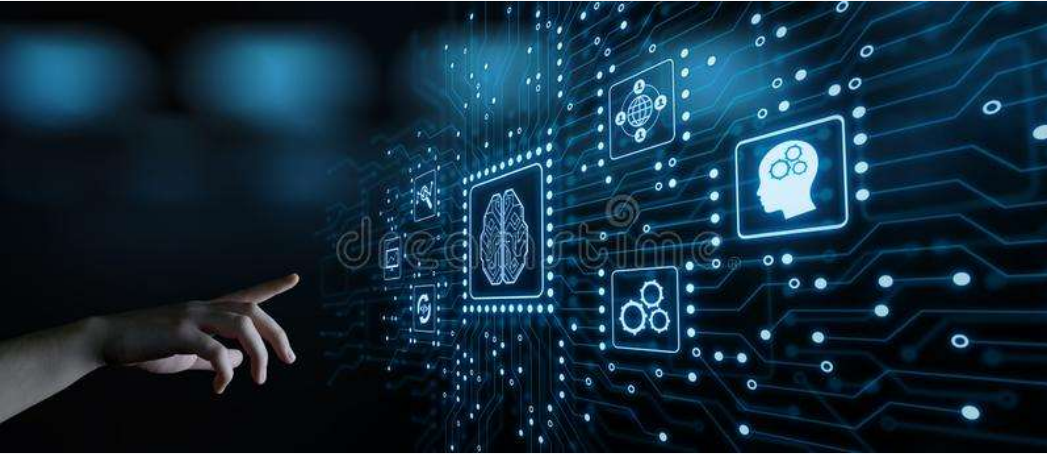




# Application of Artificial Intelligence in Construction





# Agenda

01

What is Artificial Intelligence (AI) and Why?

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02

Top AI use cases

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03

Basics of Artificial Intelligence, Machine Learning and Deep Learning

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04

Practical Applications in construction

# Presenters



**Shereen  
Fouad**  
Lecturer in  
Computer  
Science

Dr Shereen Fouad is a lecturer at the Faculty of Computing, Engineering and the Built Environment at Birmingham City University, UK. She is also an Honorary Research Fellow at the Institute of Clinical Sciences, The University of Birmingham, UK. She has a PhD in Machine Learning (ML) from the University of Birmingham, UK.

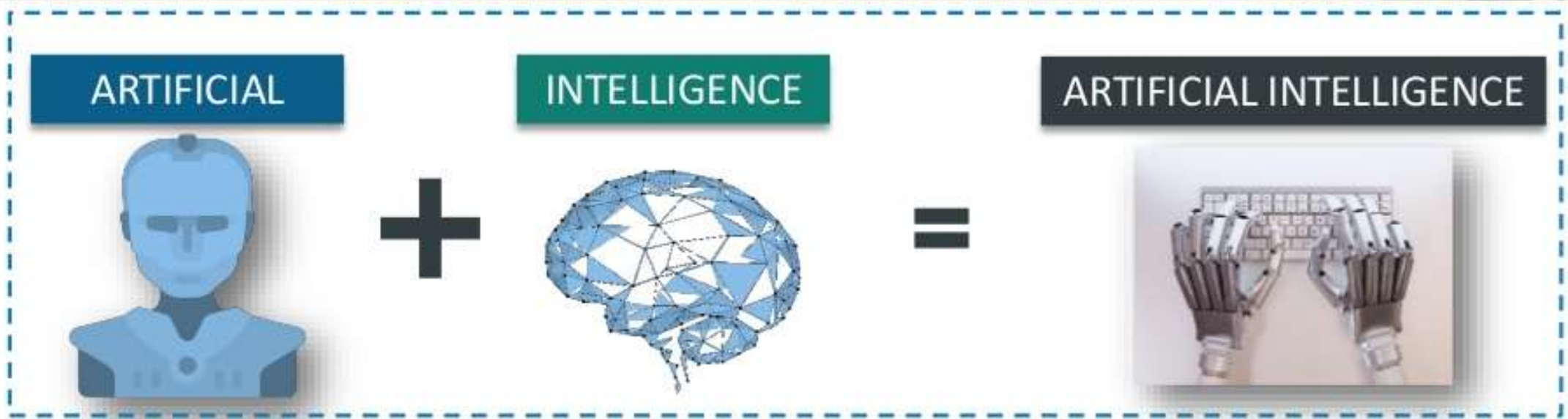


**Hassan  
Emam**  
Principal  
Planning &  
Project  
Controls  
Consultant

Hassan Emam is a principal project controls consultant at LogiKal. He gained diversified experience in mega construction projects working in a variety of sectors including airports, residential buildings, hotels, bridges, infrastructure, tunnelling and railways.



# What is AI?



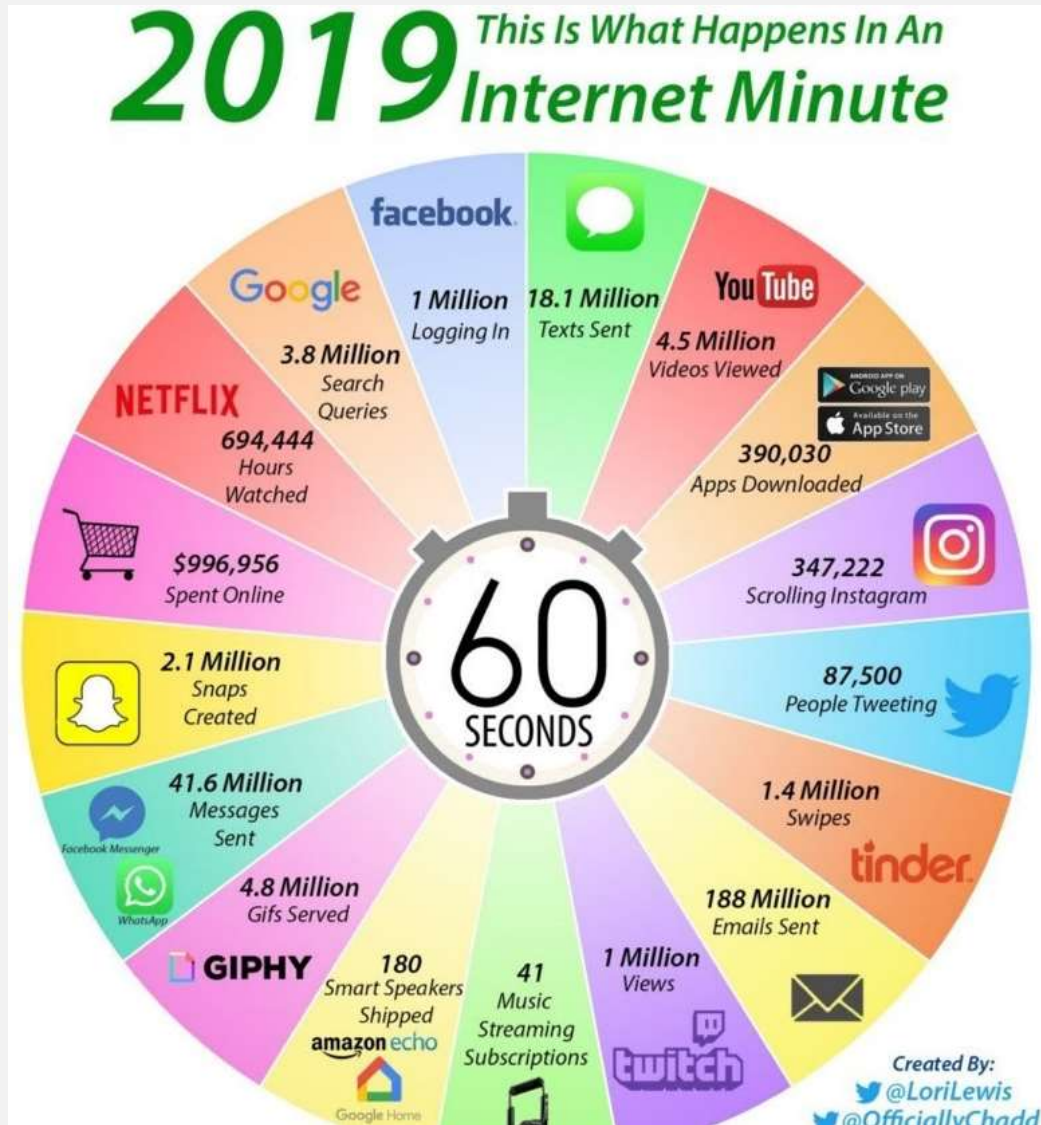
Artificial intelligence is intelligence exhibited by machines, rather than humans or other animals. The field of AI research defines itself as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of success at some goal

[What is Artificial Intelligence, Edureka](#)



According to John McCarthy, AI is *"The science and engineering of making intelligent machines, especially intelligent computer programs"*.

