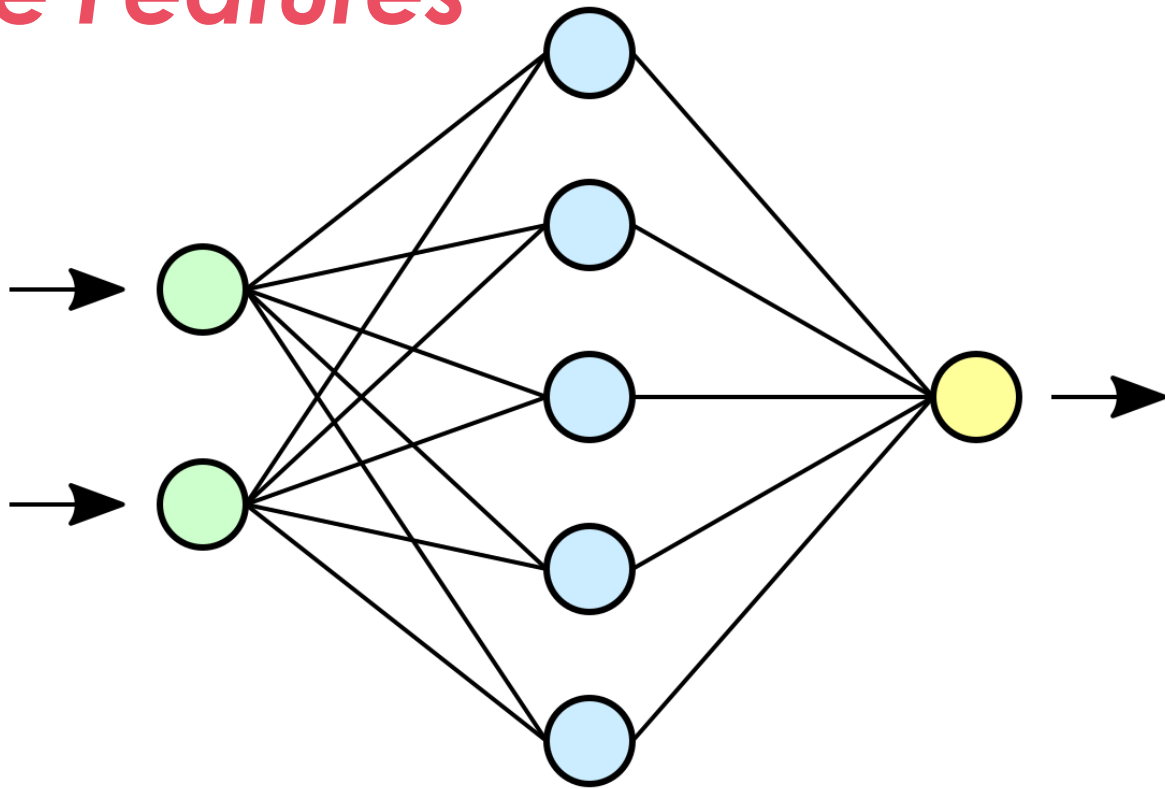
Deteccção de bordas

# Extração de *Features*

→ Filtro de bordas:



*Features*

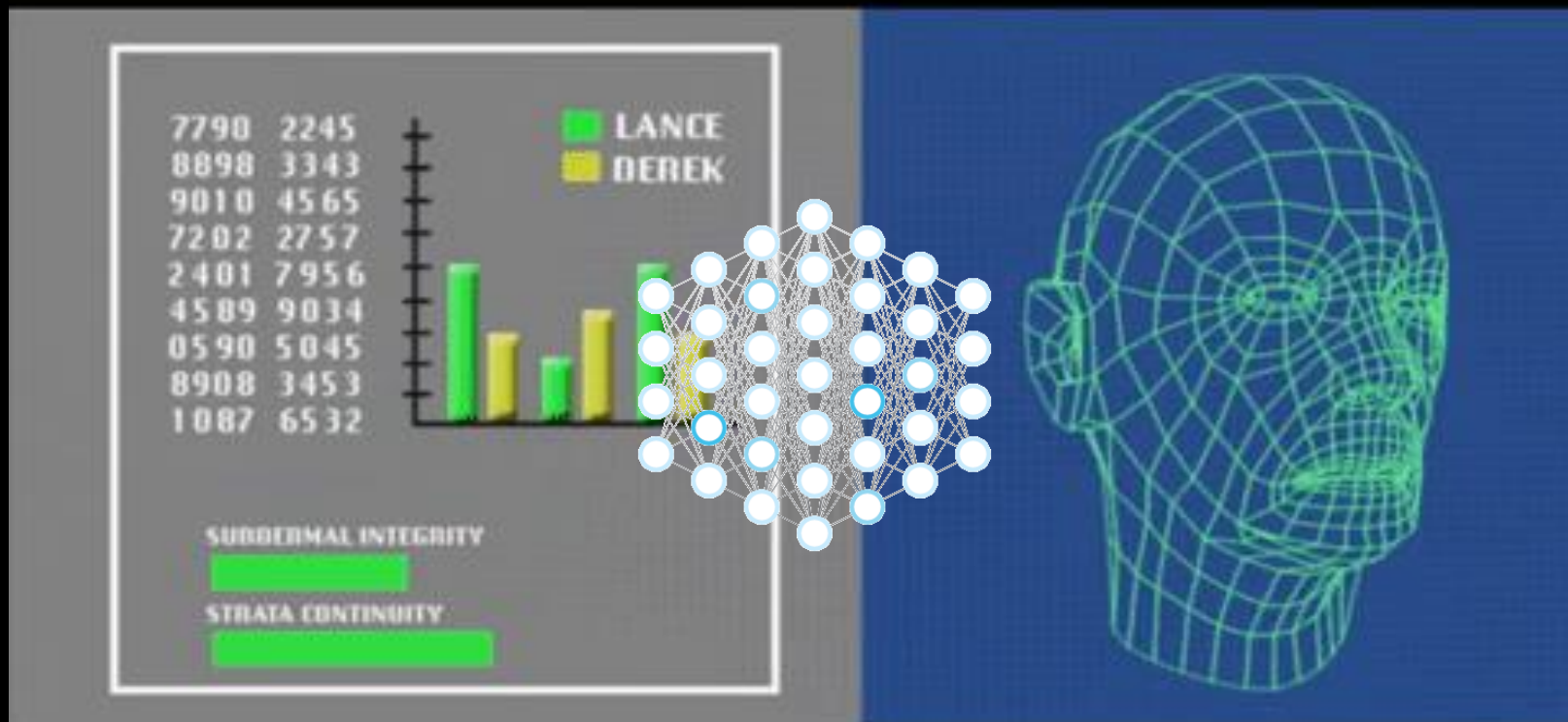


Classificação



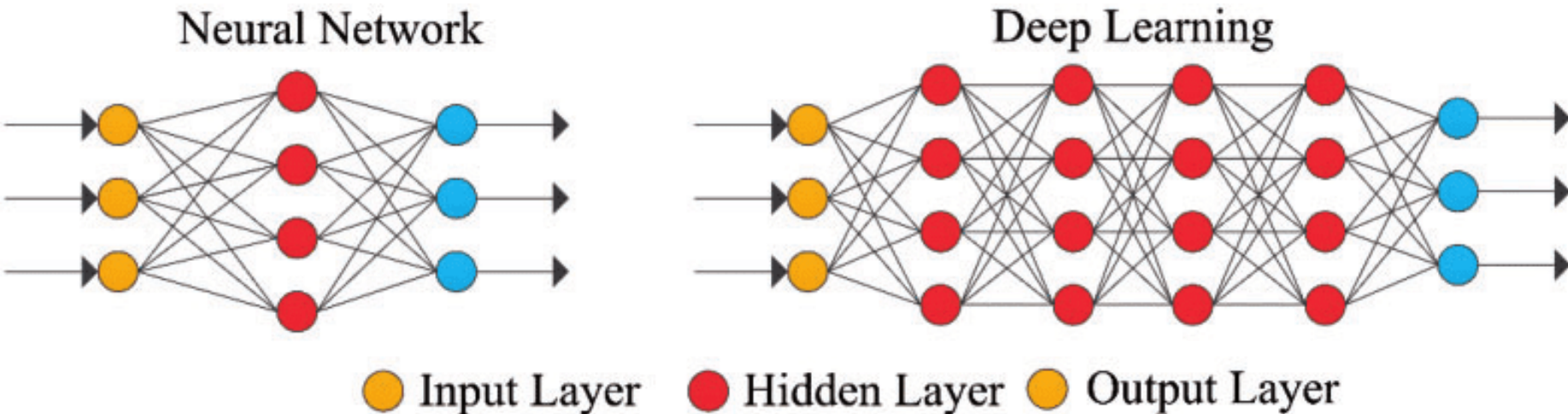
# Extração de *Features* da face humana

