

Machine Learning 101

By Abdullah Shareef



I'm Abdullah!
CS & Math Major @ Rutgers



HELLO!

**Machine Learning
is the Future.**

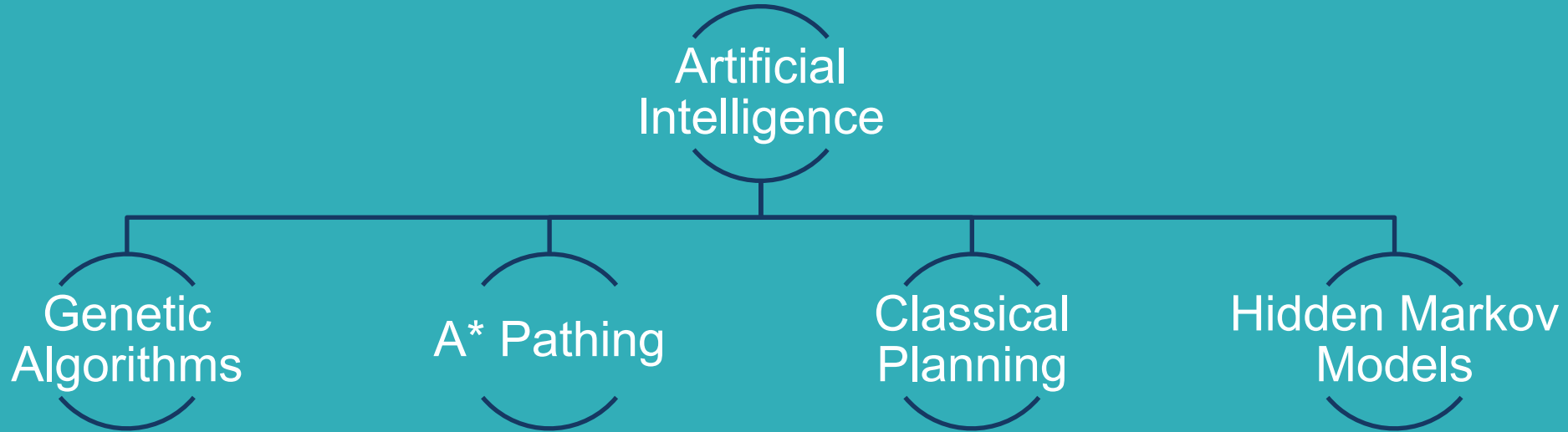




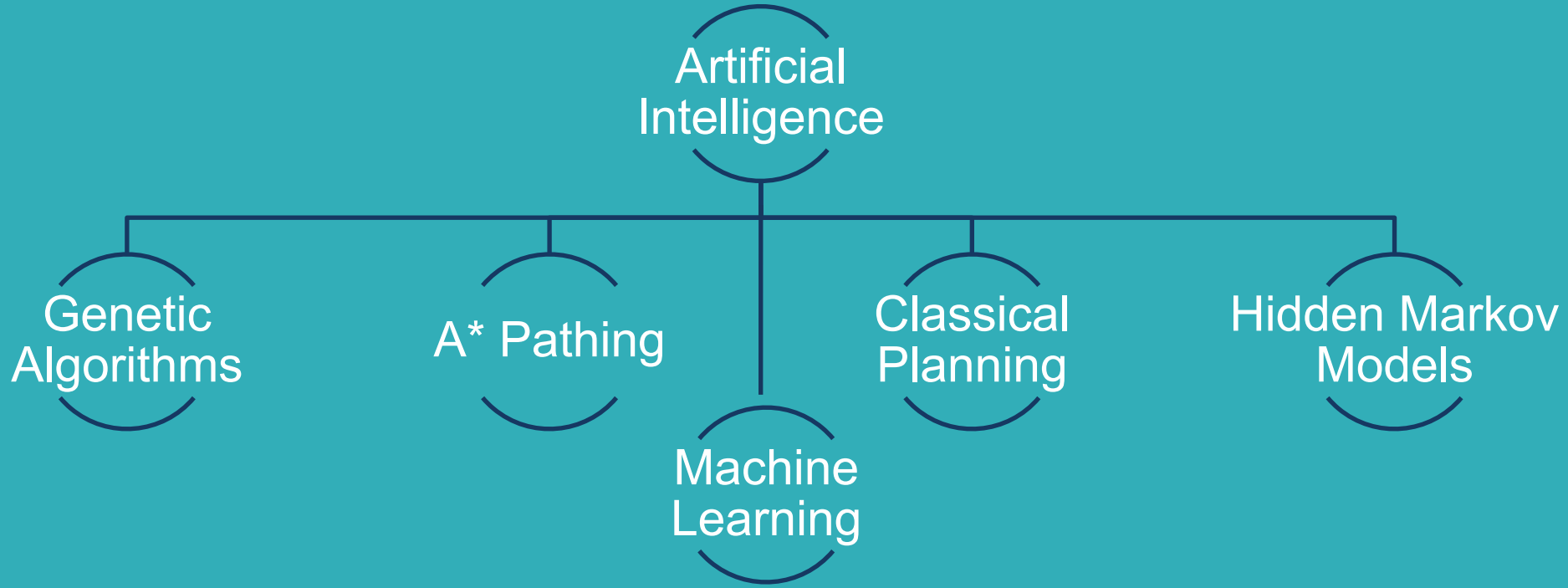
What?