# Why AI?



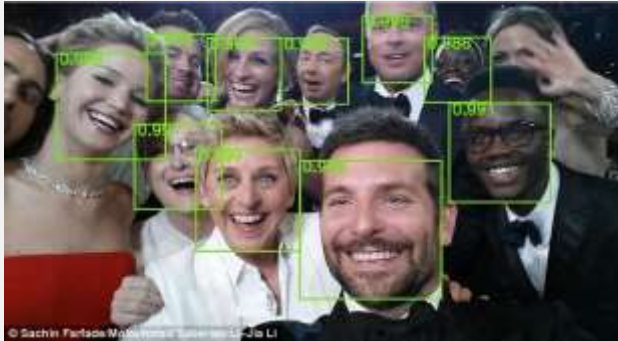


# AI use cases

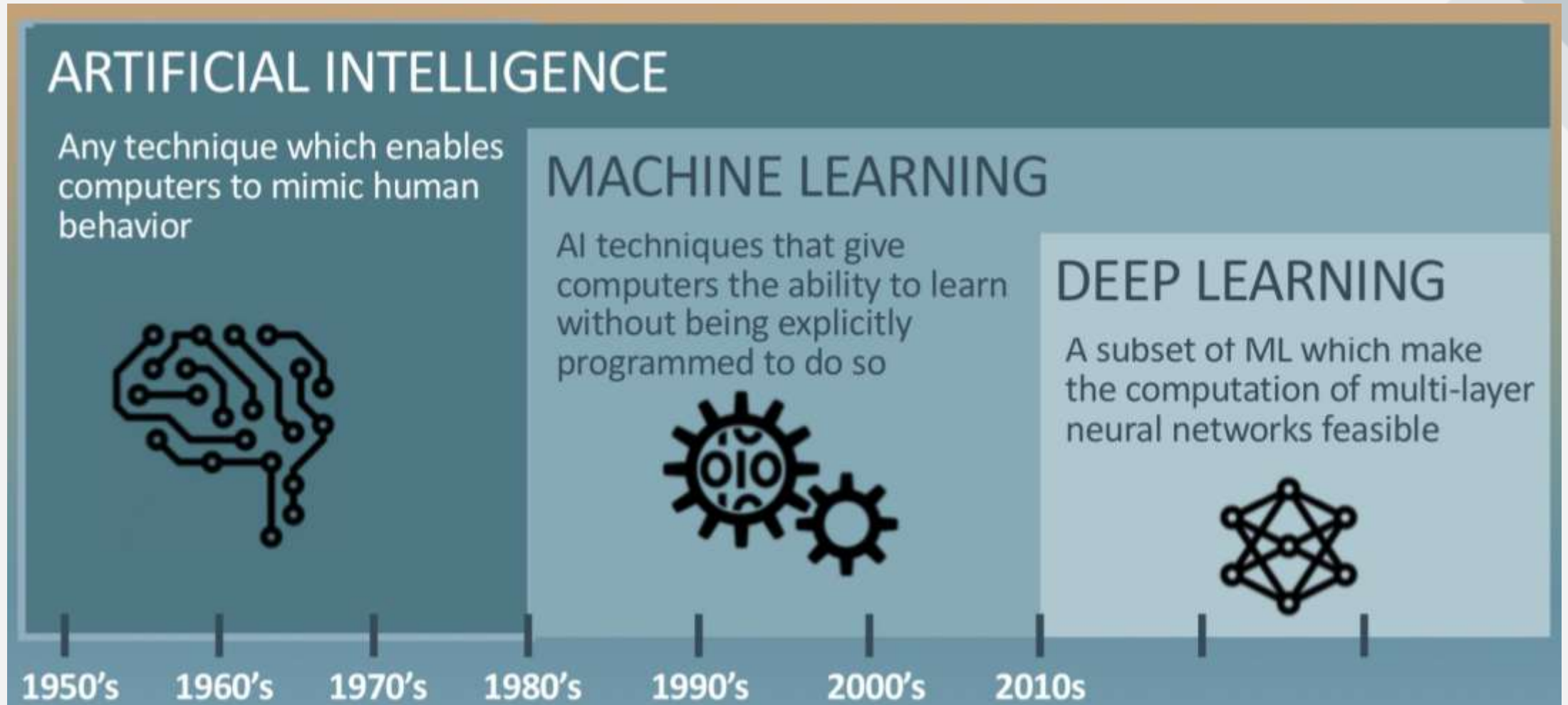


## Netflix Launches Private Facebook Recommendations

3:52 PM PDT 3/2/2014 by Natalie Jarvey



# Difference between Artificial Intelligence, Machine Learning and Deep Learning



# Machine learning models



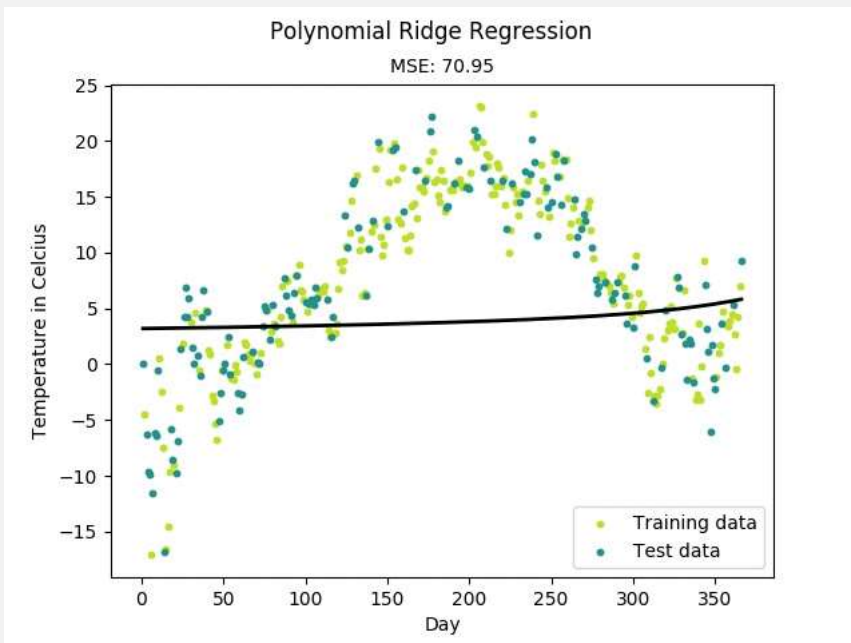


# Machine learning models

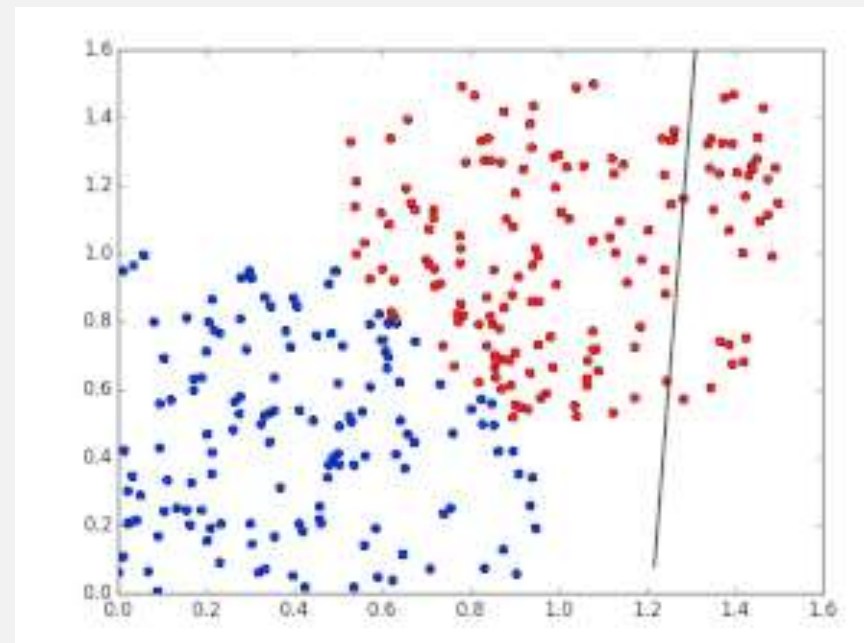
## I. Supervised learning:

Learn to predict an output when given an input vector.