## Atualmente com redes de *Deep Learning*



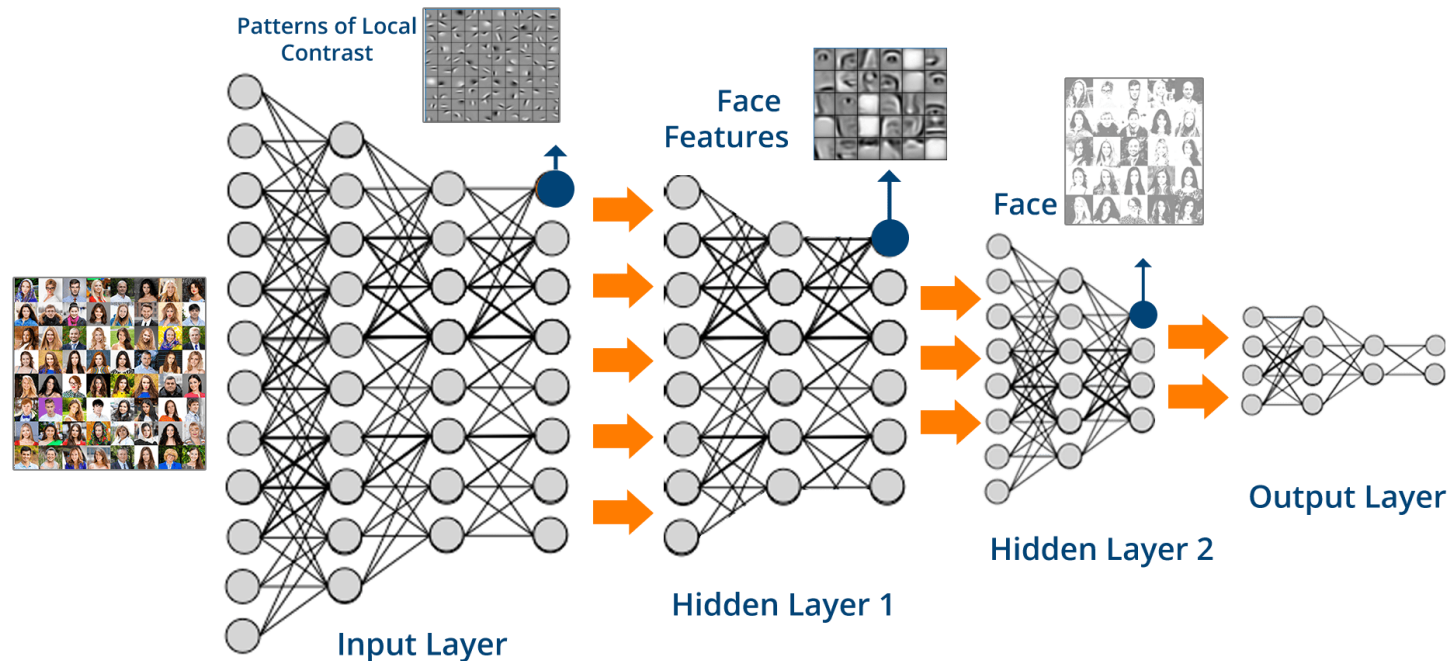
# Aprendizado com *Deep Learning*

→ Extração de *features* automática:



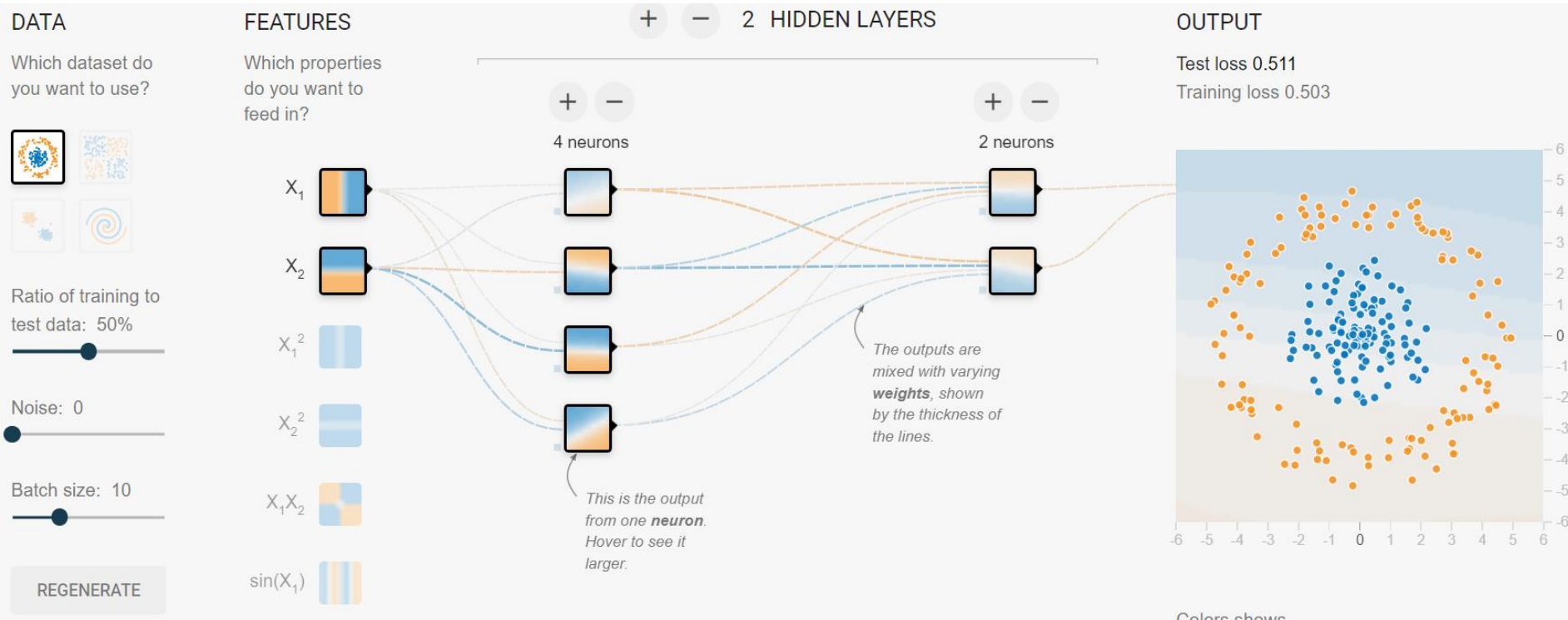
# Aprendizado com *Deep Learning*

→ Extração de *features* automática:



# Playground TensorFlow

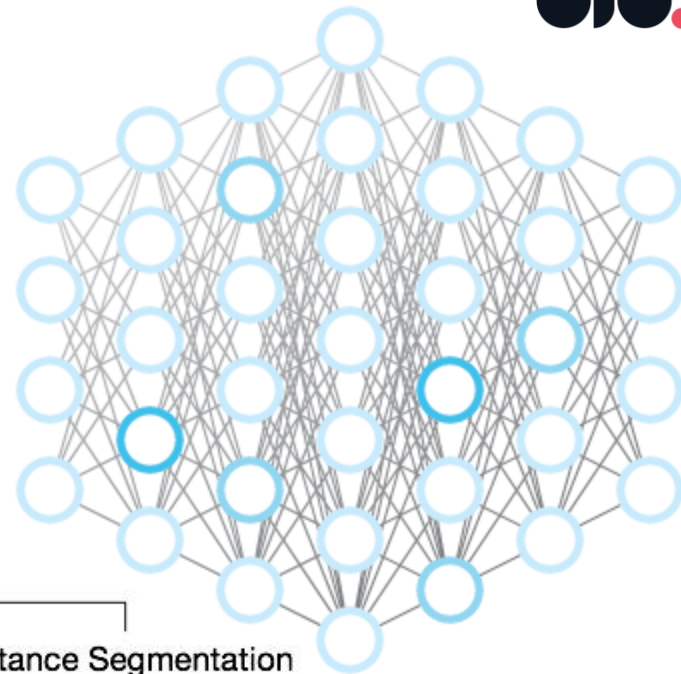
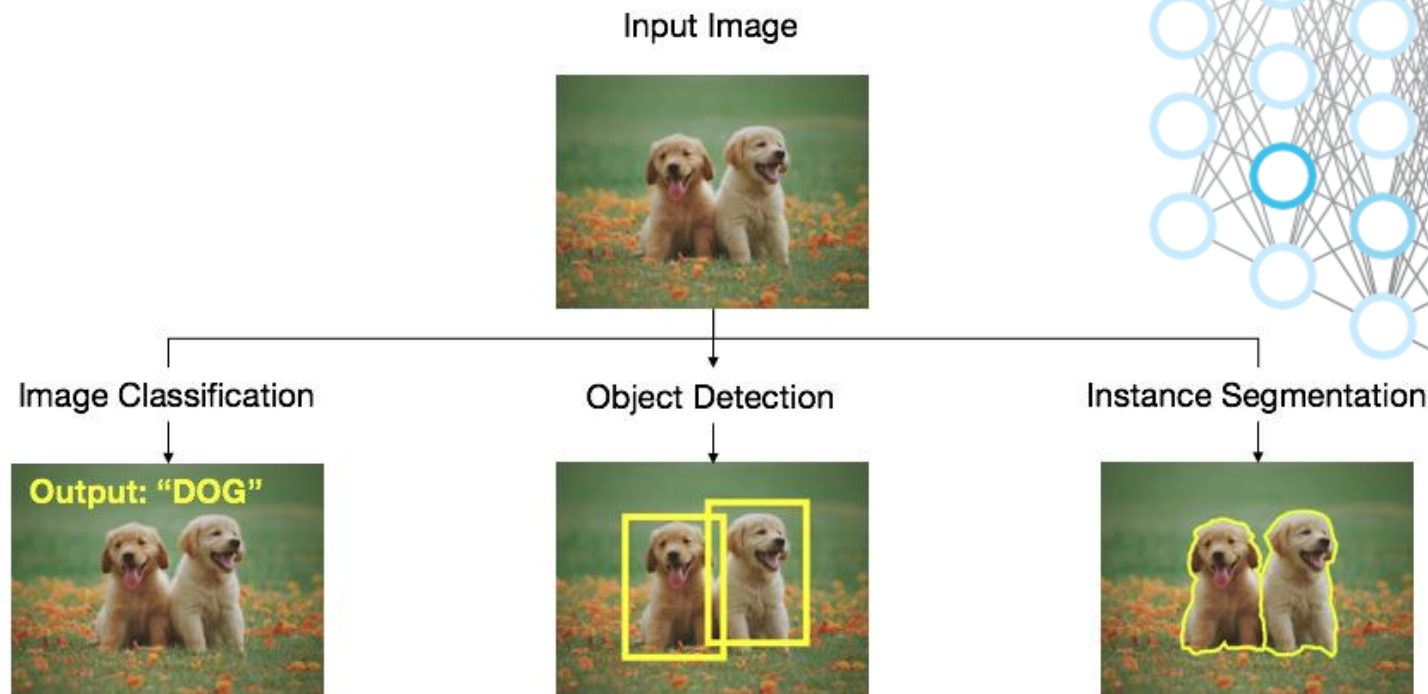
→ Estruturas de Redes de *Deep Learning*:





# Detecção em imagens

→ Detecção de objetos:



→ Detecção

→ Classificação



**Vamos aprender a detectar e reconhecer faces humanas...**

# Detecção de imagens

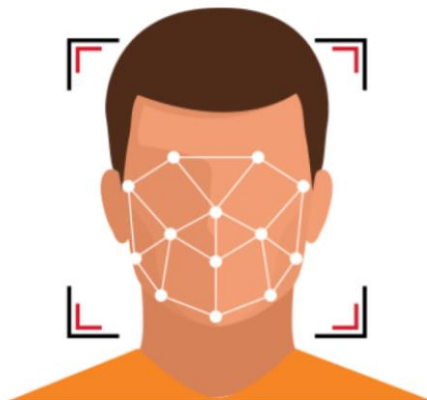
People with no idea about AI, telling me my AI will destroy the world

Me wondering why my neural network is classifying a cat as a dog..



# Como criar o *Dataset*?

→ Criando sua base de dados:





# Base de dados: Curiosidades

→ Rotulação de objetos:



# Base de dados: Curiosidades

→ Rotulação de objetos:



# Nosso projeto:

Deteccão e Reconhecimento facial:

- <https://colab.research.google.com/drive/13vgWfO1K87yCKgF-GKxXXuVTJr4l9fjf#scrollTo=Q3FhshNYIIEE>
- <https://colab.research.google.com/drive/1jrhq8hFLg3uxXfXuYU7U8Jp8qQdfe9F9>
- <https://pyimagesearch.com/2018/06/18/face-recognition-with-opencv-python-and-deep-learning/>

# Obrigado!

*Machine Learning*

Prof. Dr. Diego Bruno