What is Machine Learning?

Artificial Intelligence



Artificial Intelligence



Supervised Learning

Classification

Regression

Unsupervised Learning

Clustering

Feature Extraction

Machine Learning

Machine learning is a field of computer science that gives computer systems the ability to "learn with data, without being explicitly programmed"

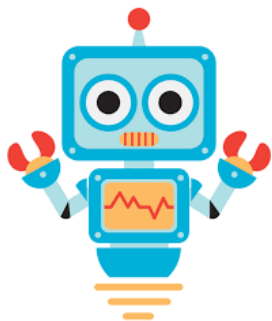
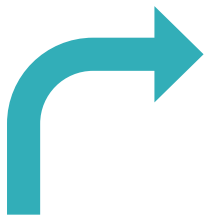




CLUSTERING



CLUSTERING



Dog



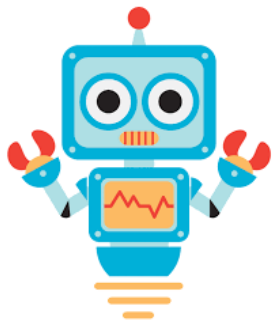
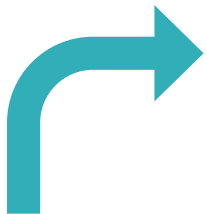
Cat



Horse



CLASSIFICATION



Dog

?



Cat

?