Regression



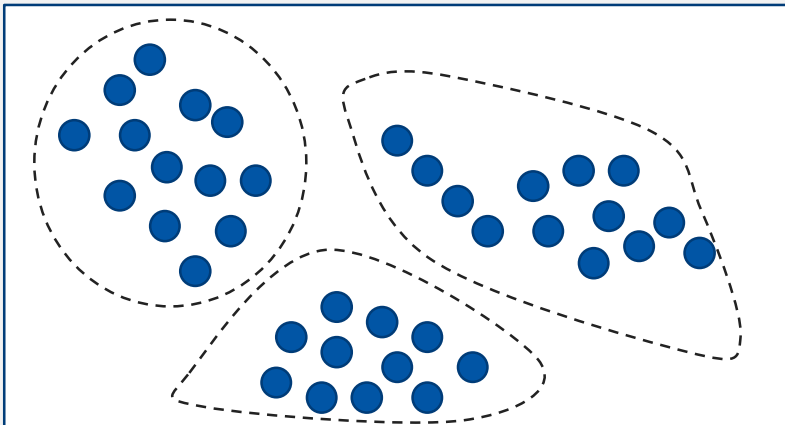
Classification



# Machine learning models

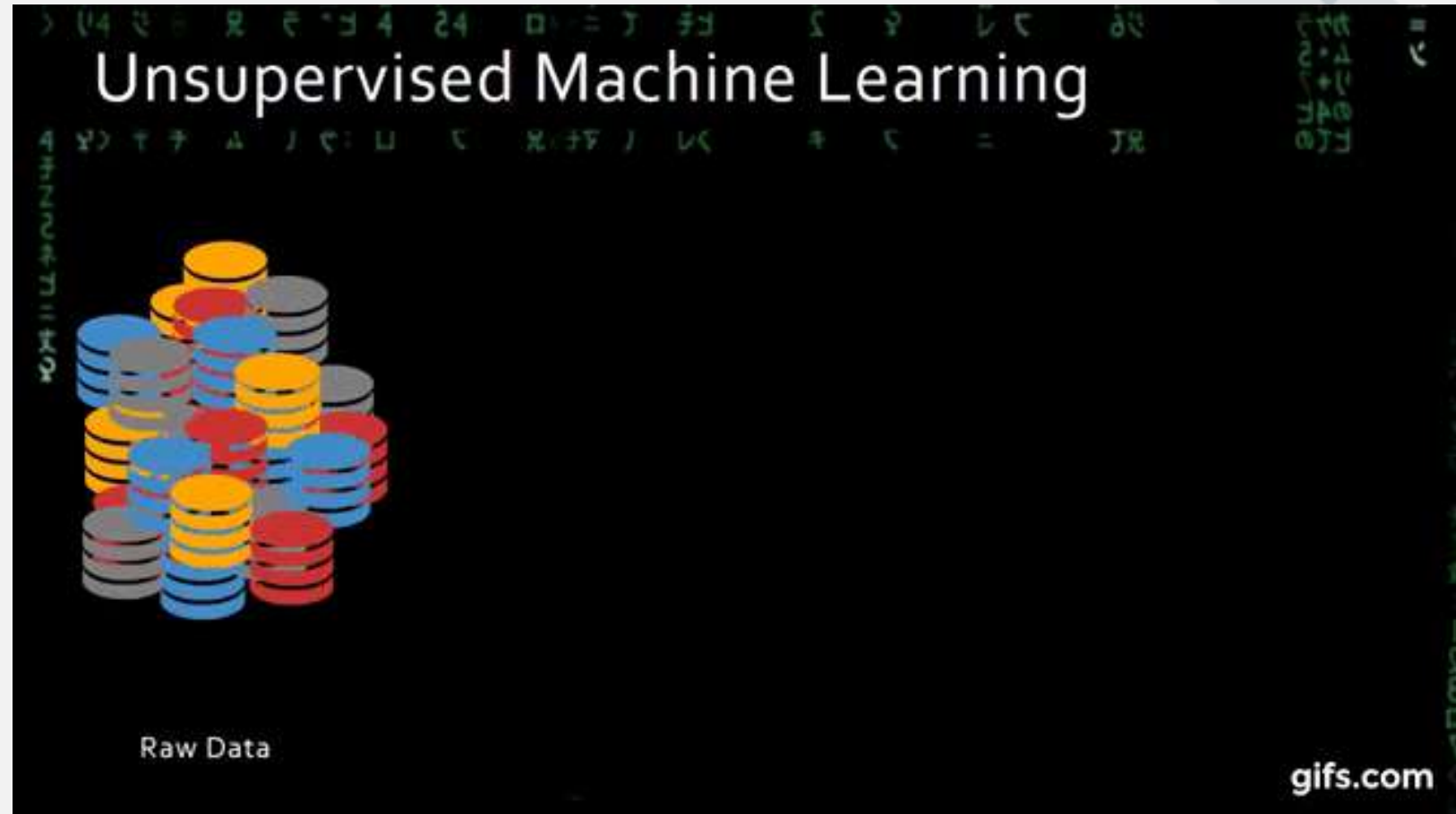
## 2. Unsupervised learning:

Discover a good internal representation of the data.



### Unsupervised learning

Training data does not include desired outputs

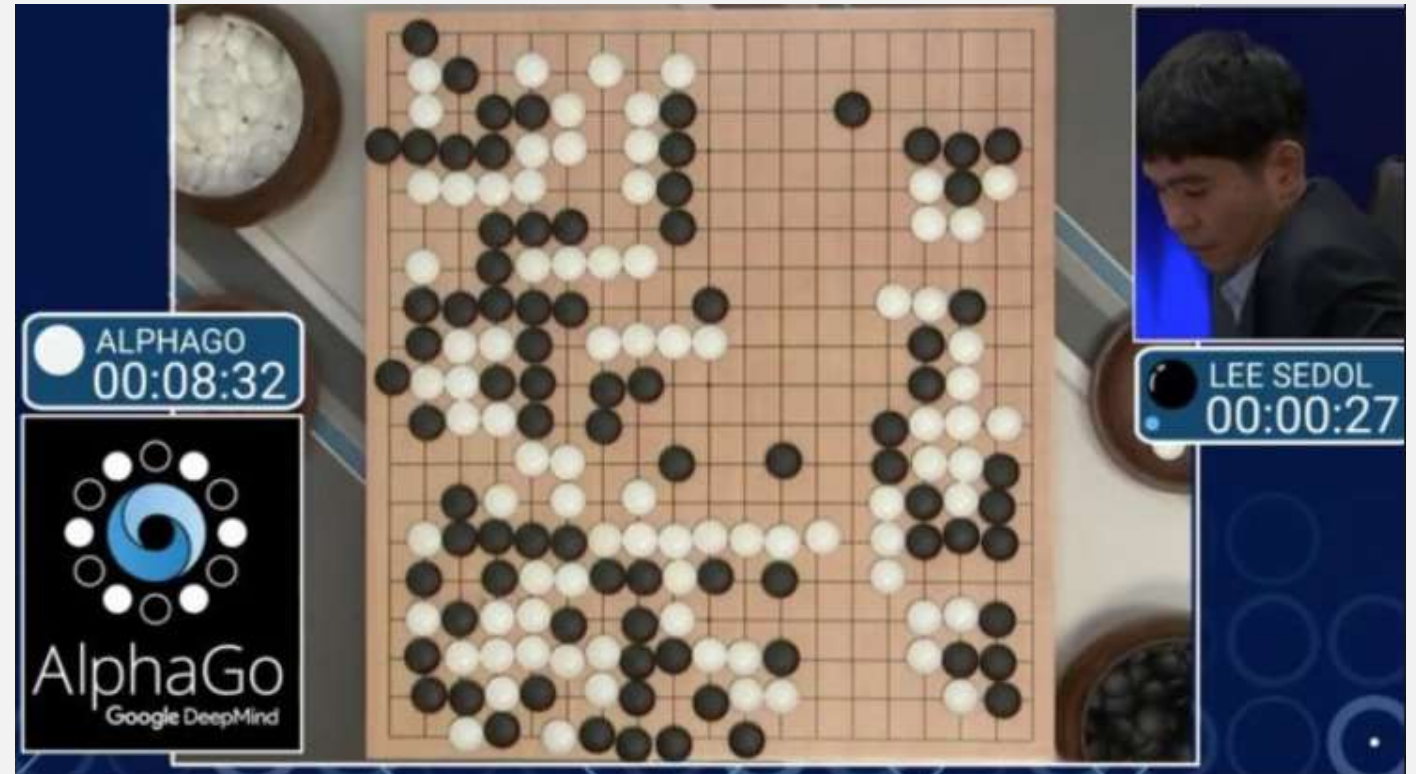
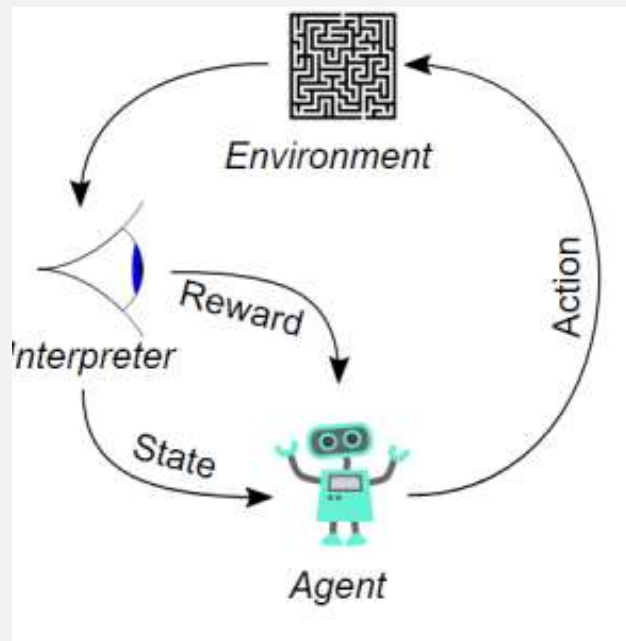


