Day 1
Cognitive Applications

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Google AI | Explore ML

Introduction to Machine Learning

What is Machine Learning?

Machine Learning systems take inputs (data) to make useful predictions and decisions about previously unseen pieces of data.

Machine learning is a specific field of AI where a system learns to find patterns in examples in order to make predictions.

Computers learning how to do a task without being explicitly programmed to do so.

Machine Learning systems might:

- Label or classify data
- Predict numerical values
- Cluster similar pieces of data together
- Infer association patterns in data
- Create complex outputs

Machine Learning

Supervised

Model is trained on labeled data

stop_sign_1

stop_sign_2

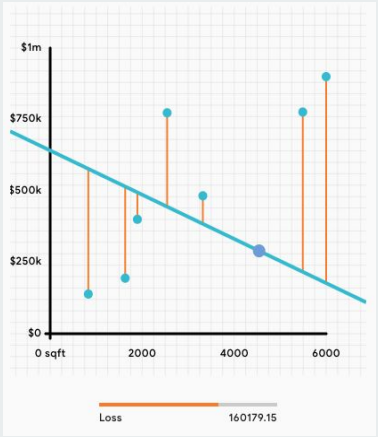
stop_sign_3

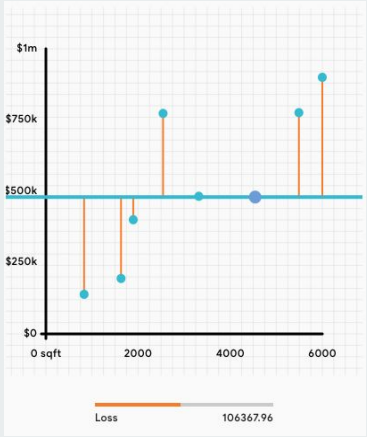
stop_sign_4

Unsupervised

Model learns patterns from unlabelled data.

