What is Data Science?

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Mari Nazary

VP Product & Learner Experience at the Lambda School

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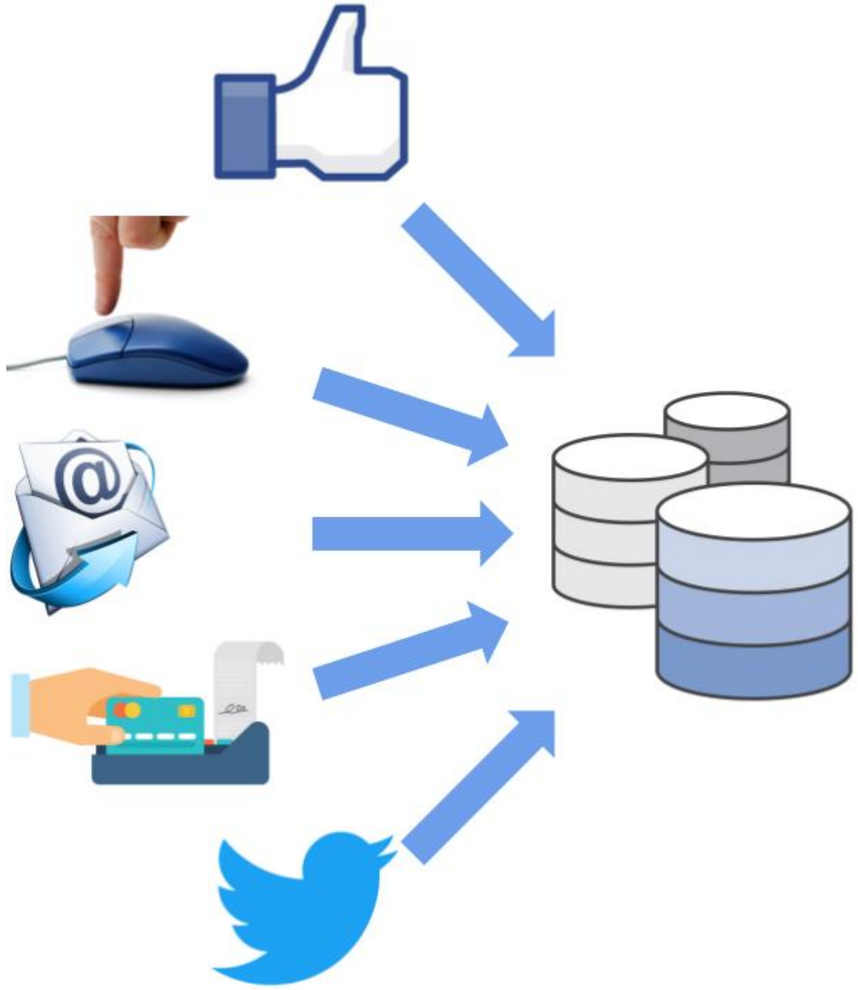
Let's ask Google!