<https://giphy.com/explore/machine-learning>

# Machine learning models

## 3. Reinforcement Learning:

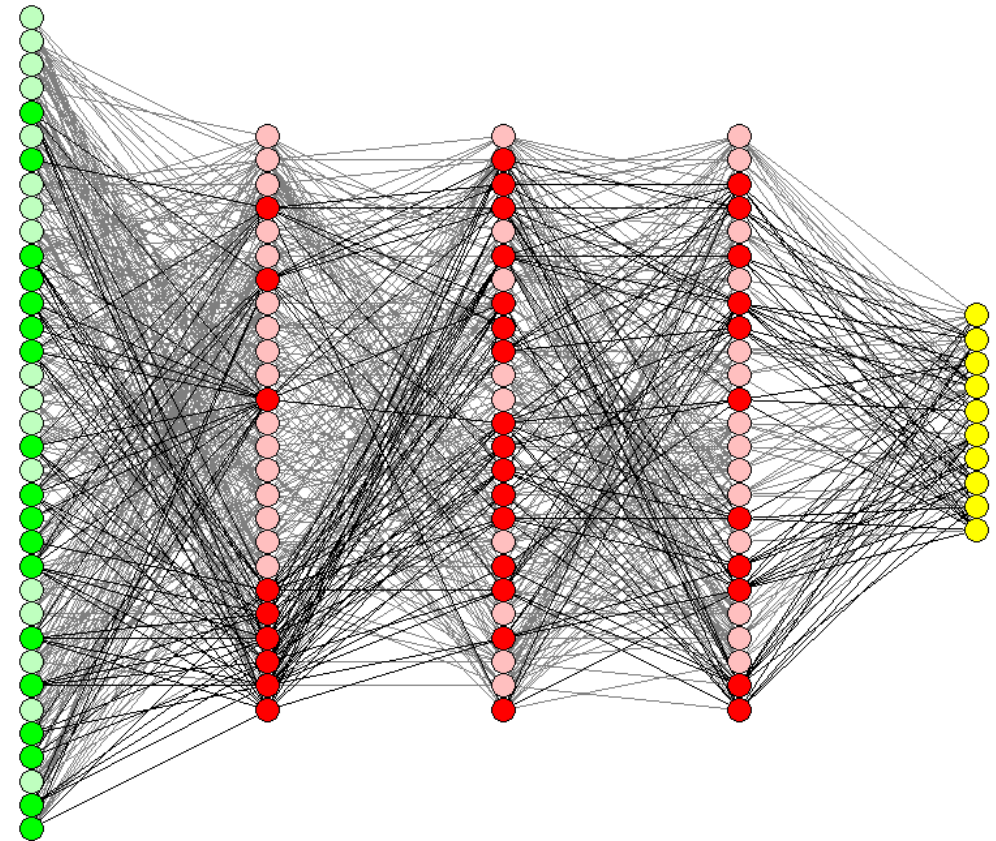
Learn to select an action to maximize payoff.



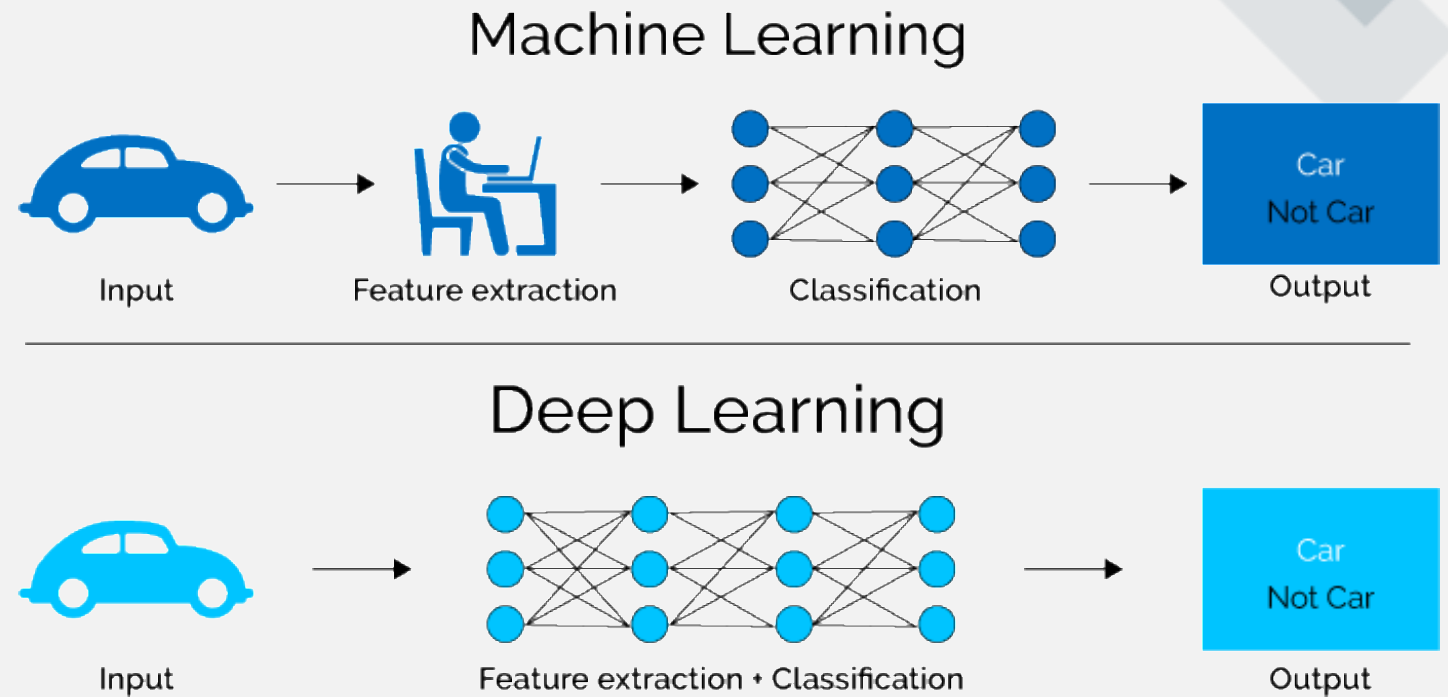
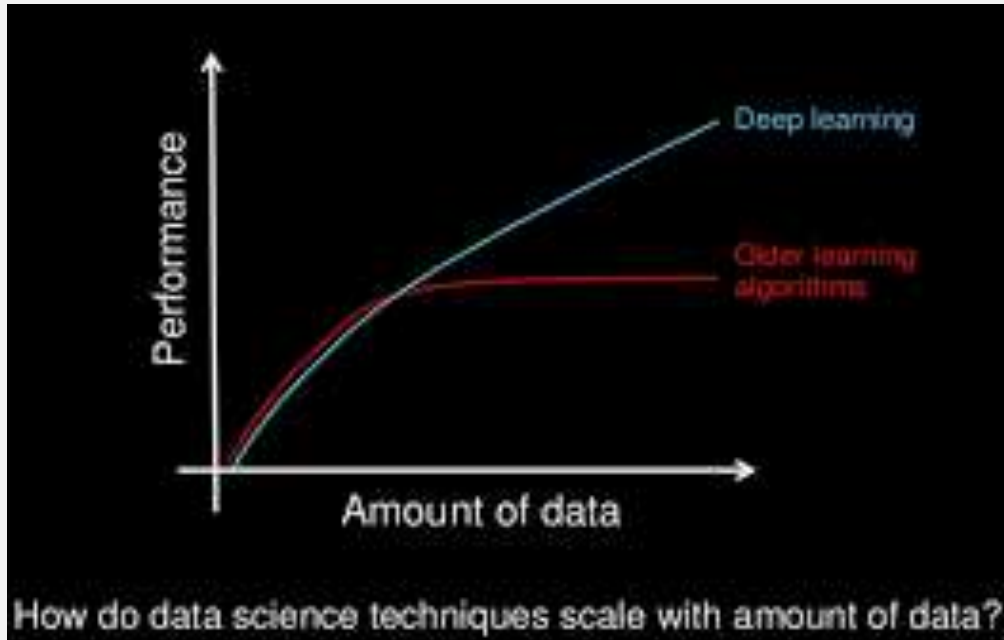


# Deep Learning

- Next evolution of machine learning.
- Inspired by the information processing patterns of human brain
- Utilizes multi-layer artificial neural networks
- Accuracy is often better than ML, specially with big data
- Requires more powerful computational resources.