Loss


$1m
$750k
$500k
$250k
$0
0 sqft
2000
4000
6000
Loss
160179.15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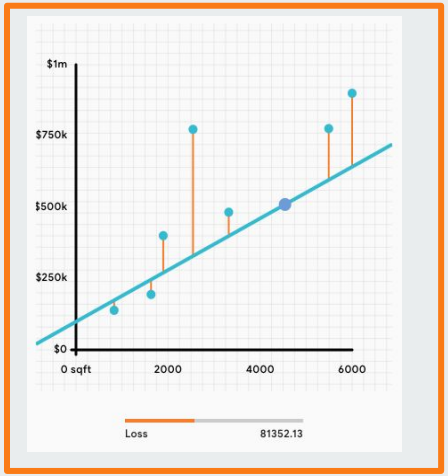
Loss
106367.96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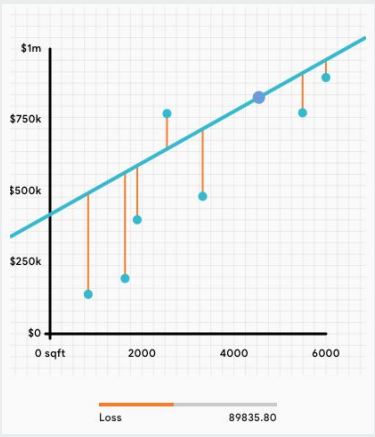
$250k
$0
0 sqft
2000
4000