Making data work for you



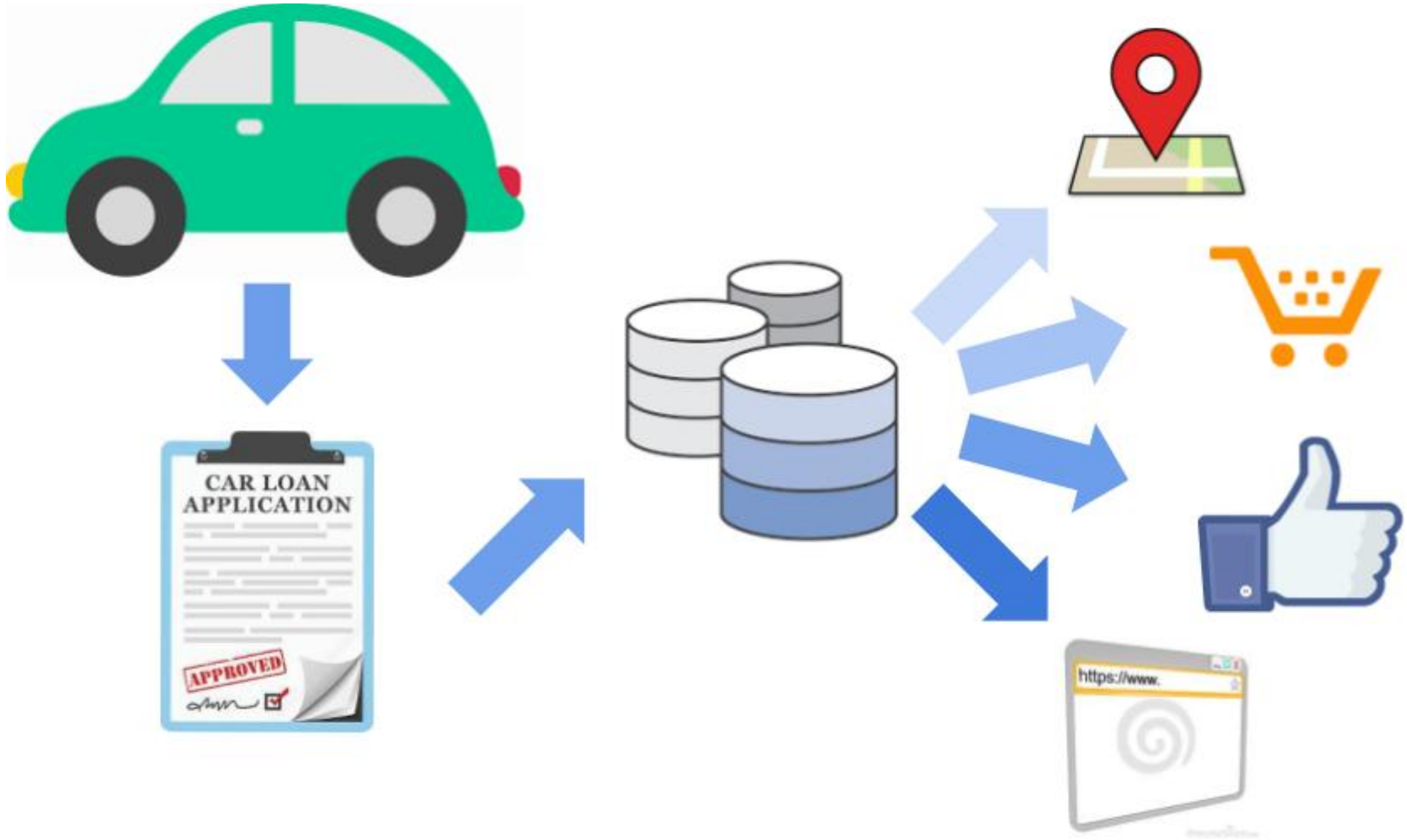
What can data do?

- Describe the current state of an organization or process
- Detect anomalous events
- Diagnose the causes of events and behaviors
- Predict future events

Why now?

Why now?

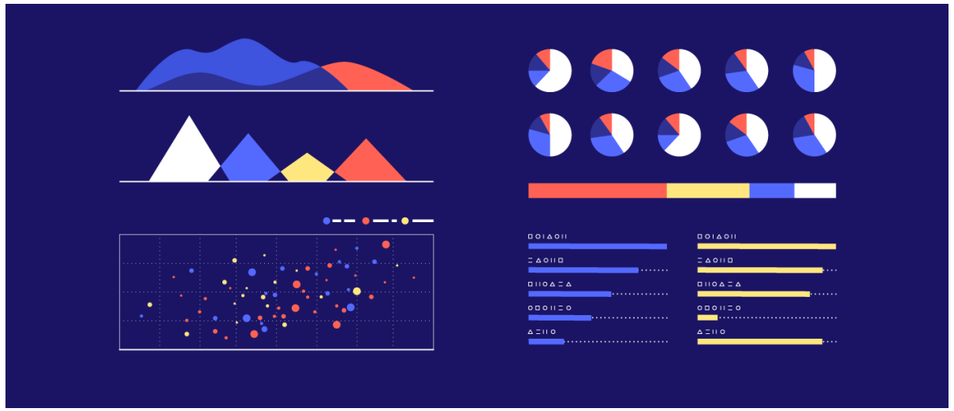
Why now?