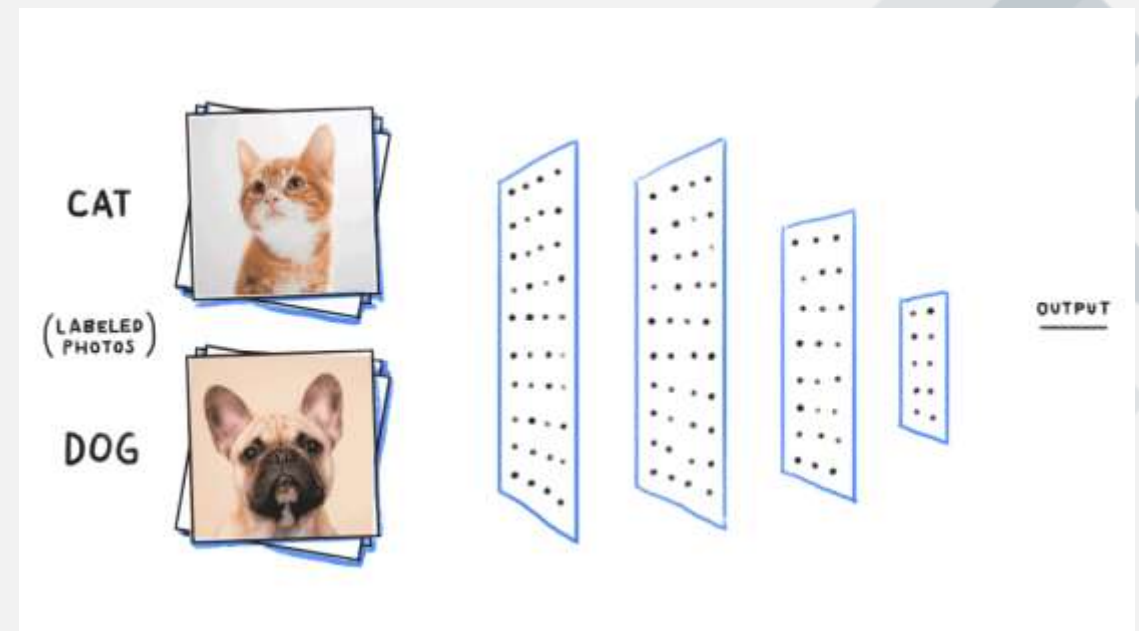
# Why Deep Learning



# Applications of Deep Learning



<https://docs.floydhub.com/examples/dcgan/>



<https://giphy.com/explore/machine-learning>



<https://techcrunch.com/2019/04/03/wayve-claims-world-first-in-driving-a-car-autonomously-with-only-its-ai-and-a-satnav/>