6000
Loss
81352.13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$500k
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$0
0 sqft
2000
4000
6000
Loss
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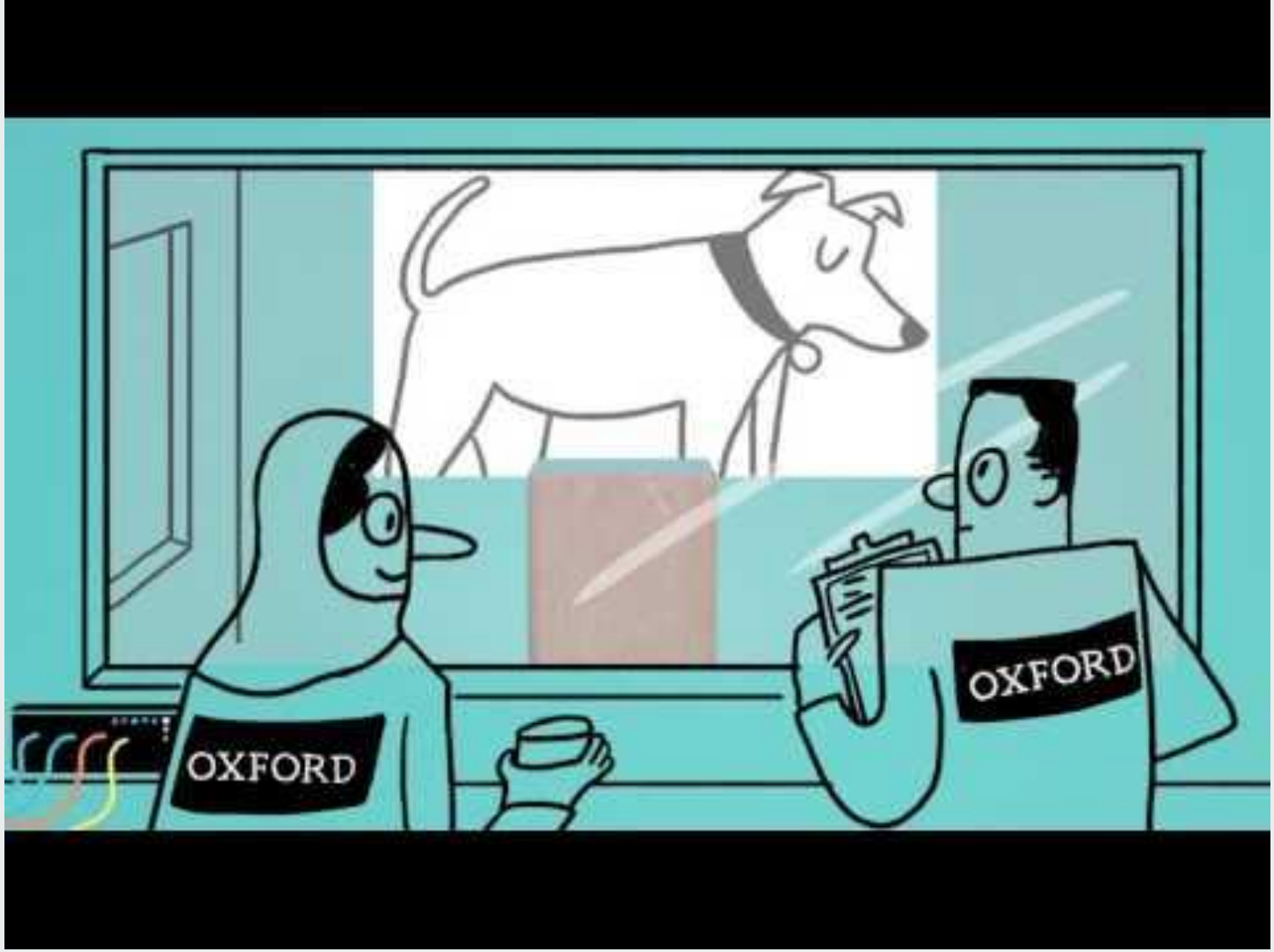
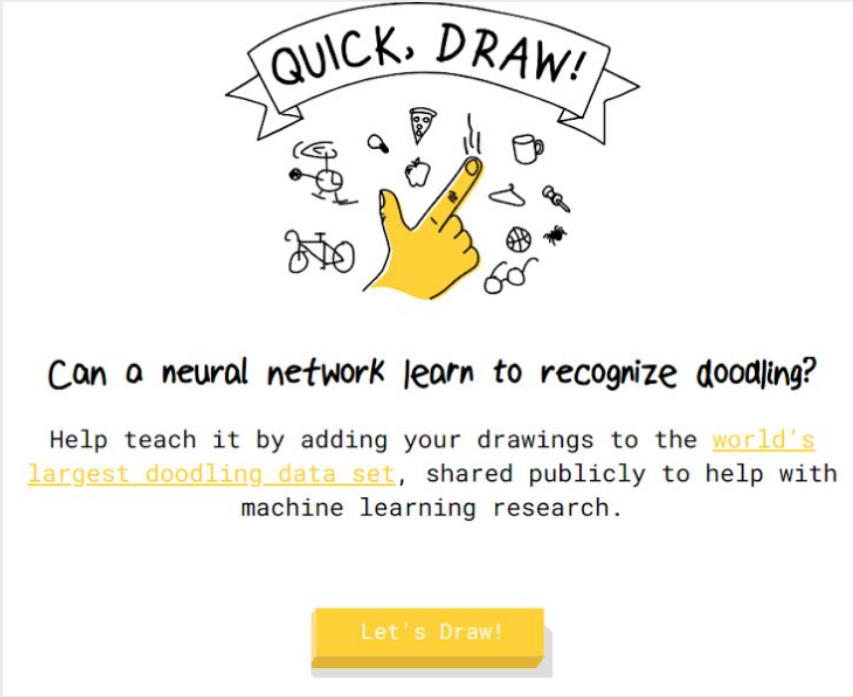

