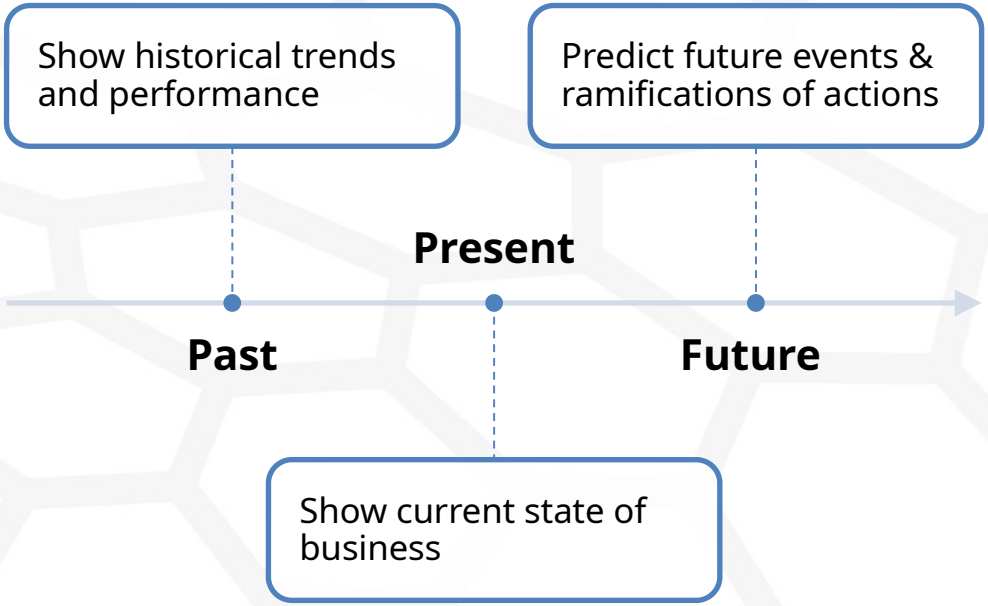
# Intro to Data Science

# The Data Revolution

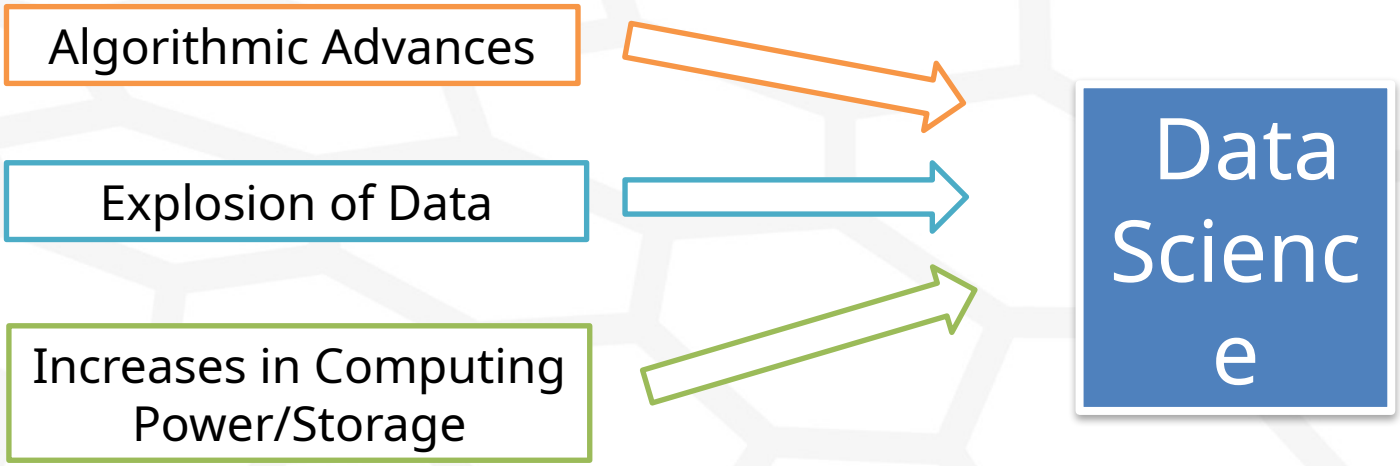



Images from https://www.nodegraph.se

# What Can Data Do?



# Why Now?



# Who Can Benefit From Data?

- Not just mega-organizations or tech
- Non-technical use cases
  - Sports teams: Maximizing bang for buck
  - Health/medicine: Reactive to preventative
  - Retail: Recommending products, predicting customer behavior

# Ways to Use Data

## Predict

Predict outcomes such as customer behavior, product prices, or health measures

Example: Volvo Trucks

https://commons.wikimedia.org/wiki/File:Oevlk_-_Volvo_VNL.jpg

- Volvo partnered with IBM to monitor data collected from Volvo Group trucks.
- Using this data and machine learning, they can predict component failure in the truck and produce preventative maintenance solutions.