The data science workflow

Data collection

Exploration and visualization



Experimentation and prediction

Let's practice!

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Applications of Data Science

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More case studies

- Traditional machine learning
- Internet of Things (IoT)
- Deep Learning

Case study: fraud detection

Case study: fraud detection

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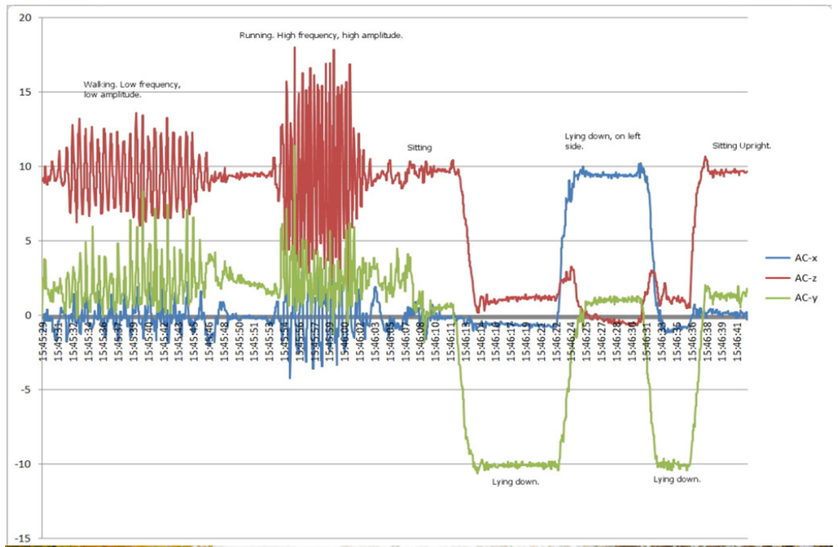
What do we need for machine learning?

- A well-defined question
  - *"What is the probability that this transaction is fraudulent?"*
- A set of example data
  - *Old transactions labeled as "fraudulent" or "valid"*
- A new set of data to use our algorithm on
  - *New credit card transactions*