OXFORD
OXFORD

Quickdraw Game

g.co/quickdraw

g.co/
quick
draw



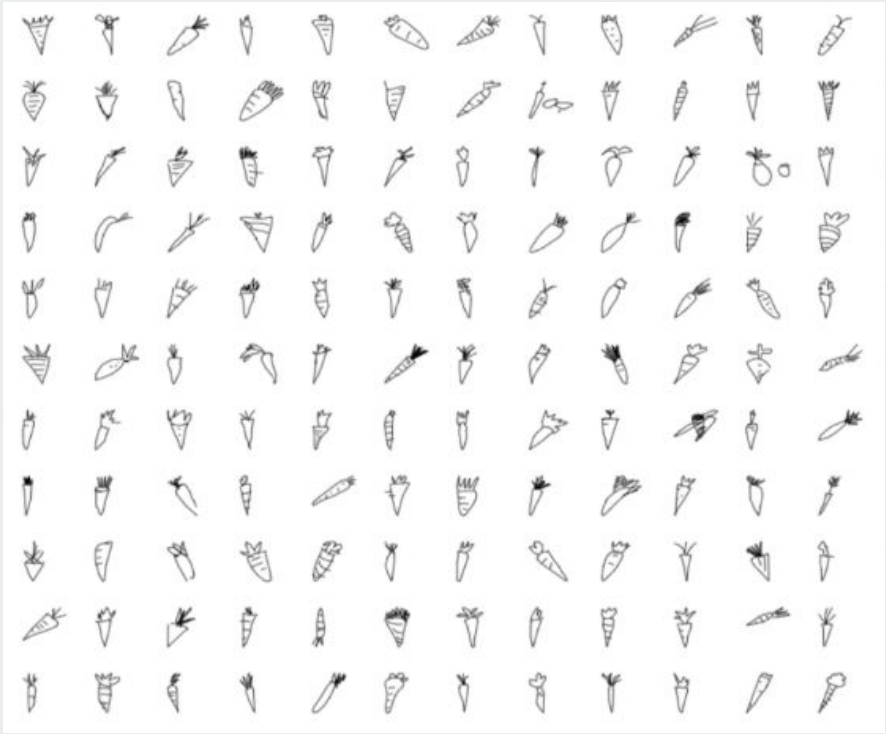
Quickdraw Game - Discussion

1. How does the game work?
2. How is it recognising your drawings?
3. Further enquiry: How could we program this?

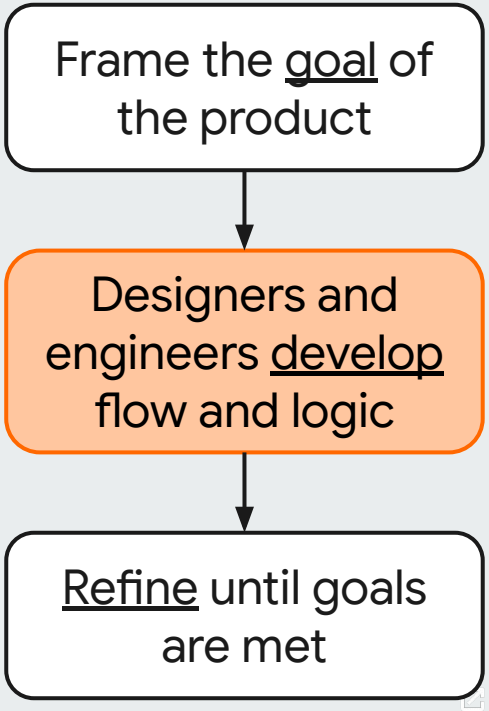
How does ML work in QuickDraw?

g.co/quickdrawdata

g.co/
quick
draw
data



Quickdraw: Rule-based




```
if object.height > 10:
  do x
if object.color is blue:
  do y
if object.numberOfLegs > 2:
  do z
...
```

