Data Science Cheat Sheet for Business Leaders

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Data Science Basics

Types of Data Science

→ **Descriptive Analytics (Business Intelligence):** Get useful data in front of the right people in the form of dashboards, reports, and emails
- Which customers have churned?
- Which homes have sold in a given location, and do homes of a certain size sell more quickly?

→ **Predictive Analytics (Machine Learning):** Put data science models continuously into production
- Which customers may churn?
- How much will a home sell for, given its location and number of rooms?

→ **Prescriptive Analytics (Decision Science):** Use data to help a company make decisions
- What should we do about the particular types of customers that are prone to churn?
- How should we market a home to sell quickly, given its location and number of rooms?

The Standard Data Science Workflow

1. **Data Collection:** Compile data from different sources and store it for efficient access

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2. **Exploration and Visualization:** Explore and visualize data through dashboards

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3. **Experimentation and Prediction:** The buzziest topic in data science—machine learning!

Building a Data Science Team

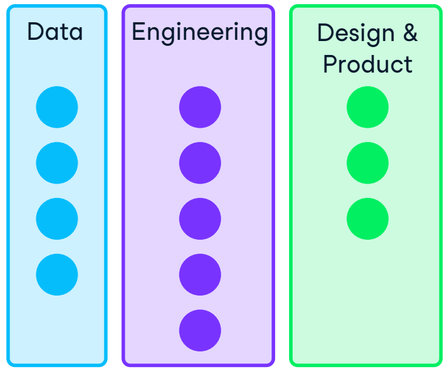
Your data team members require different skills for different purposes.

Data Engineer	Data Analyst	Machine Learning Engineer	Data Scientist
Store and maintain data	Visualize and describe data	Write production-level code to predict with data	Build custom models to drive business decisions
SQL/Java/Scala/ Python	SQL + BI Tools + Spreadsheets	Python/Java/R	Python/R/SQL

Data Science Team Organizational Models

Centralized/isolated

The data team is the owner of data and answers requests from other teams

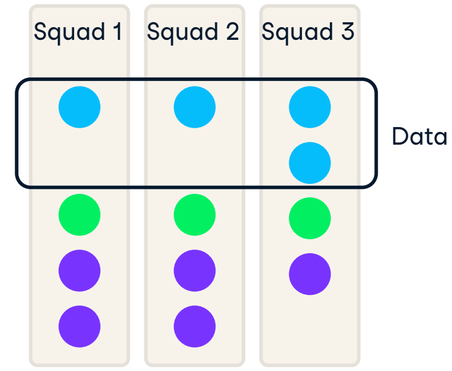


Embedded

Data experts are dispersed across an organization and report to functional leaders

Hybrid

Data experts sit with functional teams and also report to the Chief Data Scientist—so data is an organizational priority



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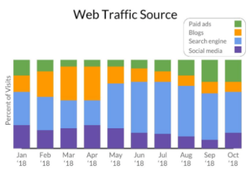
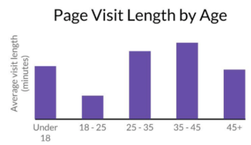
Exploration and Visualization

The type of dashboard you should use depends on what you'll be using it for.

Common Dashboard Elements

Type	What is it best for?	Example
Time series	Tracking a value over time	
Stacked bar chart	Tracking composition over time	
Bar chart	Categorical comparison	

Popular Dashboard Tools

Spreadsheets	BI Tools	Customized Tools
Excel	Power BI	R Shiny
Sheets	Tableau	d3.js
	Looker	

When You Should Request a Dashboard

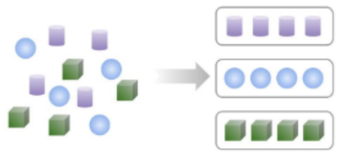
- When you'll use it multiple times
- When you'll need the information updated regularly
- When the request will always be the same

Experimentation and Prediction

Machine Learning

Machine learning is an application of artificial intelligence (AI) that builds algorithms and statistical models to train data to address specific questions without explicit instructions.

	Supervised Machine Learning	Unsupervised Machine Learning
Purpose	Makes predictions from data with labels and features	Makes predictions by clustering data with no labels into categories
Example	Recommendation systems, email subject optimization, churn prediction	Image segmentation, customer segmentation



Special Topics in Machine Learning

→ **Time Series Forecasting** is a technique for predicting events through a sequence of time and can capture seasonality or periodic events.

→ **Natural Language Processing (NLP)** allows computers to process and analyze large amounts of natural language data.

- Text as input data
- Word counts track the important words in a text
- Word embeddings create features that group similar words

Deep Learning / Neural Networks enables unsupervised machine learning using data that is unstructured or unlabeled.	**Explainable AI** is an emerging field in machine learning that applies AI such that results can be easily understood.
Highly accurate predictions	Understandable by humans
Better for "What?"	Better for "Why?"