Case study: smart watch

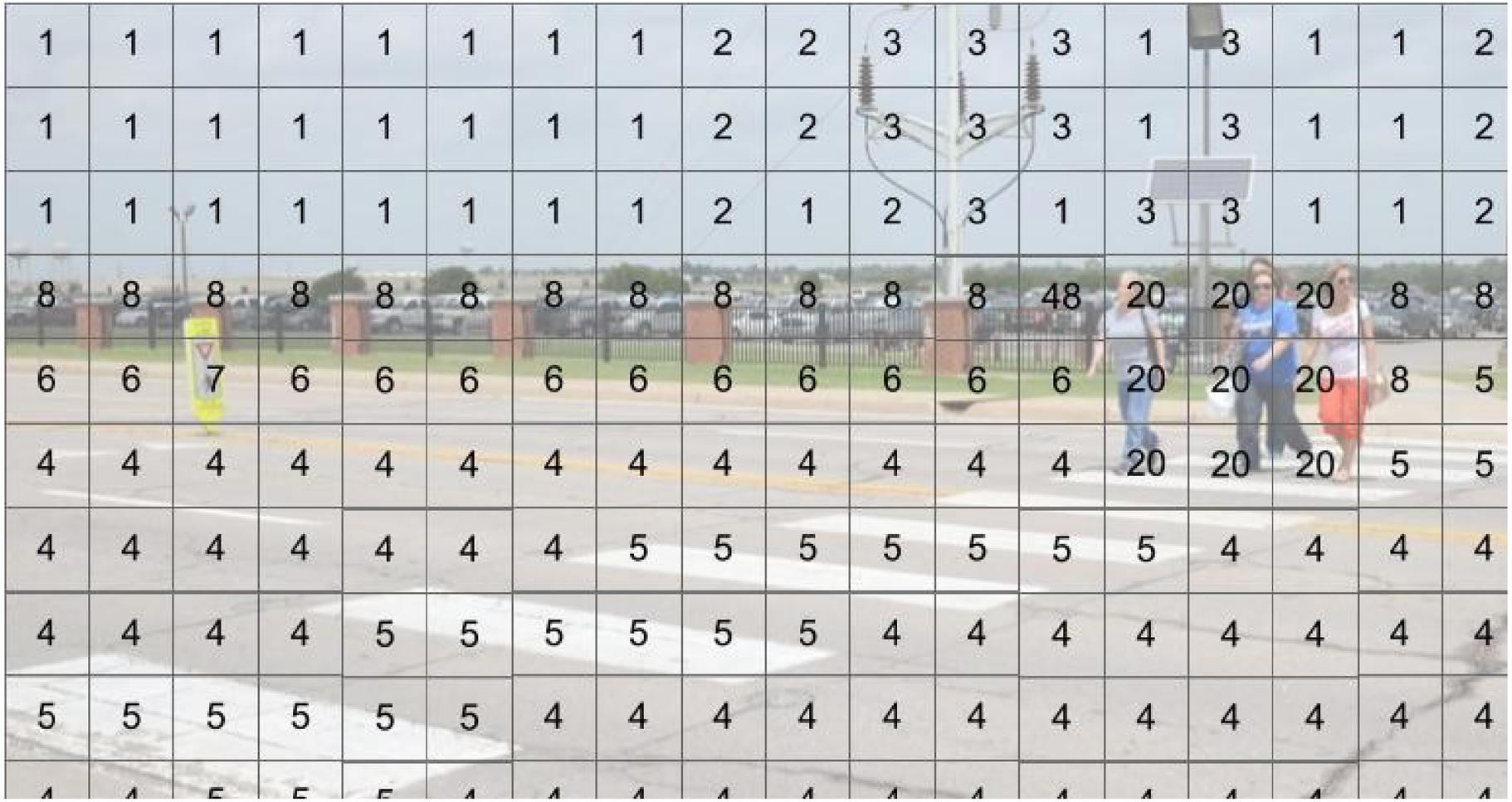


Internet of Things

- Smart watches
- Internet-connected home security systems
- Electronic toll collection systems
- Building energy management systems
- Much, much more!

Case study: image recognition

Case study: image recognition



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6	6	7	6	6	6	6	6	6	6	6	6	6	20	20	20	8	5
4	4	4	4	4	4	4	4	4	4	4	4	4	20	20	20	5	5
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5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4

Deep learning

- Many neurons work together
- Requires much more training data
- Used in complex problems
  - Image classification
  - Language learning/understanding

Let's practice!

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Building a data science team

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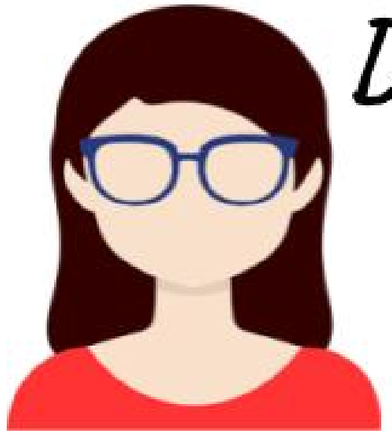
Members of your team

