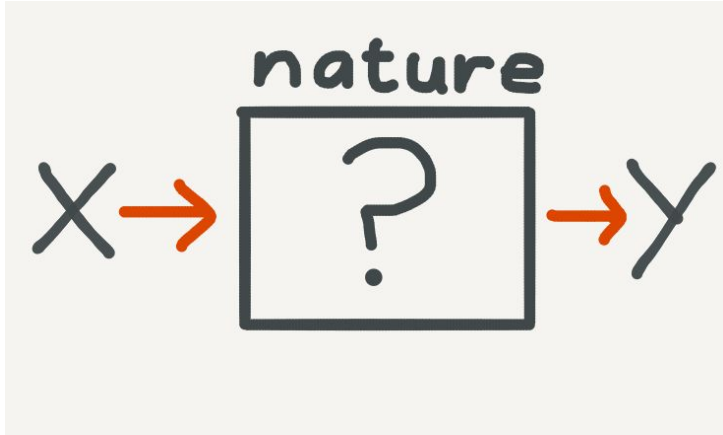


Everything you need  
to know about  
Machine Learning in  
10 minutes

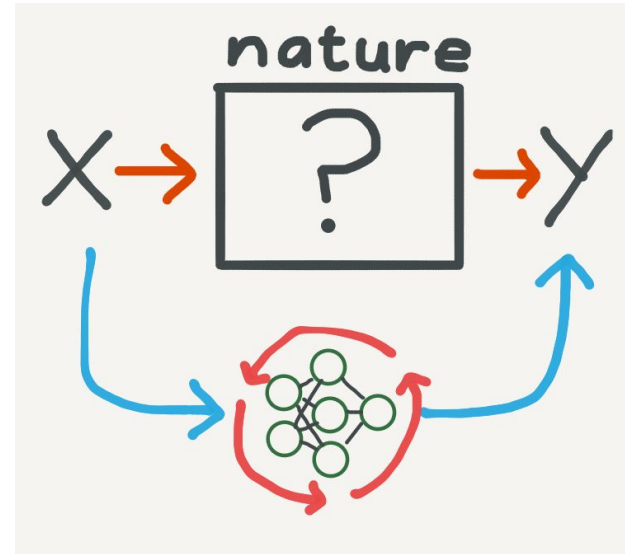
Chris Nemeth (Lancaster)

# Trying to understanding nature

Imagine a simple system with inputs  $X$  and outputs  $Y$ .



*Can we learn the relationship between  $X$  and  $Y$ ?*



# The three pillars of machine learning

**SUPERVISED  
LEARNING**



**UNSUPERVISED  
LEARNING**



**REINFORCEMENT  
LEARNING**



# Supervised Learning

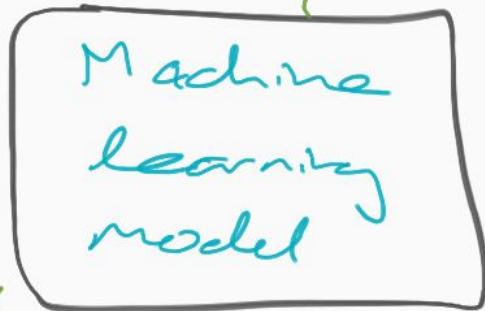
input data



(images)

Labels

oak, birch,  
conifer, ...