Quickdraw: Machine Learning

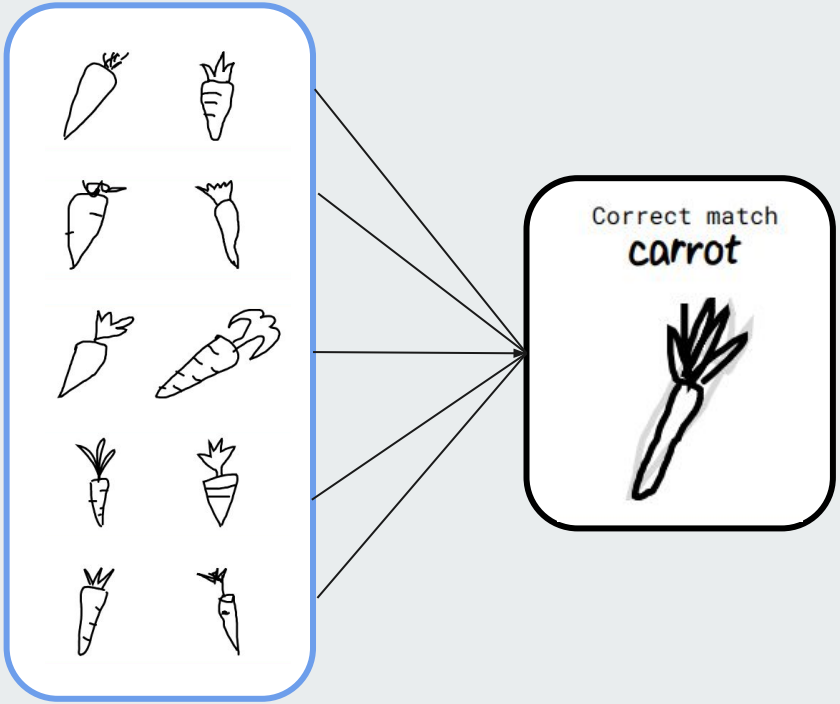
Frame the goal of the product

↓

Train a model using examples

↓

Refine until goals are met



Recap

Rule-based Approach

- Rules are defined
