

What is Data Science?

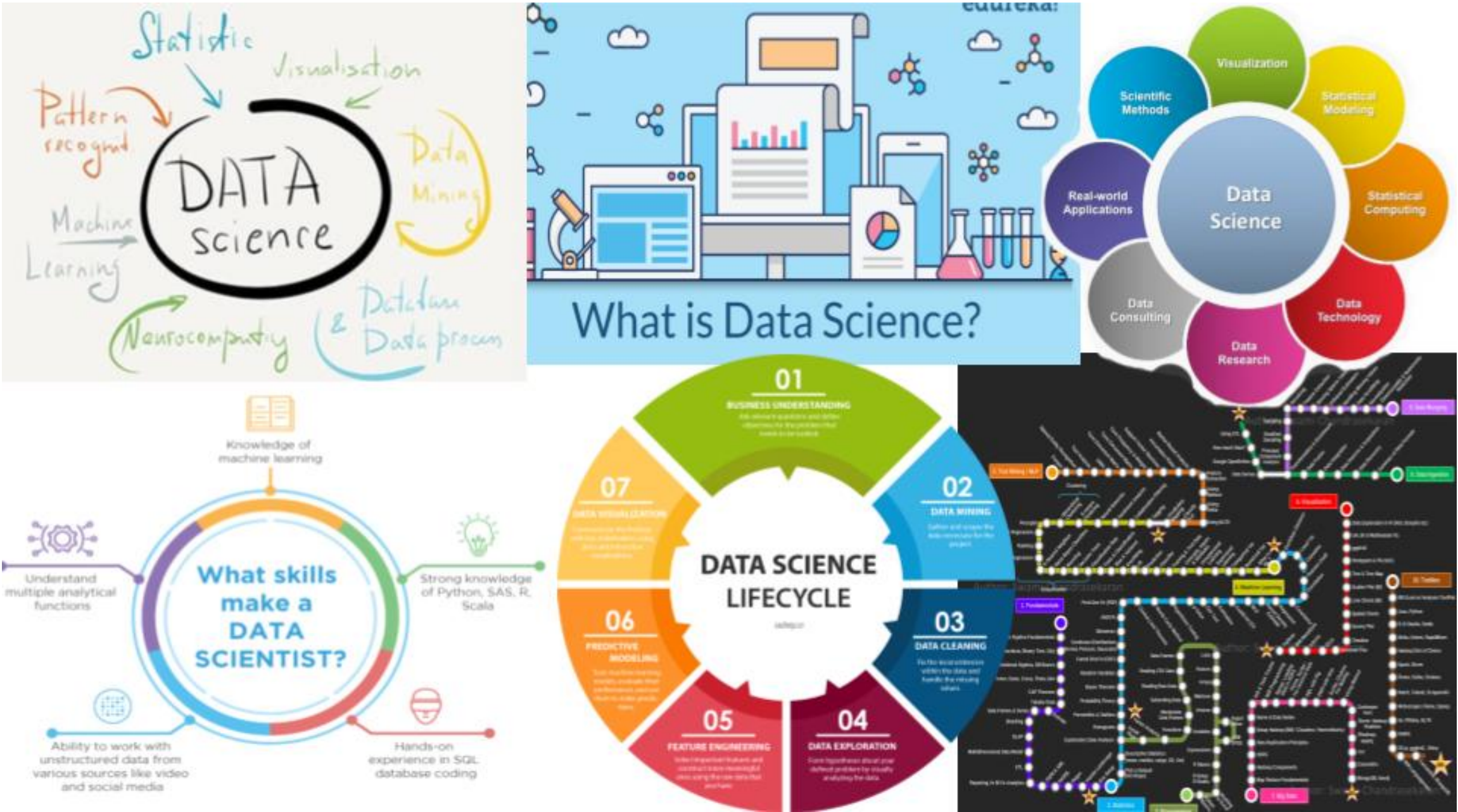
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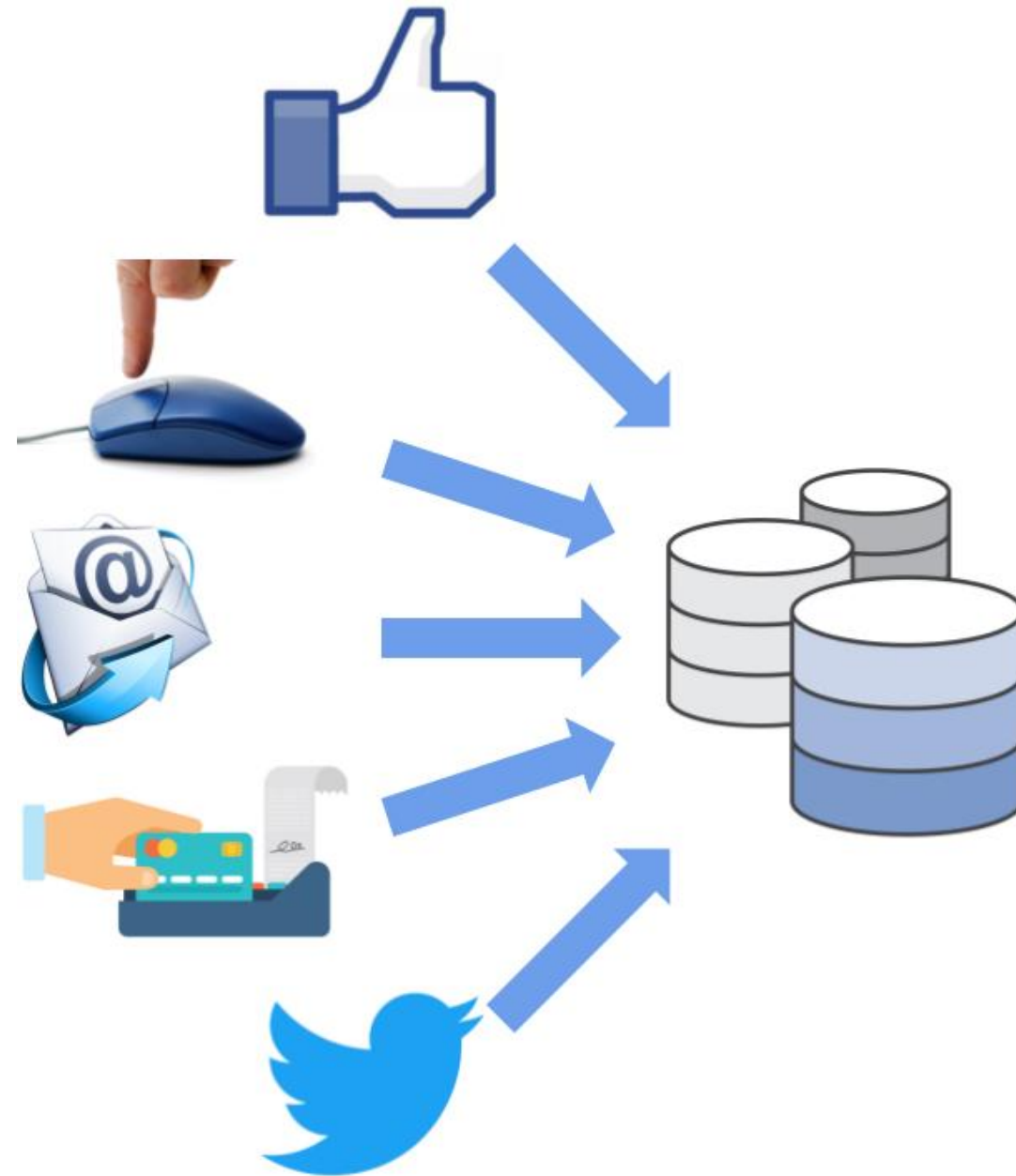
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VP Product & Learner Experience at the
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Let's ask Google!