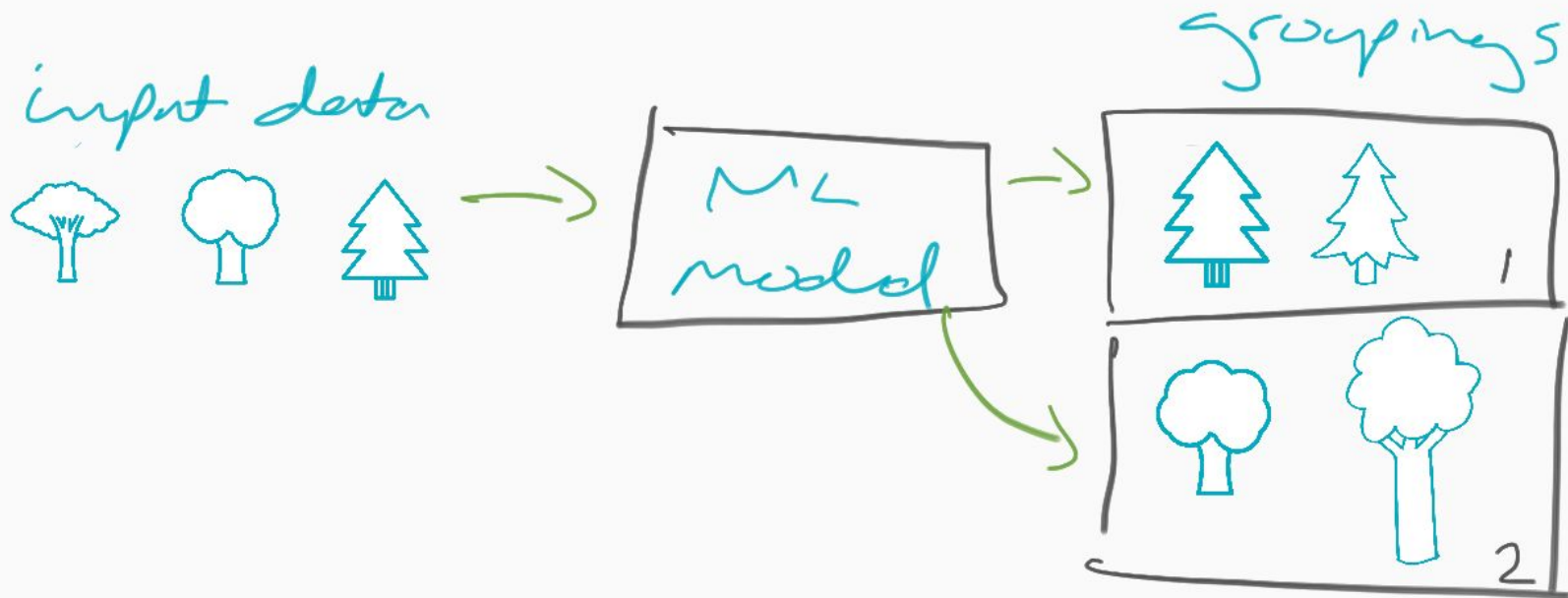
Prediction

This is an  
oak tree

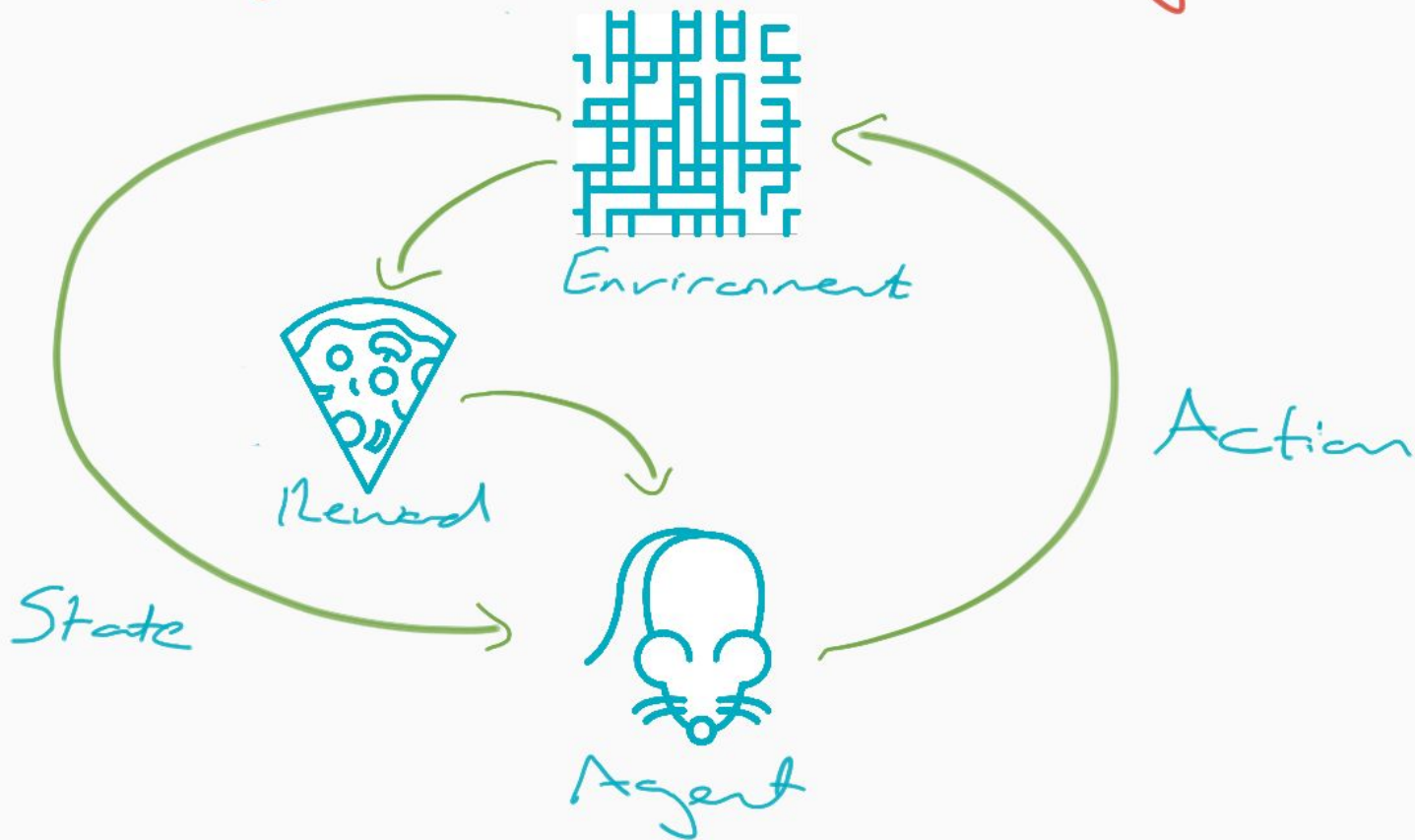
New image



# Unsupervised learning



# Reinforcement learning



# Popular Machine Learning Algorithms

## Supervised learning:

- Linear regression
- Support vector machines
- Random forests
- Neural networks

## Unsupervised learning:

- K-means clustering
- Principal component analysis
- Autoencoders

## Reinforcement learning:

- Q-Learning
- Policy optimisation
- Actor-Critic models

## Final thoughts:

- Lots of algorithms available - which one suits your problem?
- Machine learning *cheat sheets* can help you decide which algorithm you should use.