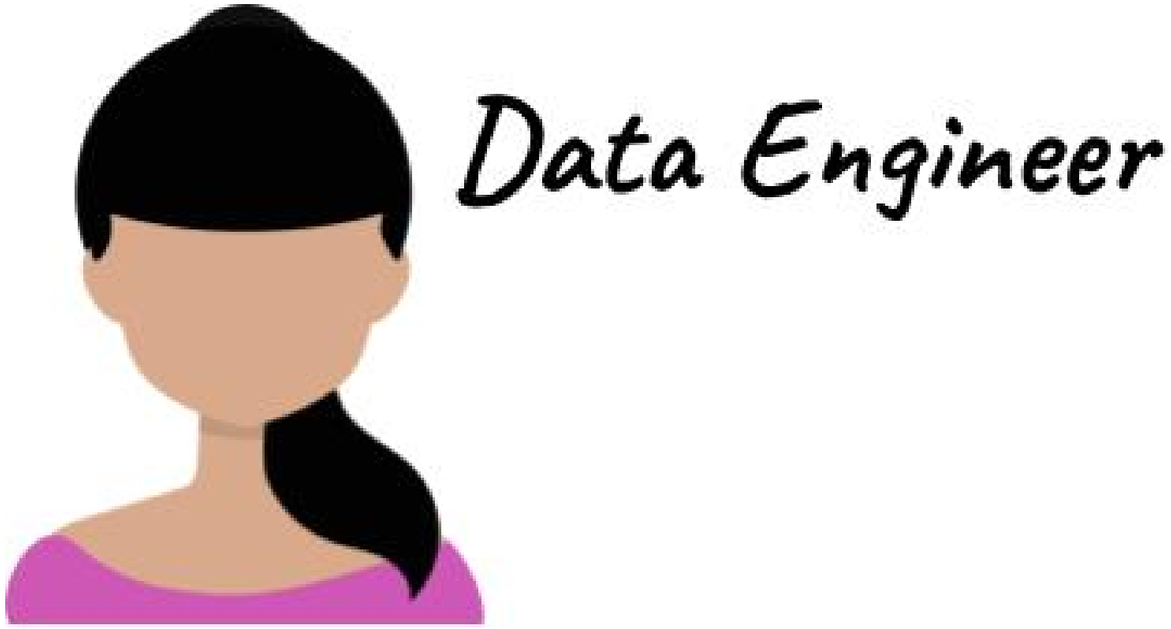
Data Engineer



Data Analyst

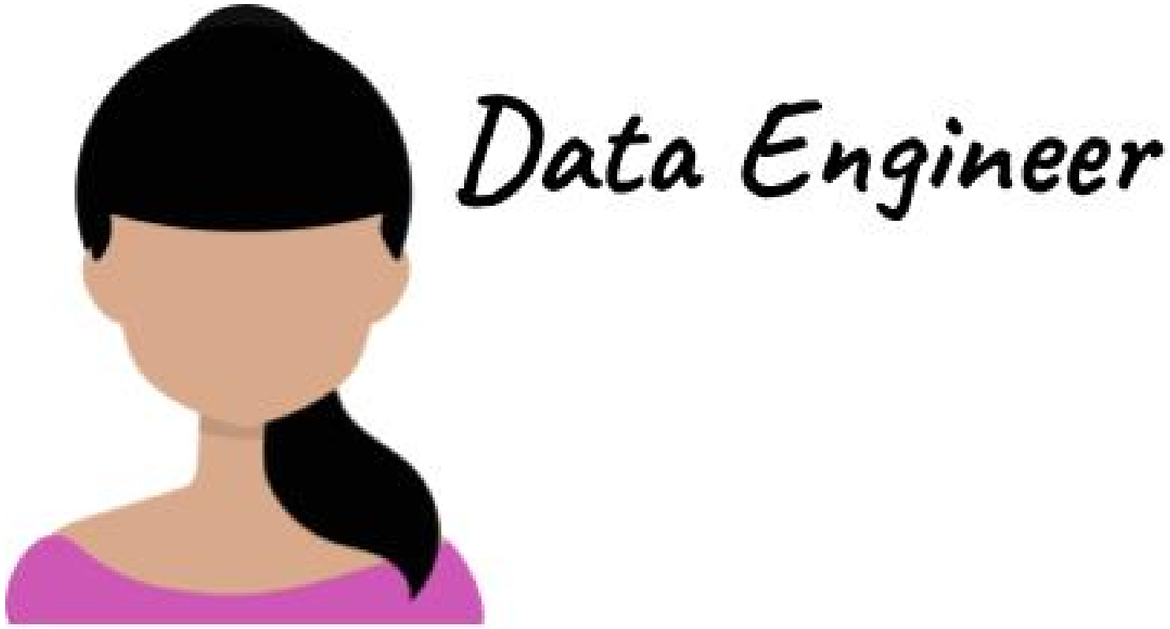
Machine Learning Scientist

Data engineering



- Information architects
- Build storage solutions
- Maintain data access

Data engineering tools



- SQL
  - Storing large quantities of data
- Java, Scala, or Python
  - Programming languages for processing data and automating tasks

Data analysis

- Creating dashboards
- Hypothesis testing
- Data visualization

Data analysis tools

- Spreadsheets (Excel or Google Sheets)
  - Simple storage and analysis
- SQL
  - Large-scale analysis
- BI Tools (Tableau, Power BI, Looker)
  - Dashboarding and sharing information

Machine learning

- Predictions and extrapolations
- Classification
- Stock price prediction
- Image processing
- Automated text analysis