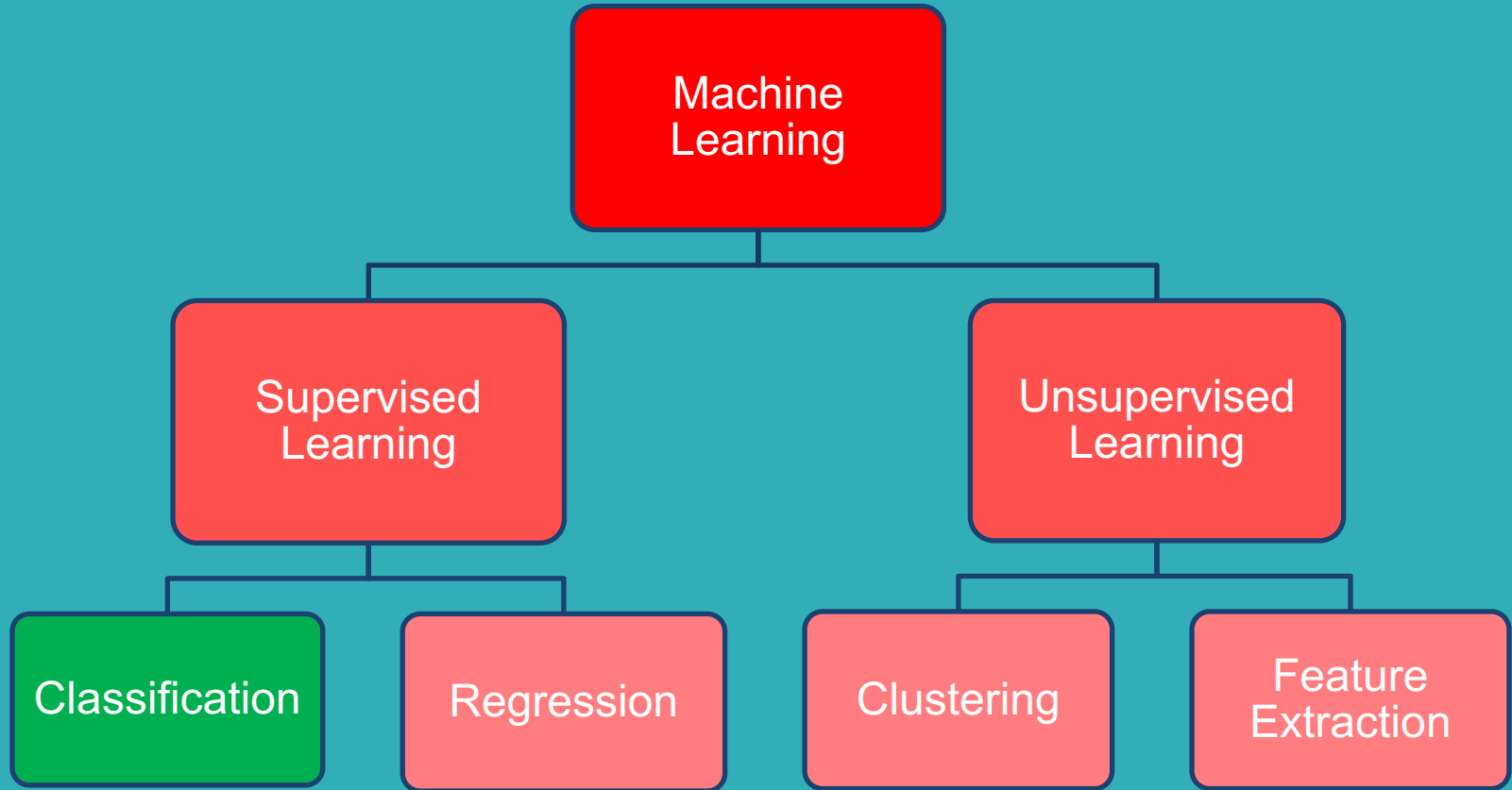


Horse



CLASSIFICATION

Machine Learning



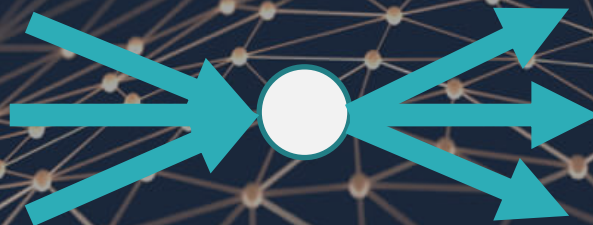


Neural Networks

Neural Networks



Neural Networks

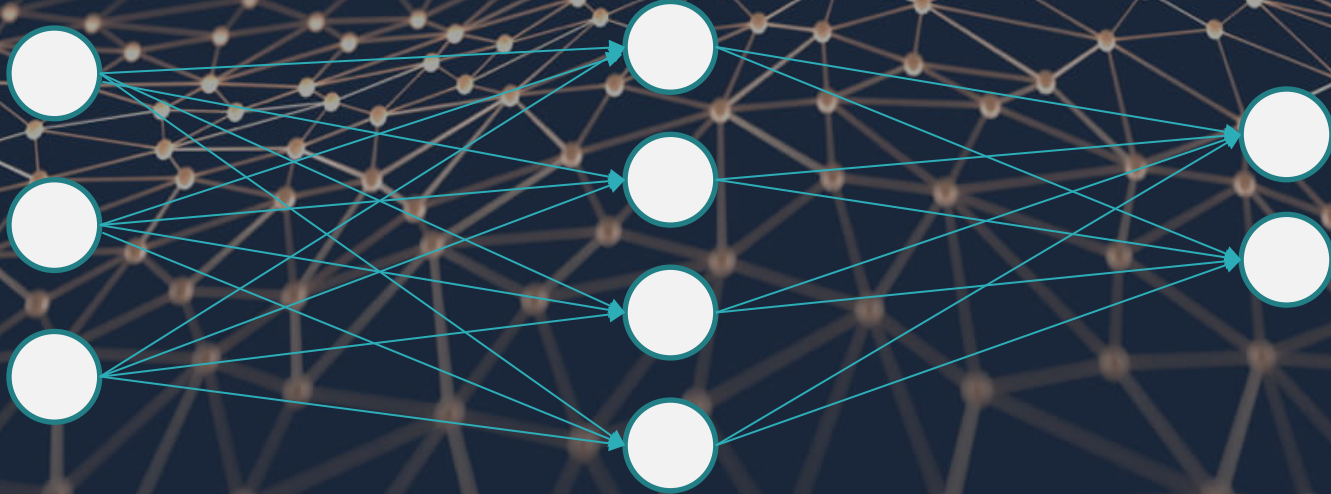


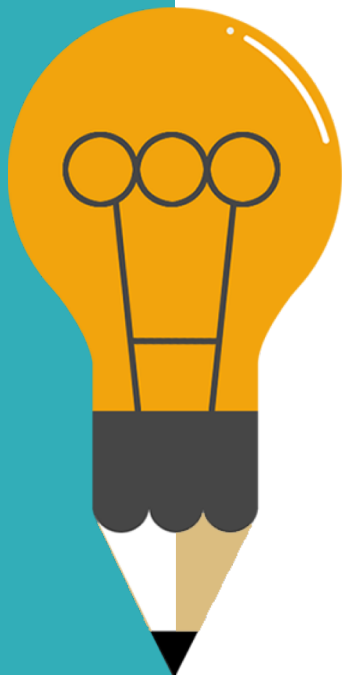
Neural Networks

Inputs

Hidden

Outputs





Neural Networks

- Backfed Input Cell
- Input Cell
- △ Noisy Input Cell
- Hidden Cell
- Probabilistic Hidden Cell
- △ Spiking Hidden Cell
- Output Cell
- Match Input Output Cell
- Recurrent Cell
- Memory Cell
- △ Different Memory Cell
- Kernel
- Convolution or Pool

Perceptron (P)



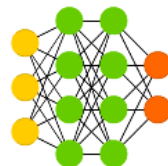
Feed Forward (FF)



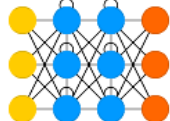