# Microsoft Azure Machine Learning: Algorithm Cheat Sheet

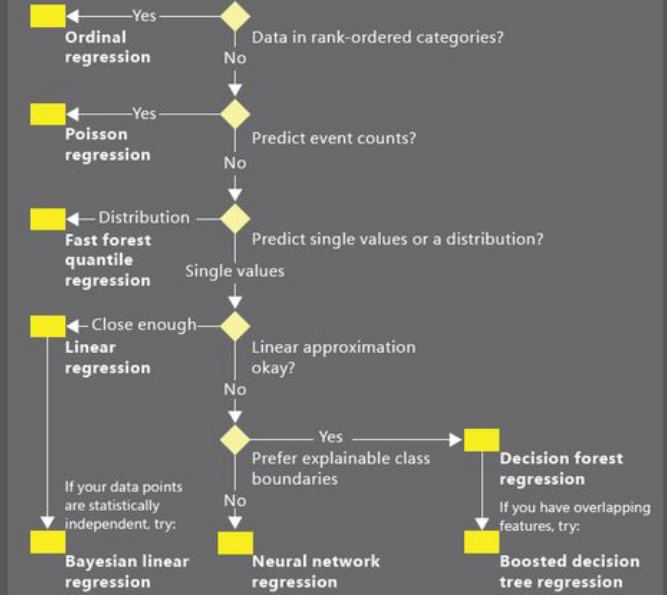
## CLUSTERING



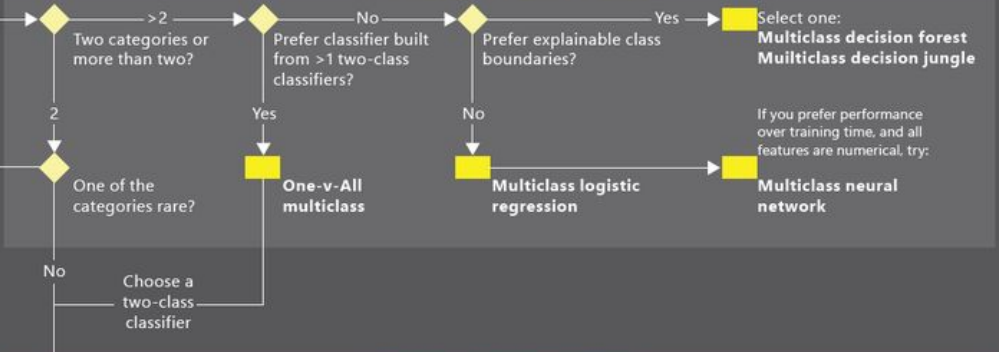
## ANOMALY DETECTION



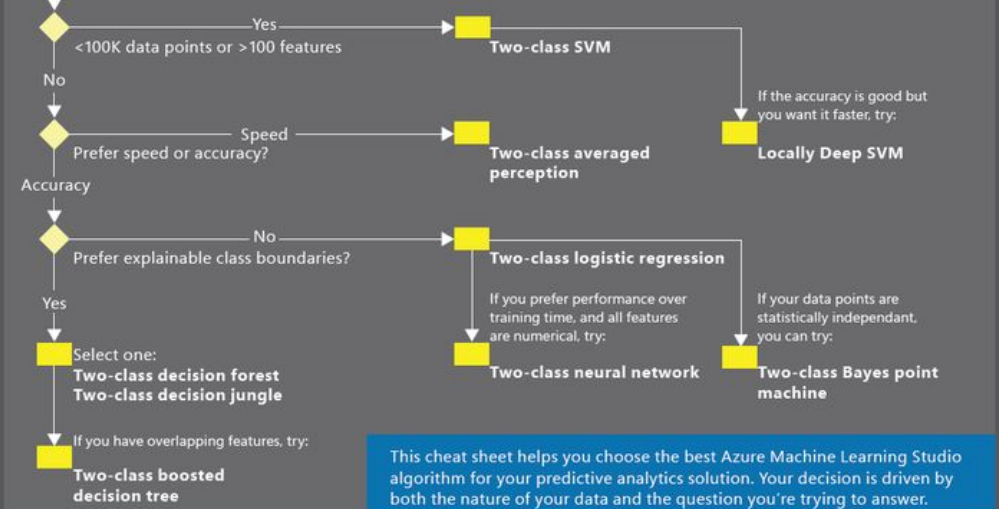
## REGRESSION



## MULTI-CLASS CLASSIFICATION



## TWO-CLASS CLASSIFICATION



This cheat sheet helps you choose the best Azure Machine Learning Studio algorithm for your predictive analytics solution. Your decision is driven by both the nature of your data and the question you're trying to answer.