# Practical Applications

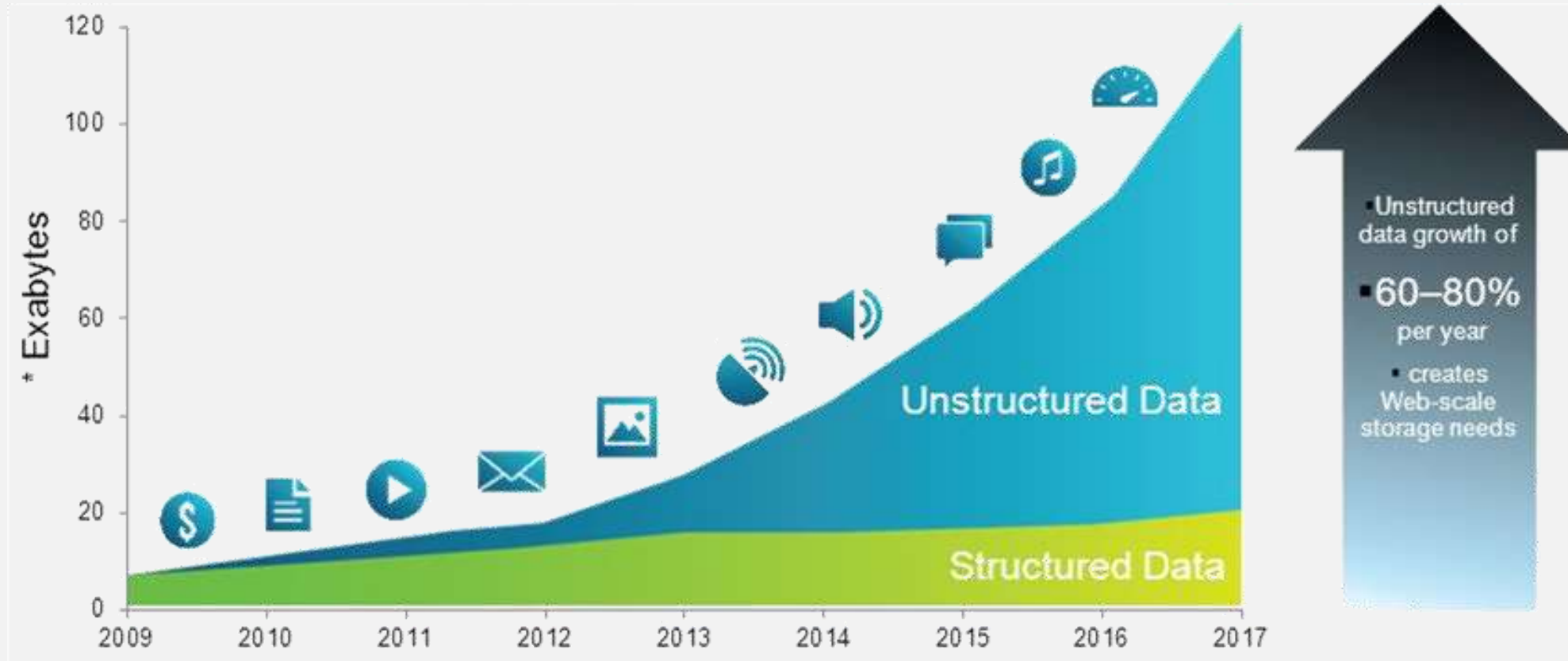


# Why bother?

**'Data now as important to UK  
Infrastructure as concrete or steel' – Sir  
John Armitt speech to DAFNI**

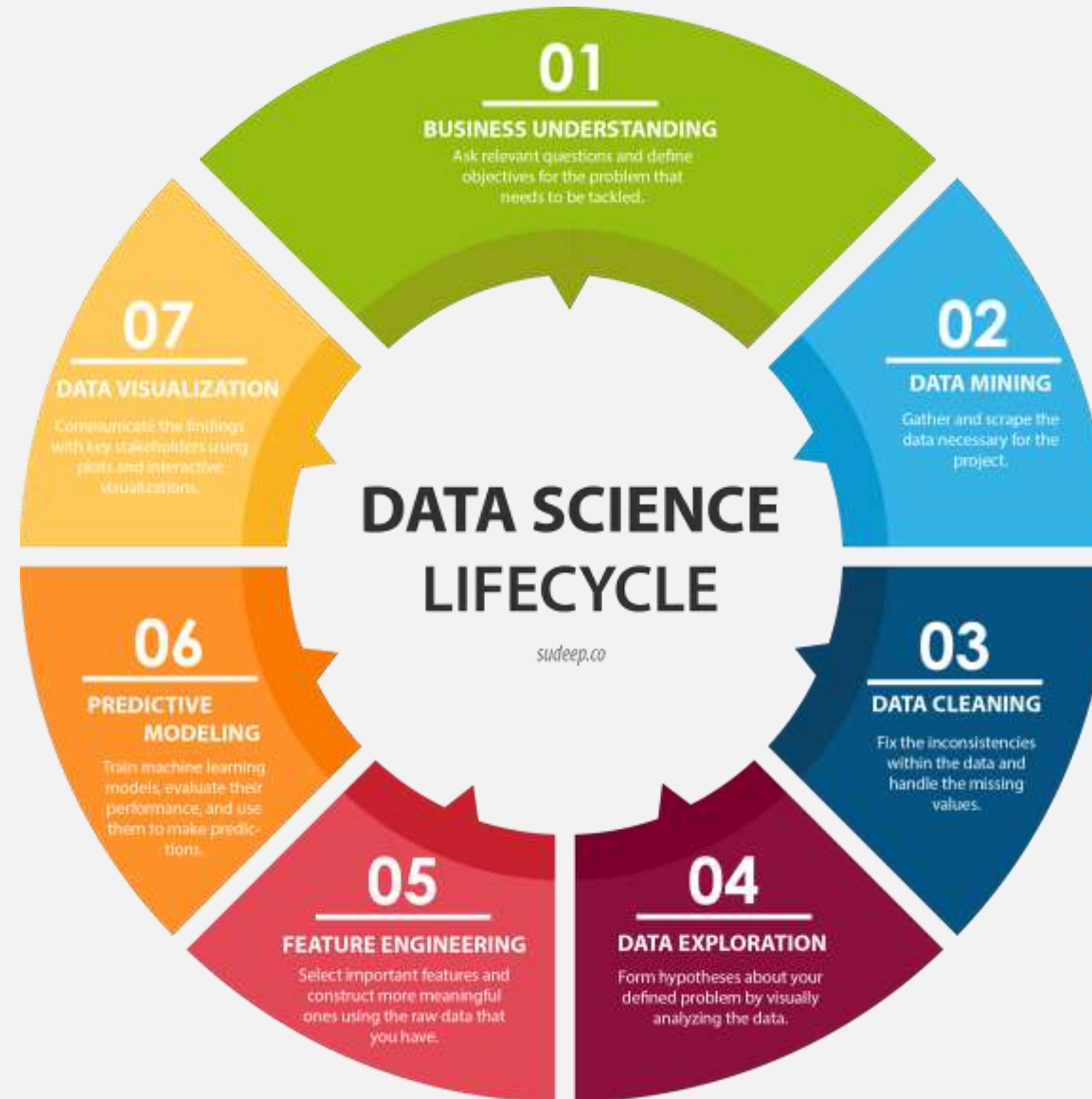


# Data Explosion

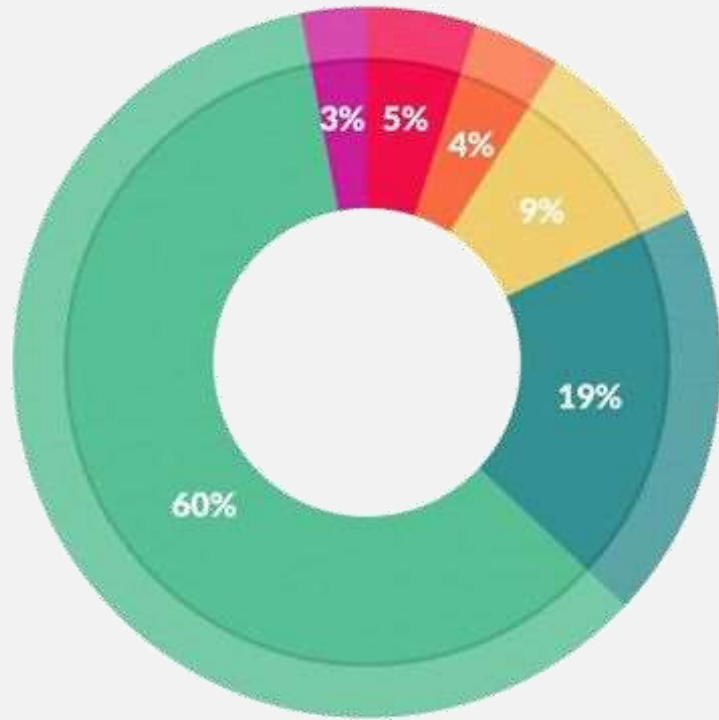




# Data Science Process



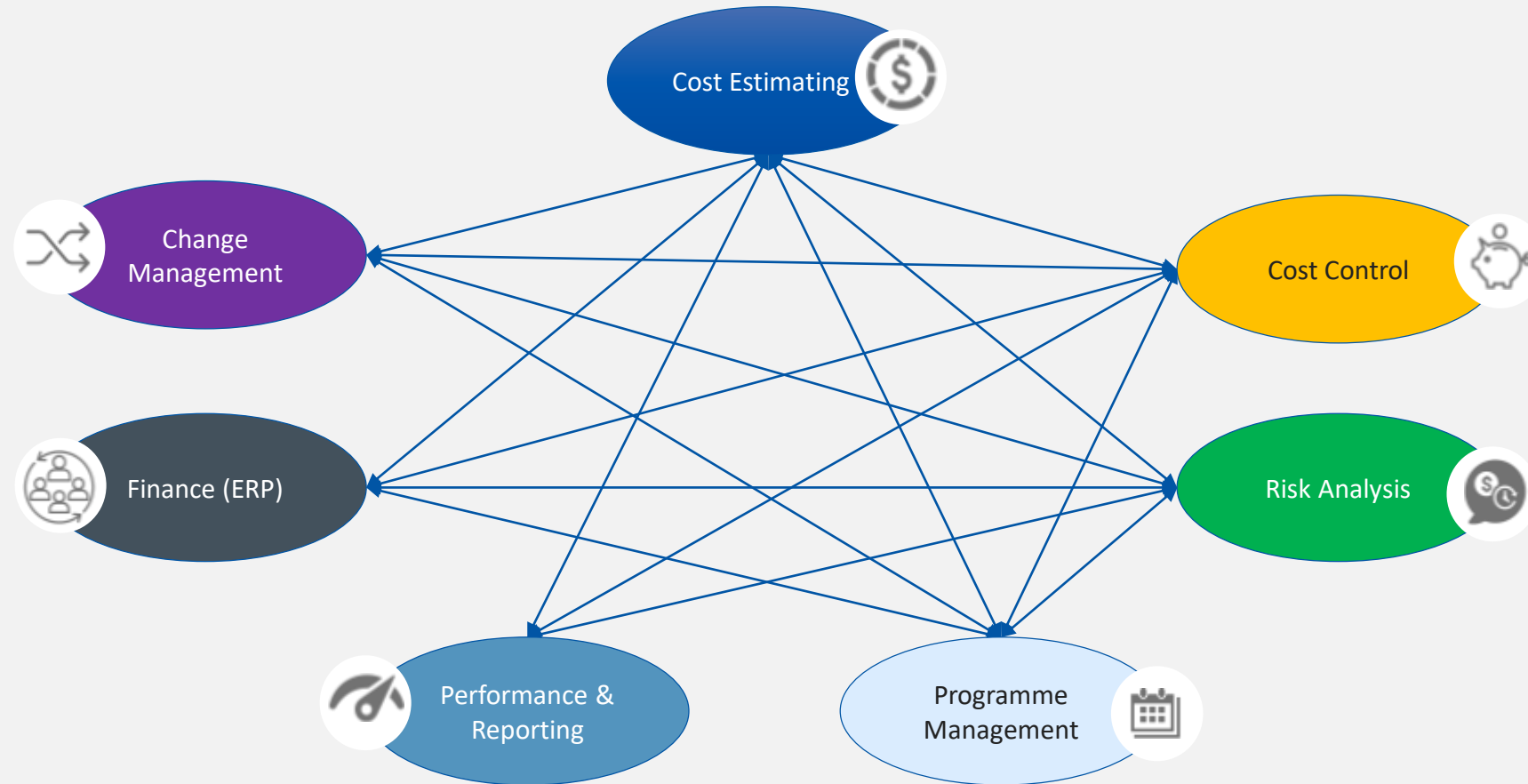
# Analytics Effort



What data scientists spend the most time doing

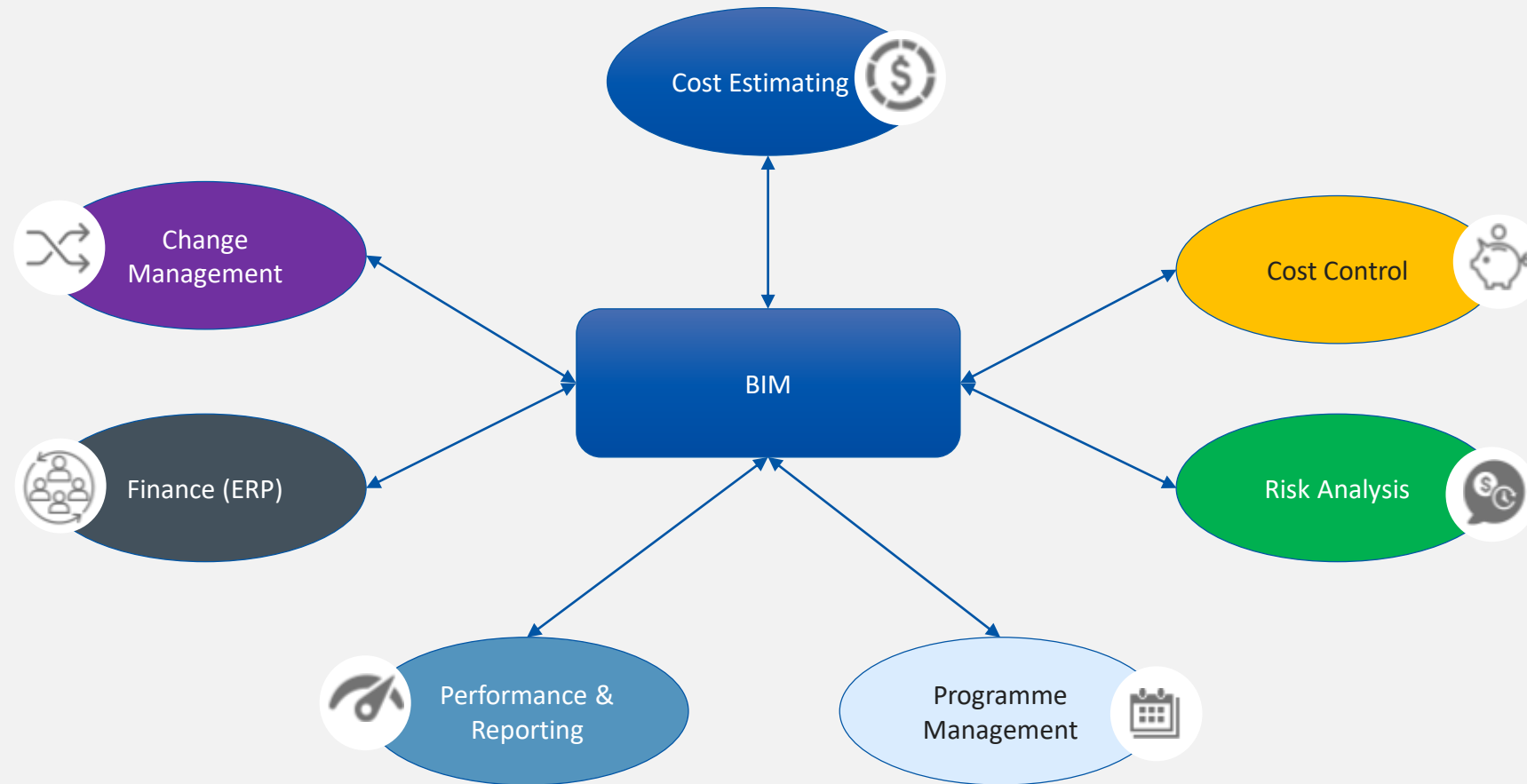
- Building training sets: 3%
- Cleaning and organizing data: 60%
- Collecting data sets: 19%
- Mining data for patterns: 9%
- Refining algorithms: 4%
- Other: 5%

# Data in Construction Context





# Data Streamlining using BIM



# Analytics Applications in Construction

Discipline	Applications
Health and Safety	PPE detection, Hazards warning, Near miss reporting Pose estimation for detecting
Security	Face recognition ANPR Automated detection of intruders Theft detection