Radial Basis Network (RBF)



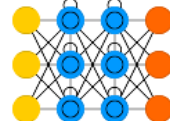
Deep Feed Forward (DFF)



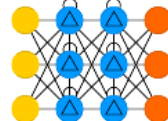
Recurrent Neural Network (RNN)



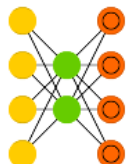
Long / Short Term Memory (LSTM)



Gated Recurrent Unit (GRU)



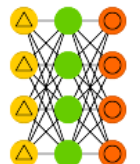
Auto Encoder (AE)



Variational AE (VAE)



Denoising AE (DAE)



Sparse AE (SAE)



Markov Chain (MC)



Hopfield Network (HN)



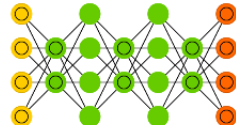
Boltzmann Machine (BM)



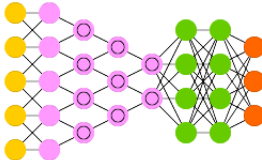
Restricted BM (RBM)



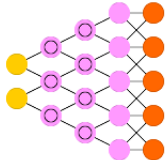
Deep Belief Network (DBN)



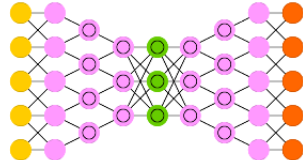
Deep Convolutional Network (DCN)