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

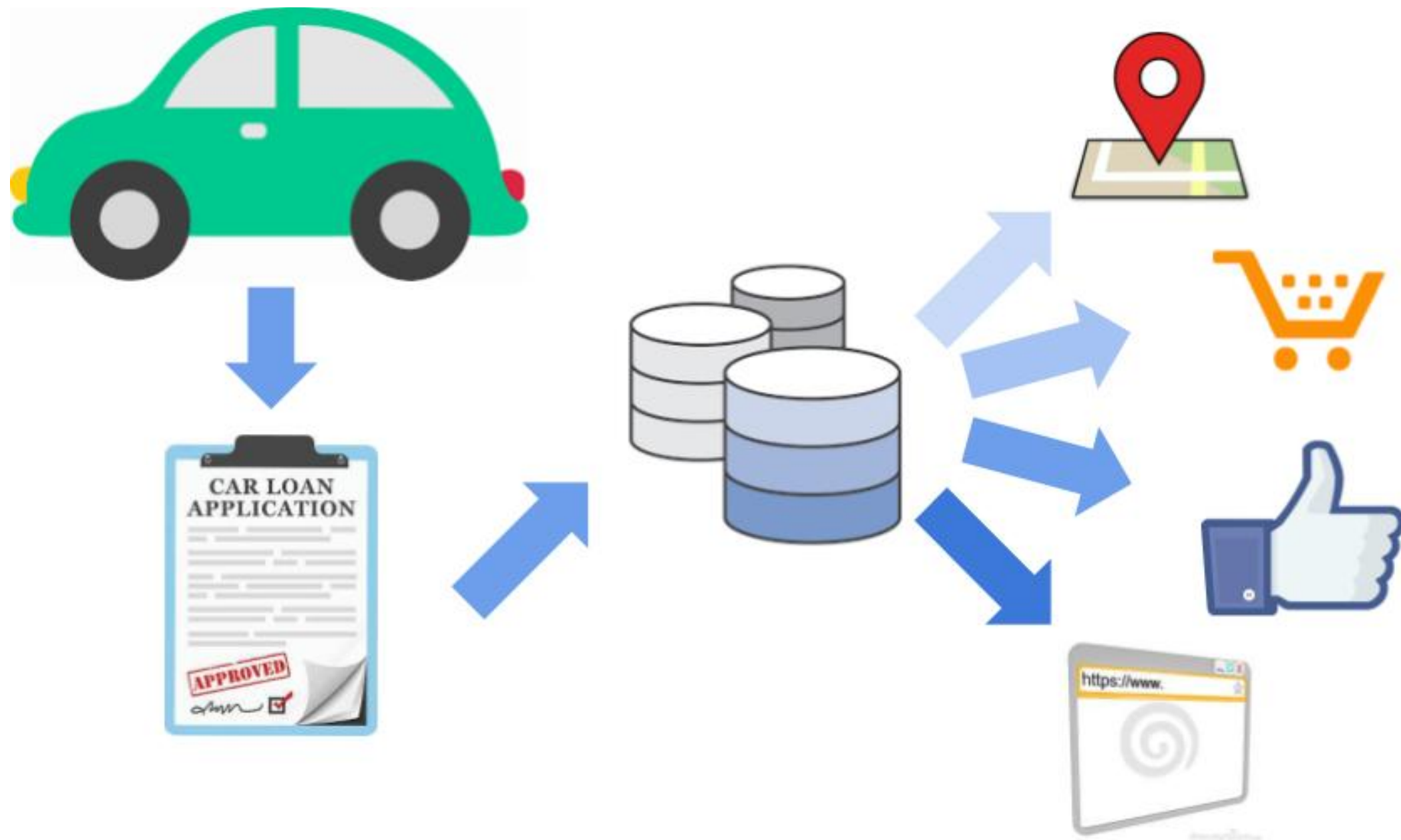
Why now?



Why now?