Machine learning tools

- Python and R
  - Programming languages for creating predictive models

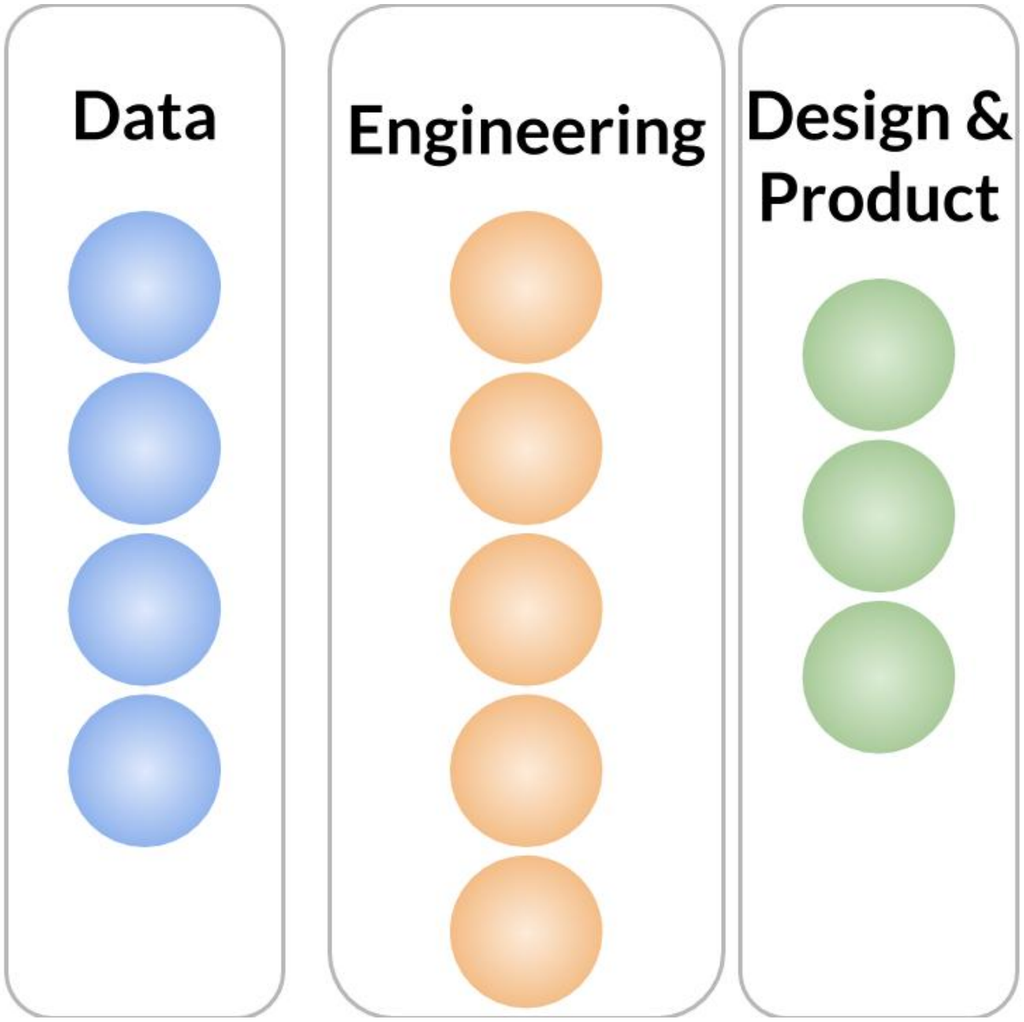
Review: members of your team

Data Engineer	Data Analyst	Machine Learning Scientist
Store and maintain data	Visualize and describe data	Model and predict with data
SQL + Java/Scala/Python	SQL + BI Tools + Spreadsheets	Python/R