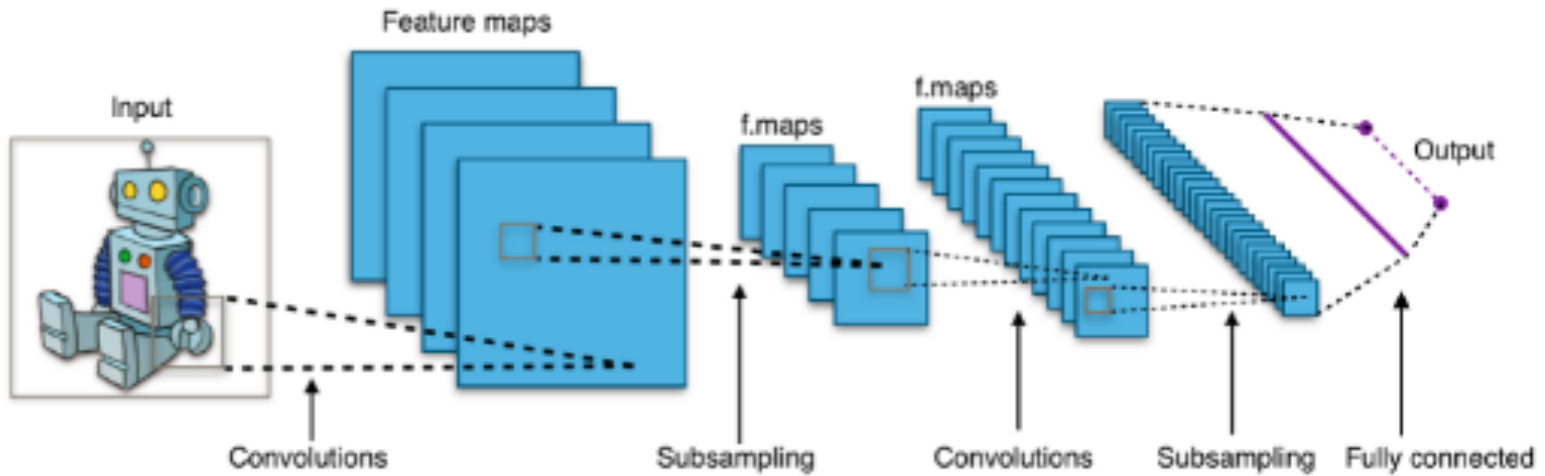


Deconvolutional Network (DN)

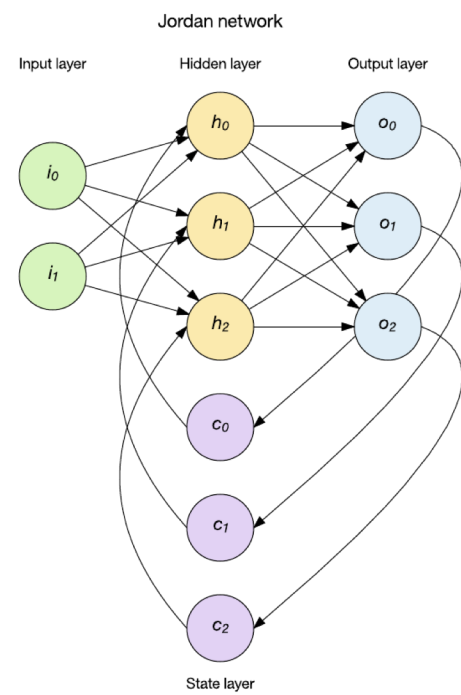
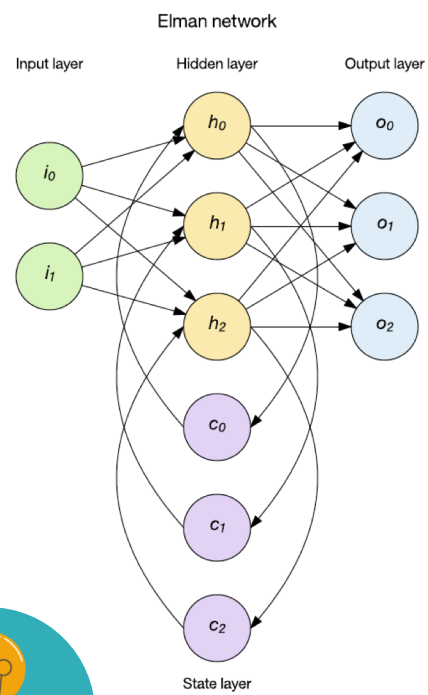
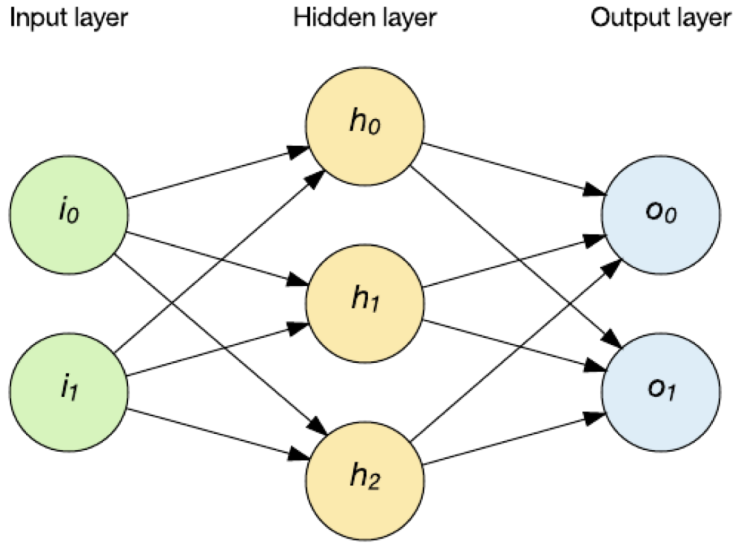