https://www.ibm.com/case-studies/volvo-group

# Ways to Use Data

## Cluster

Behavior segmentation, pinpoint marketing, filtering nuisance material

Example: Salesforce


https://commons.wikimedia.org/wiki/File:Salesforce_Users_Email_list.png

- Salesforce has implemented a way for users to cluster their data. For example, accounts can be clustered based on characteristics such as number of employees, annual revenue, etc.

https://help.salesforce.com/s/articleView?id=sf.bi_integrate_recipe_transformation_cluster.htm&type=5

# Ways to Use Data

## Optimize

Price points, marketing campaigns, inventory levels

Example: Stitch Fix


https://commons.wikimedia.org/wiki/File:Stack_and_box_fall.jpg

- They need to determine which styles to purchase, how to allocate inventory appropriately to different warehouses, and when to remove old inventory to make room for new styles
- Use robust optimization on a model of their inventory system that was fit to historical data

https://algorithms-tour.stitchfix.com/#inventory-management

# Ways to Use Data

## Detect

Fraudulent activity, cyber-attacks, objects in images, process anomalies

Example: Anheuser-Busch InBev


https://commons.wikimedia.org/wiki/File:Budweiser_Beer_Anheuser_Busch_InBev_Brewing_Company.jpg

- Launched a platform called "BrewRight" that monitors transaction activity across 100 countries and uses machine learning to identify fraud and corruption.
- Used to help ensure compliance with the Federal Corrupt Practices Act

https://www.ab-inbev.com/news-media/innovation/how-brewright-is-rooting-out-corruption-at-ab-inbev-and-beyond/

# Ways to Use Data

## Recommend

Recommend movies, books, or other items for purchasing

Example: Netflix Recommender System

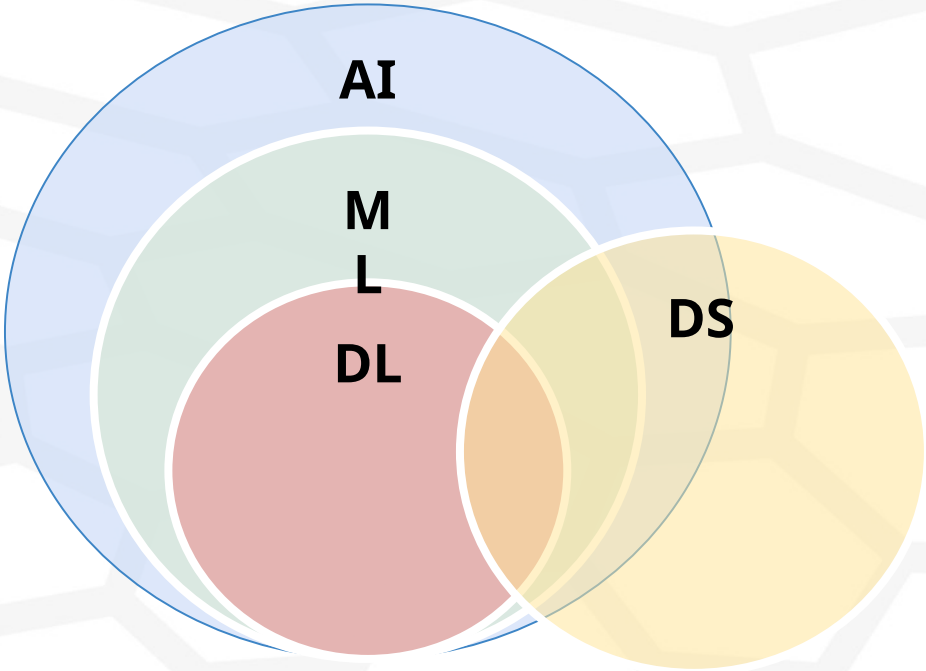
https://commons.wikimedia.org/wiki/File:Netflix-new-icon.png

Netflix uses a personalized recommender system to recommend movies to watch.

- Netflix has about a 90-second window to help viewers find a movie or a TV show before they leave the platform.
- Netflix's recommendation system produces $1 billion a year in value from customer retention.

https://medium.com/@springboard_ind/how-netflixs-recommendation-engine-works-bd1ee381bf81

# What is Data Science?




**Artificial Intelligence (AI)**
The development of a machine that can simulate human behavior.

**Machine Learning (ML)**
The process of a machine learning from data and making decisions without explicit programming.

**Deep Learning (DL)**
A term associated with a ML algorithm involving artificial neural networks that work to mimic neurons in the brain.

**Data Science (DS)**
The process of using data analytics, statistics, and programming to solve business problems.