Quality	Compliance check, defects inspection, process validation
Stakeholders	Quantification of Community engagement effectiveness Duration prediction for consents
Environment	Emission prediction Recycling using CV and Robots Ecology Surveys

# Analytics Applications in Construction

Discipline	Applications
Controls and Reporting	BI tools to automate reporting Performance monitoring Automated progress capturing Accurate forecasting Schedule duration estimation Cost estimation prediction
Procurement	Work winning Review bidding companies
Commercial	Management of Contracts Correspondence Monitoring
Engineering	Design Compliance Review Design Recommendations Recommendations for design
HR	Recruitment skills analysis Interview video analysis Absenteeism prediction





# Security



## Plate Group

**Best Plate**  
5AG5604

**State**  
Alabama

**Site**  
Landmark

**Camera**  
FT LPR

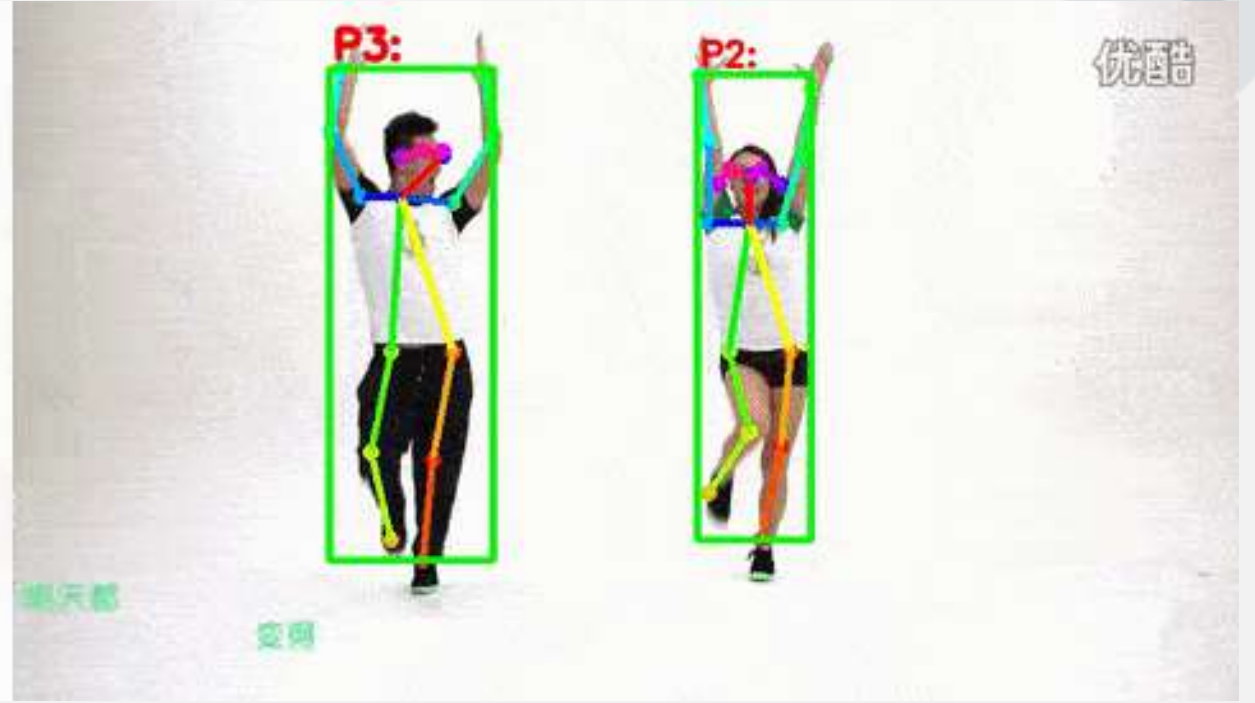
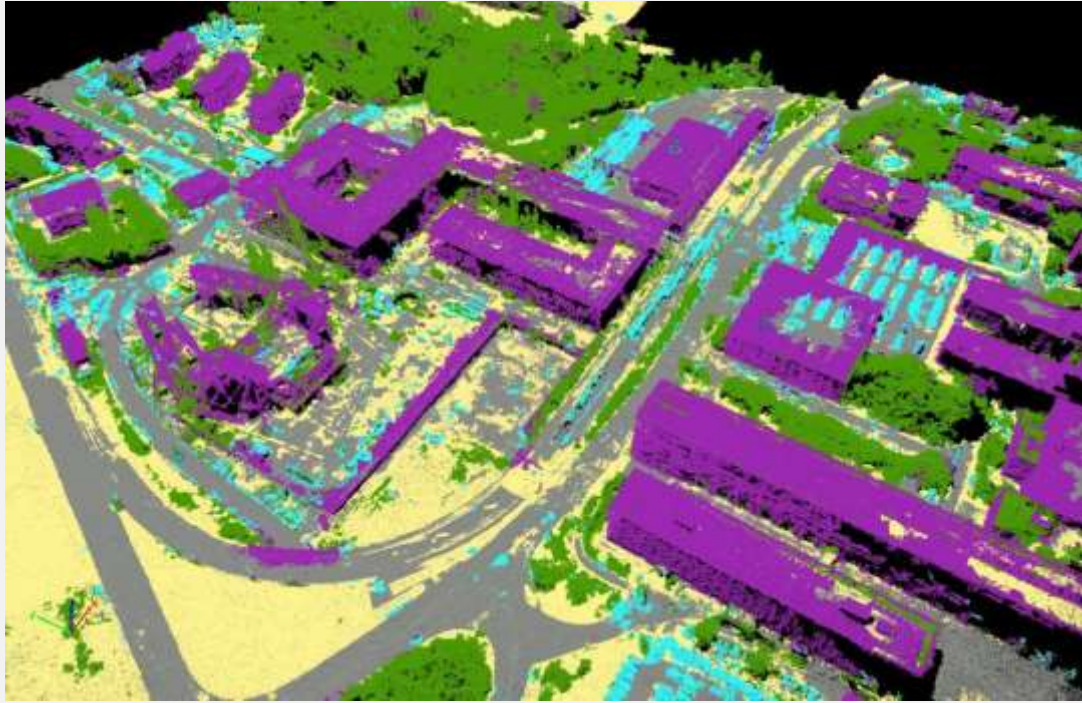
**Local Time**  
Sep 5th, 11:36:06 am