Deep Convolutional Inverse Graphics Network (DCIGN)





Convolutional Neural Network (CNN)



Recurrent Neural Network (RNN)



How?

How does a machine actually learn?

Vector Inputs



Metrics :

- Time Studying
- Height



Time Spent

Height

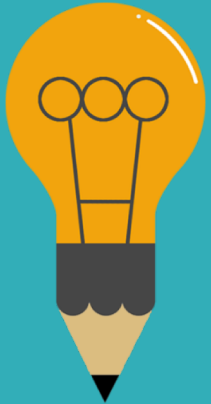
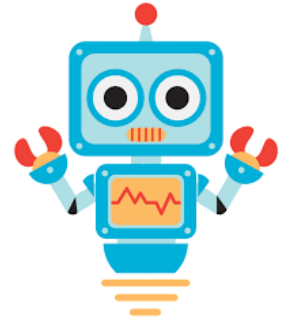
Training Data

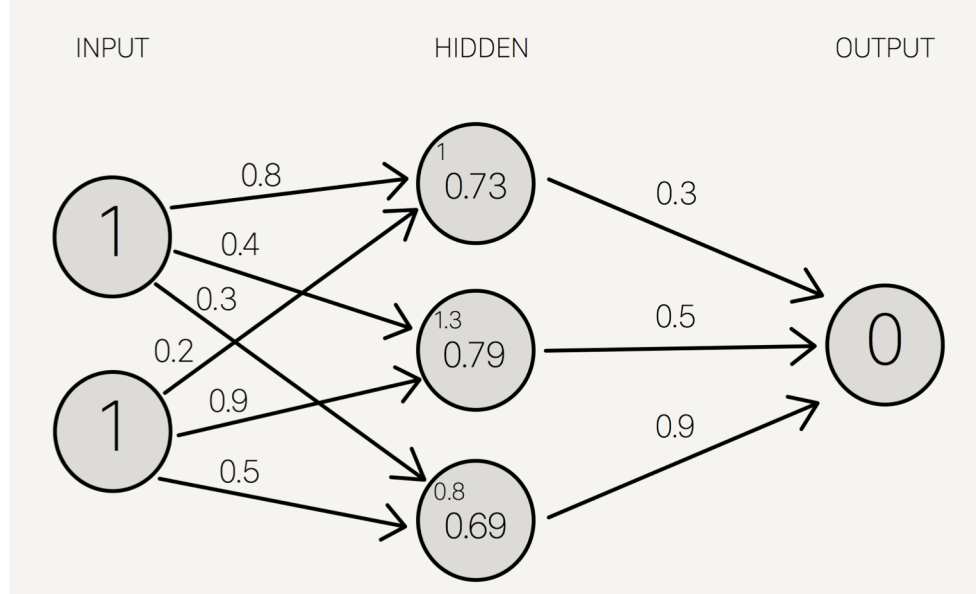
Time Spent
Studying
Height



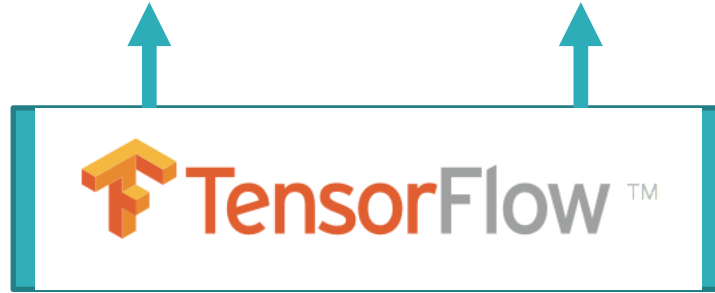
2 weeks
50in

Label : A





FUN MATH!



What are the Buzzy Technology?!

LIVE CODING!!





Thank you

Any Questions?