- Improvements come from algorithms and network

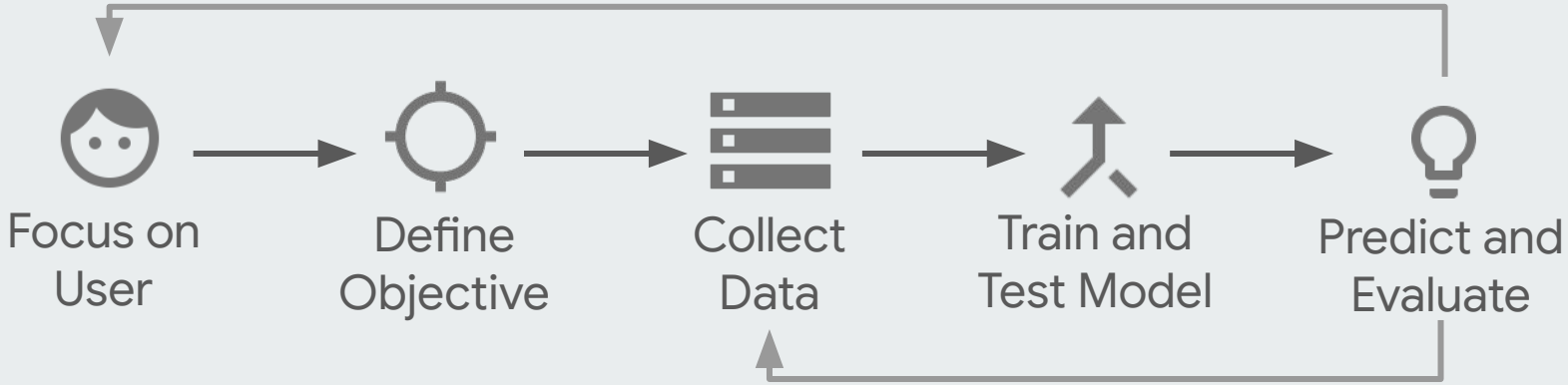
Machine Learning

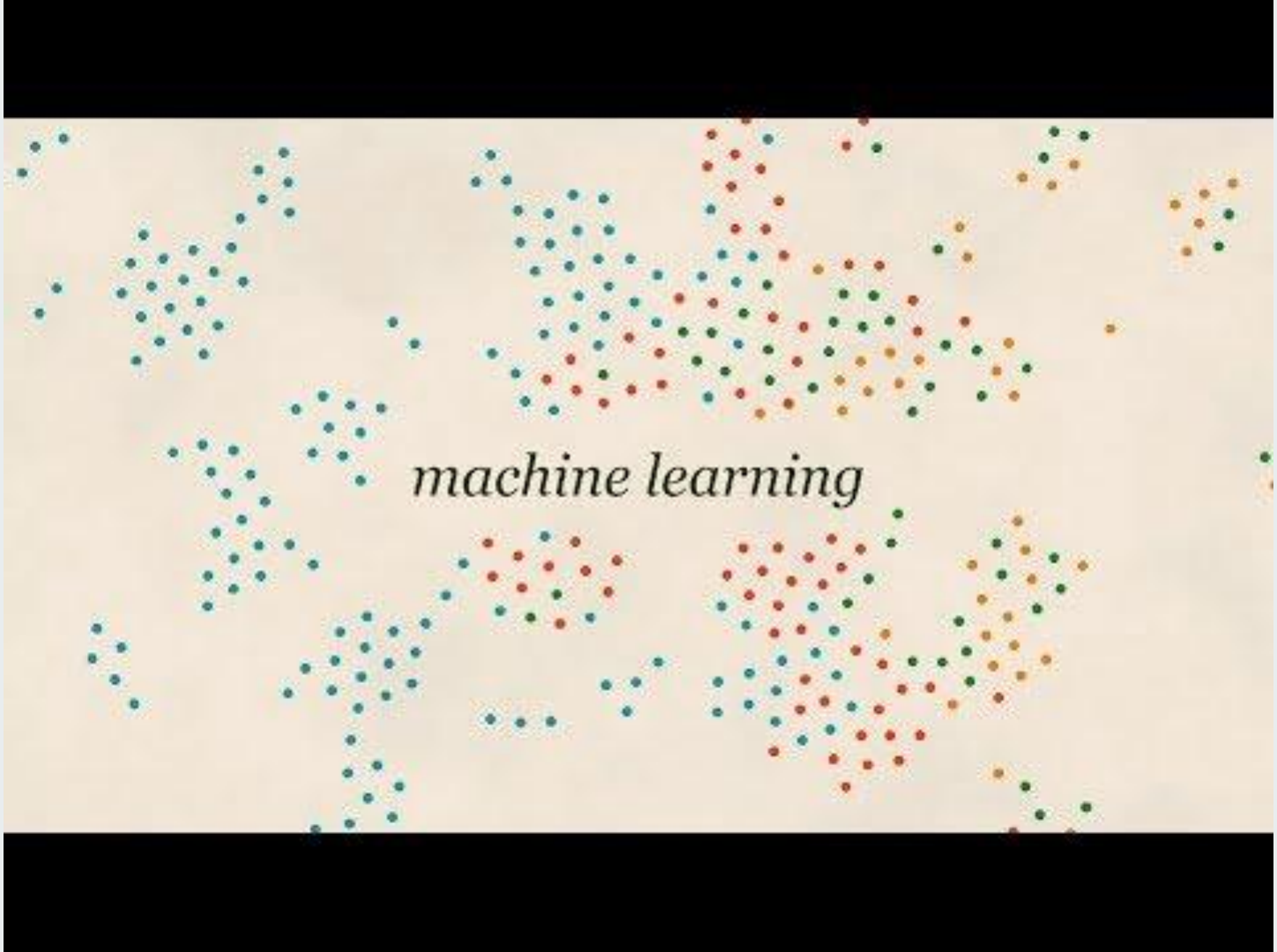
- Learns patterns from data
- Improvements can from additional data