**Group Duration**  
0.742 seconds

[Download Image](#)



# Performance Monitoring

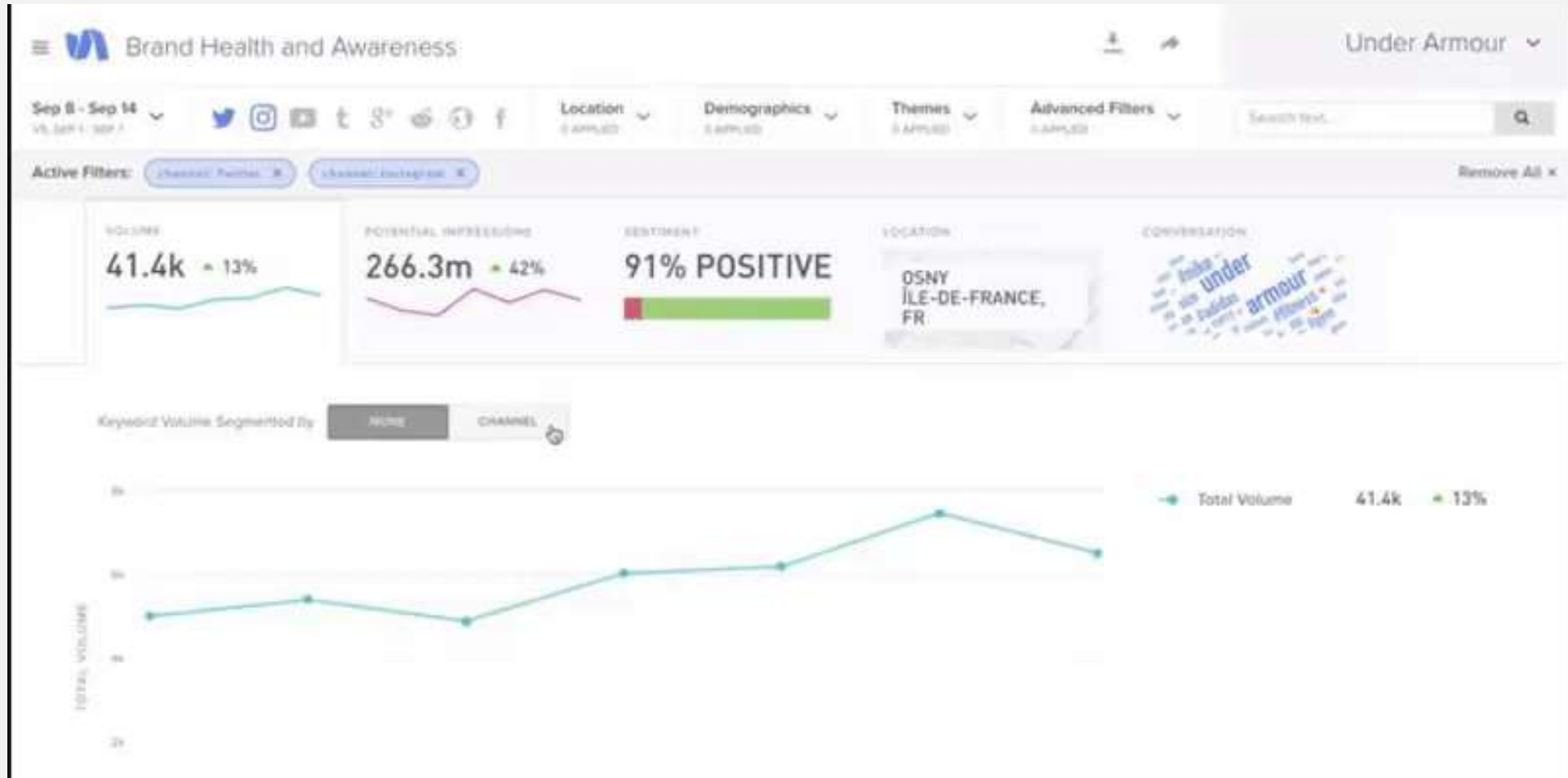




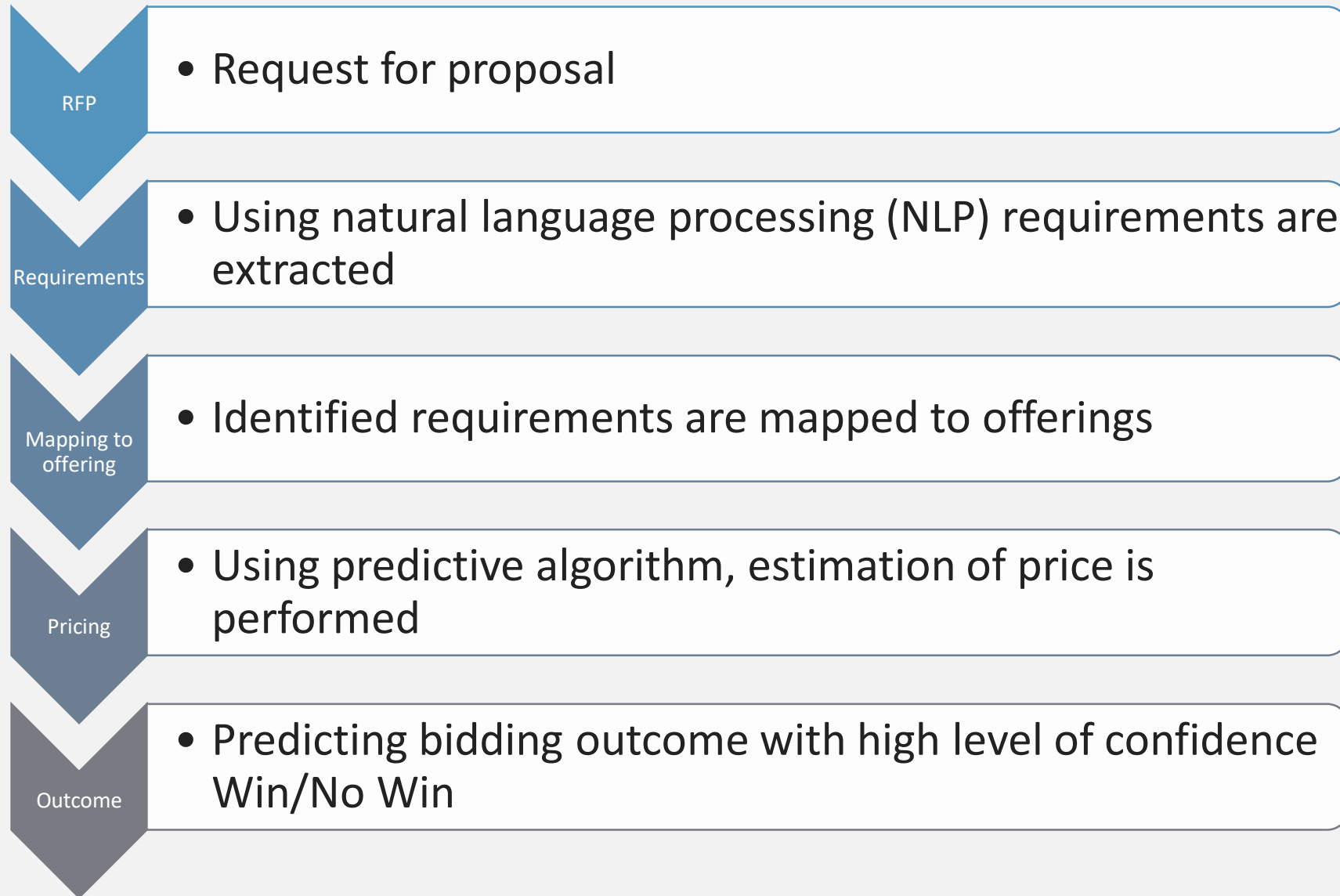
# Planning and Controls



# Community Engagement



# Procurement







# Q&A

If you have any questions, please visit us at the LogiKal stand (5)

## Connect with Me



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