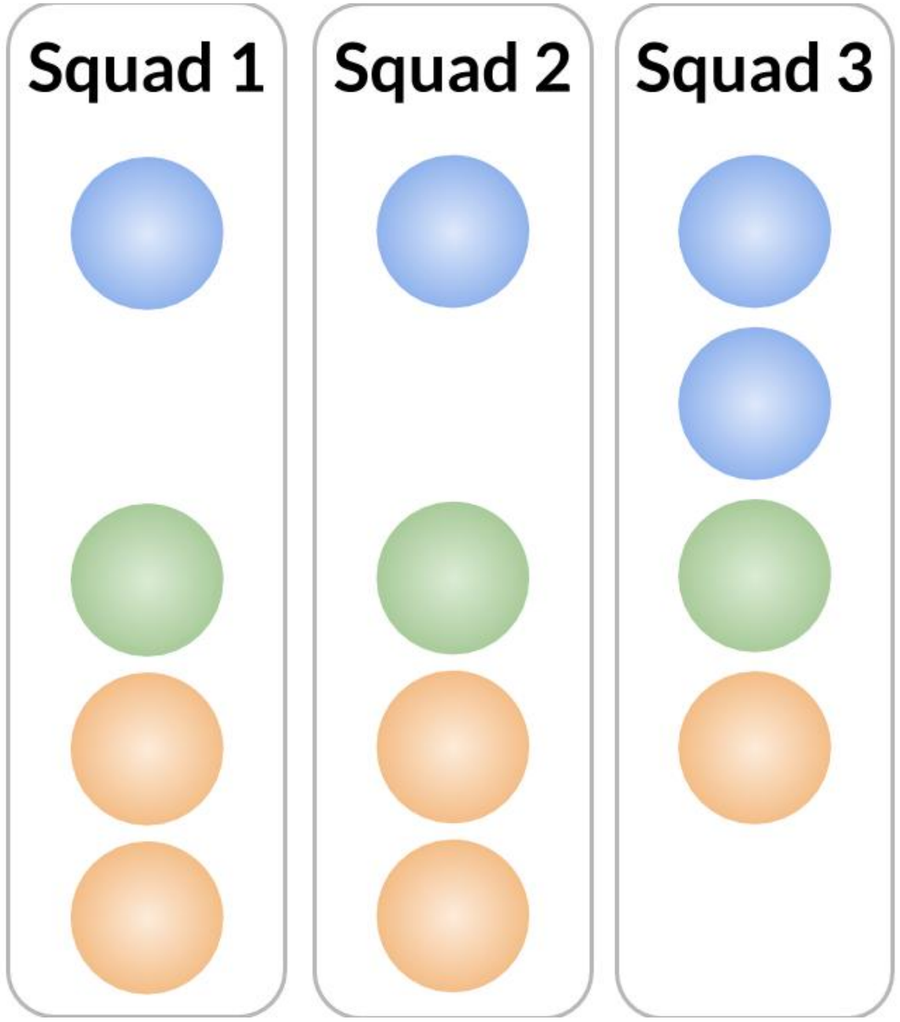
Data science team structure

- Isolated
- Embedded
- Hybrid

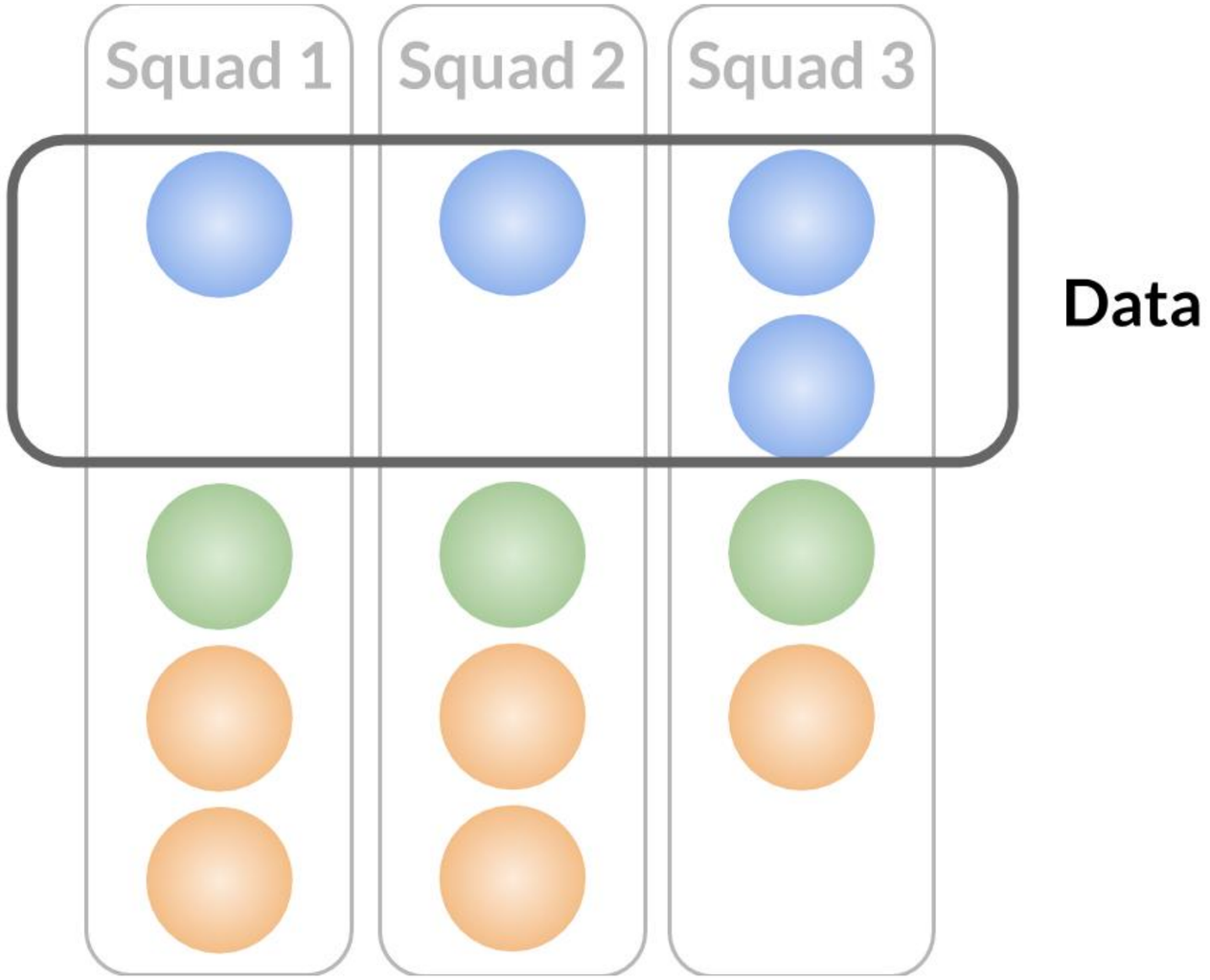
Team structure: isolated



Team structure: embedded



Team structure: hybrid



Let's practice!

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