Each has its benefits

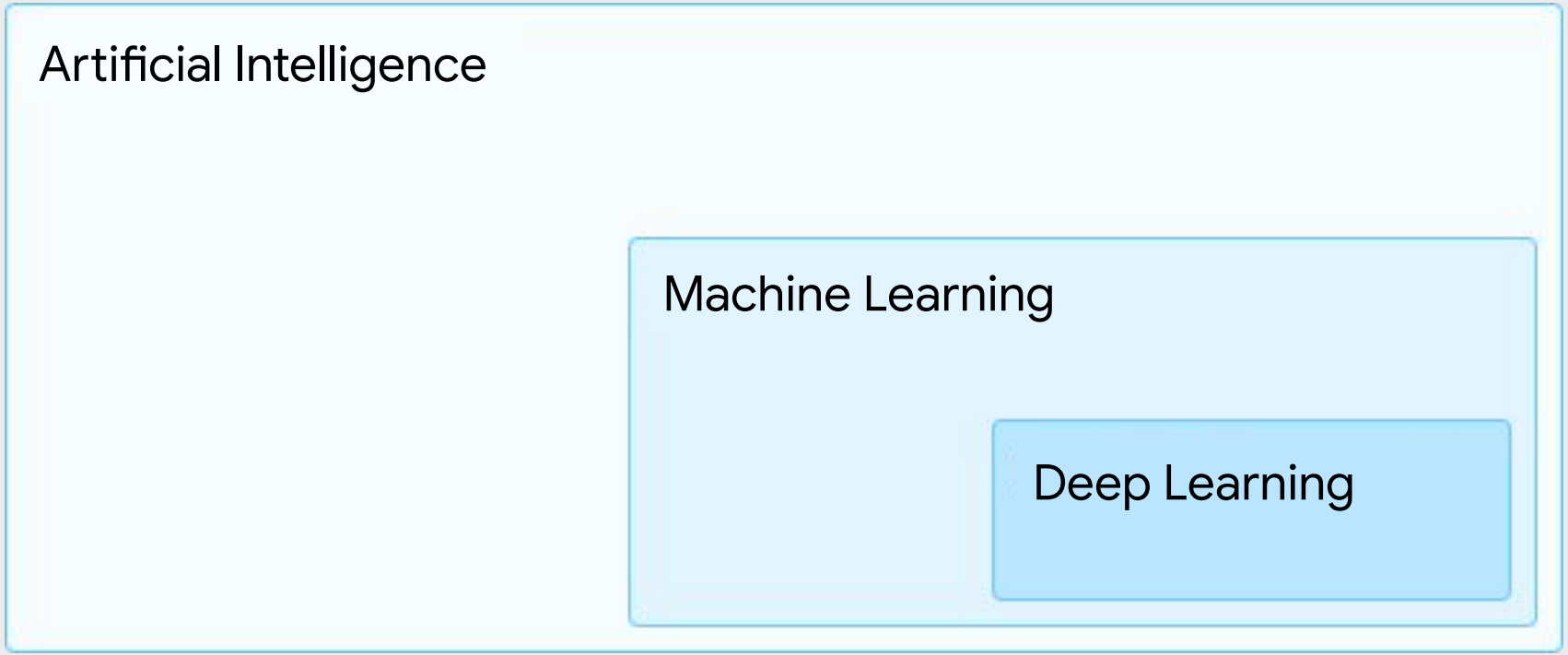
Idea to Implementation

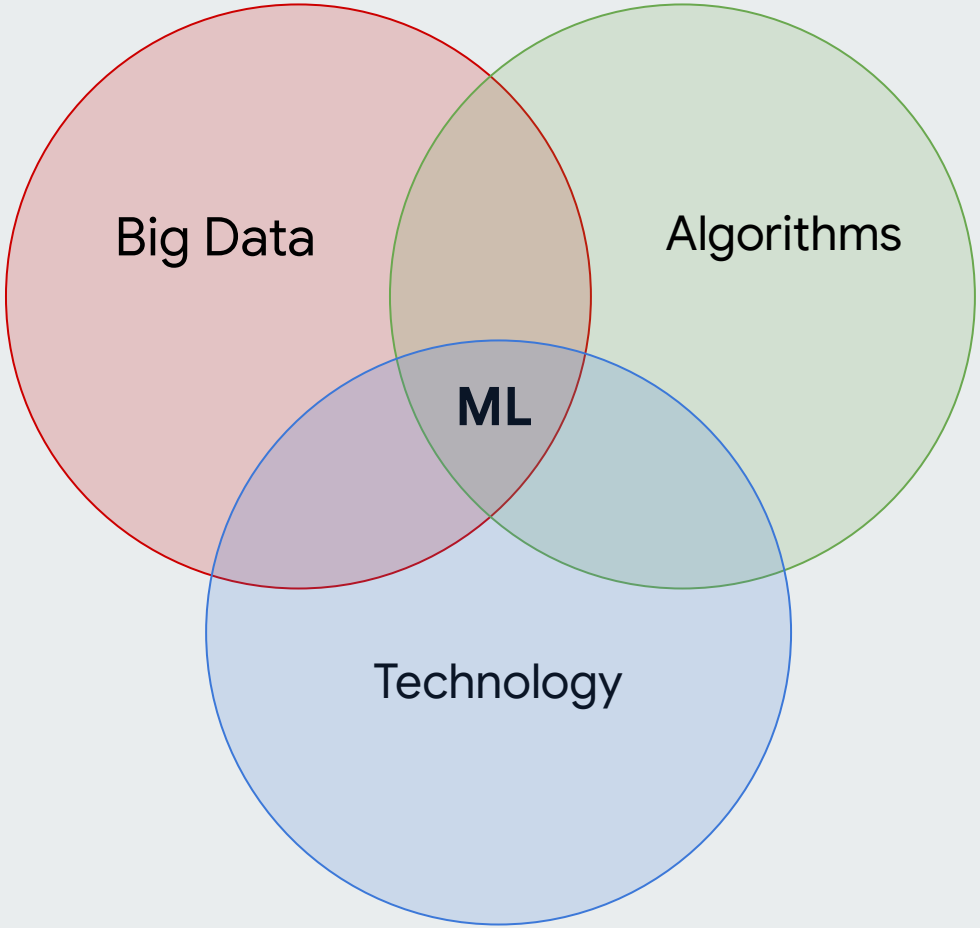
Machine Learning Process



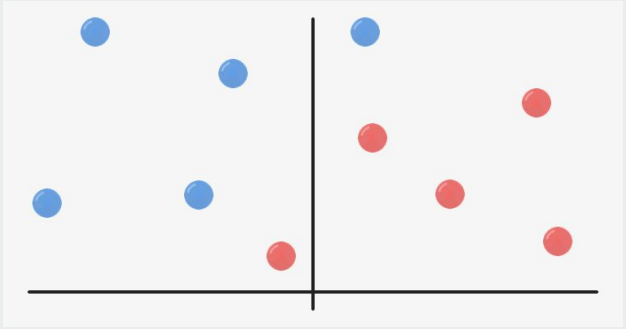

machine learning

What Can ML Do?

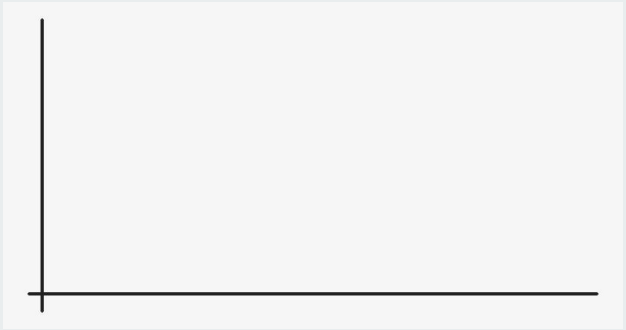

Artificial Intelligence
Machine Learning
Deep Learning

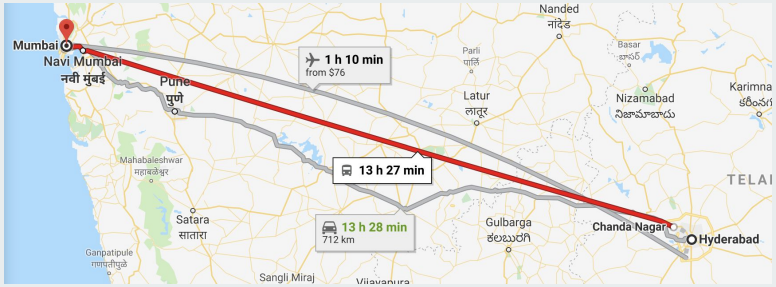

Big Data
Algorithms
ML
Technology

Classification

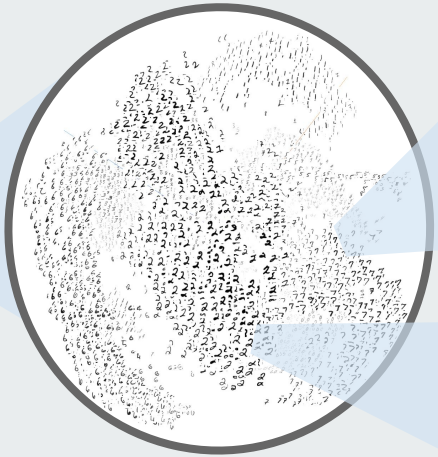


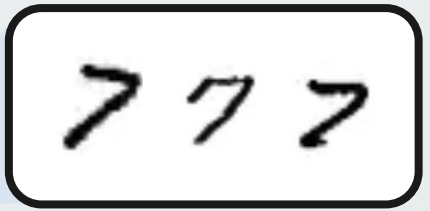
Regression

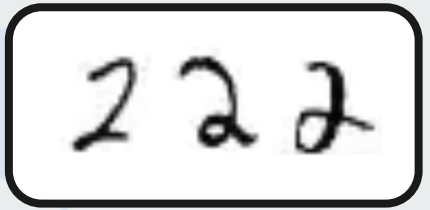



Mumbai
Navi Mumbai
नवी मुंबई
Pune
पुणे
1 h 10 min
from $76
13 h 27 min
13 h 28 min
712 km
Nanded
नांदेड
Parli
परळी
Basar
బాసర
Latur
लातूर
Nizamabad
నిజామాబాదు
Karimna
Mahabaleshwar
महाबळेश्वर
Satara
सातारा
Ganpatipule
गणपतीपुळे
Sangli Miraj
Gulbarga
ಕಲಬುರಗಿ
Chanda Nagar
Hyderabad
TELA

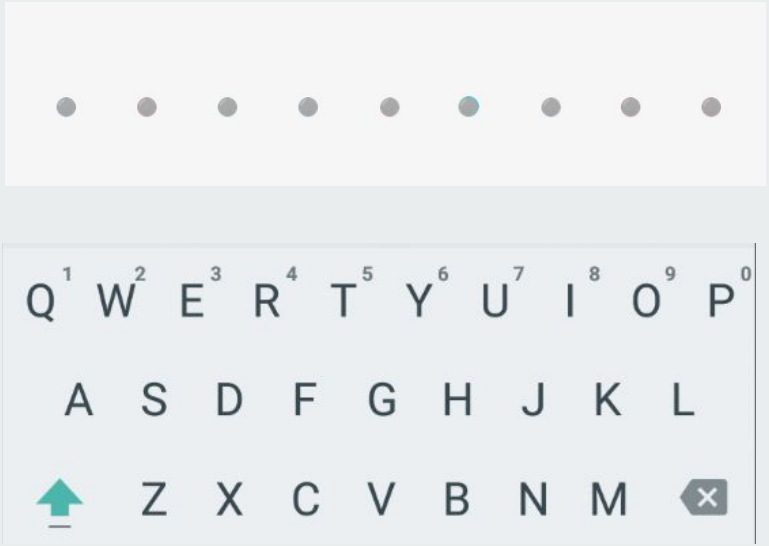
Clustering



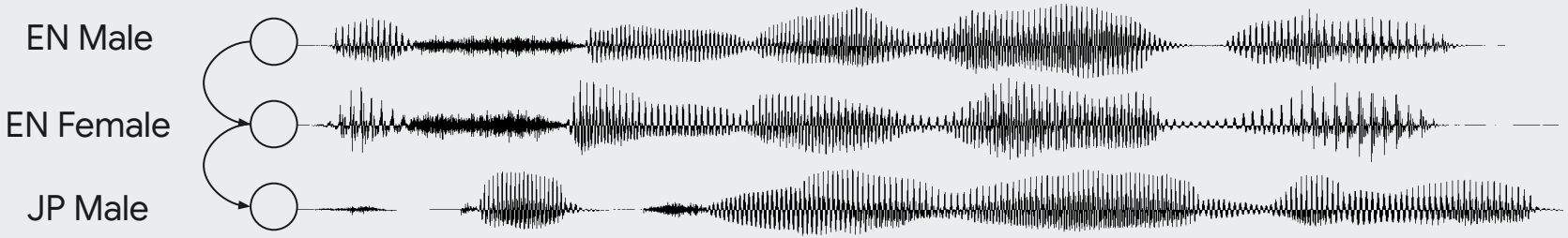




Sequence Prediction



Style Transfer



Questions / Review

1. What is ML?
2. ML vs Rule-based
3. Idea to Implementation
4. AI vs ML vs Deep Learning
5. History of ML
6. Types of ML *[Classification, Clustering, Regression, Sequence Prediction, Style Transfer]*