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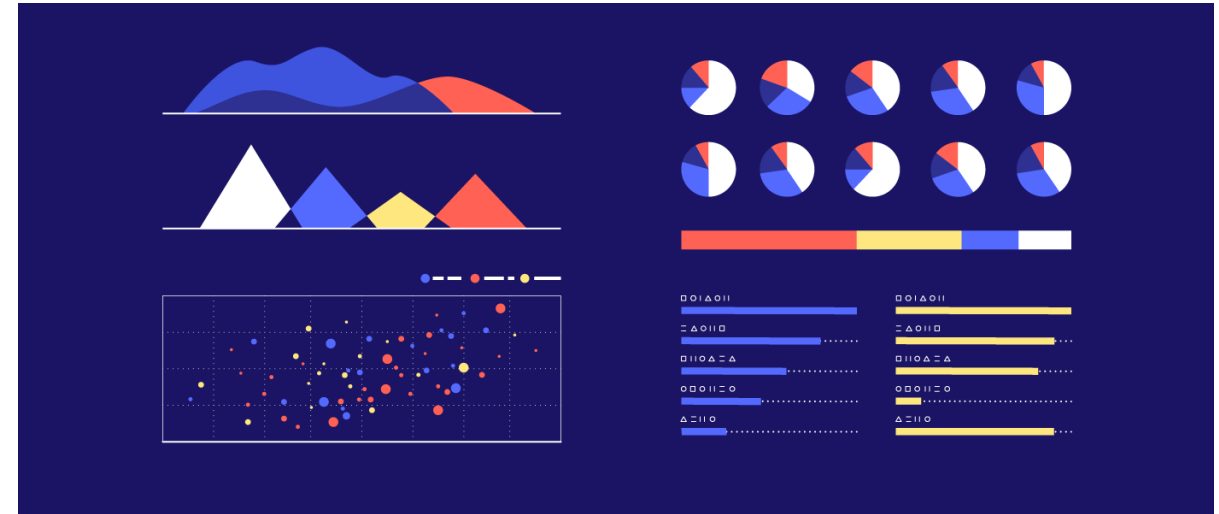


The data science workflow

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

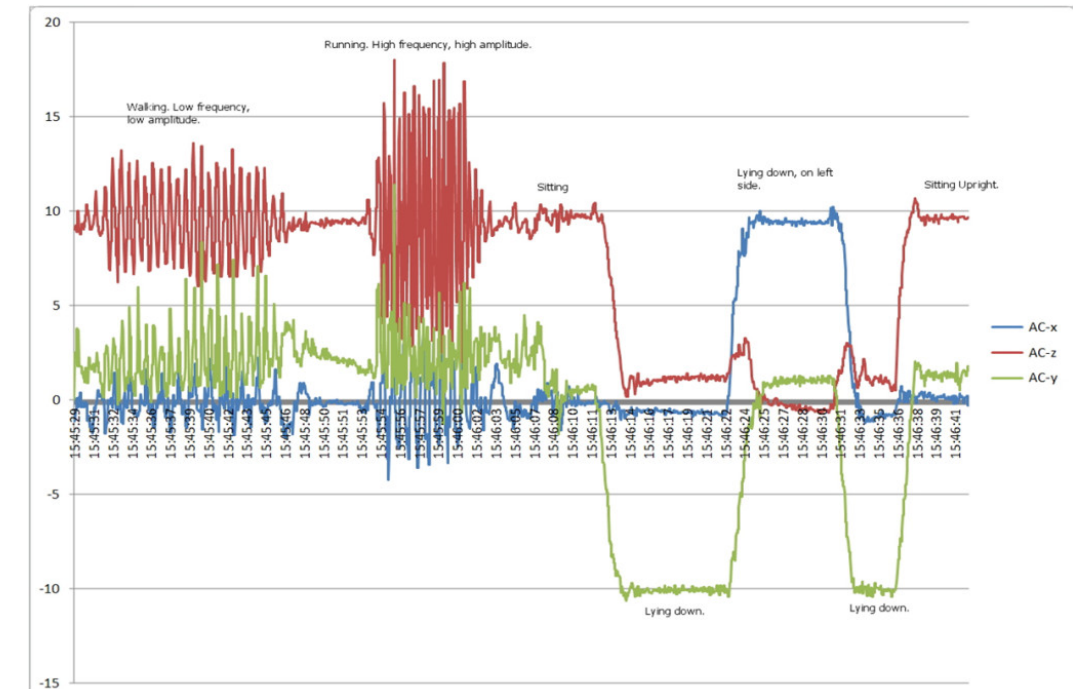


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What do we need for machine learning?

- 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

1	1	1	1	1	1	1	1	2	2	3	3	3	1	3	1	1	2
1	1	1	1	1	1	1	1	2	2	3	3	3	1	3	1	1	2
1	1	1	1	1	1	1	1	2	1	2	3	1	3	3	1	1	2
8	8	8	8	8	8	8	8	8	8	8	8	48	20	20	20	8	8
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4	4	4	4	5	5	5	5	5	5	4	4	4	4	4	4	4	4
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4	4	5	5	5	4	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

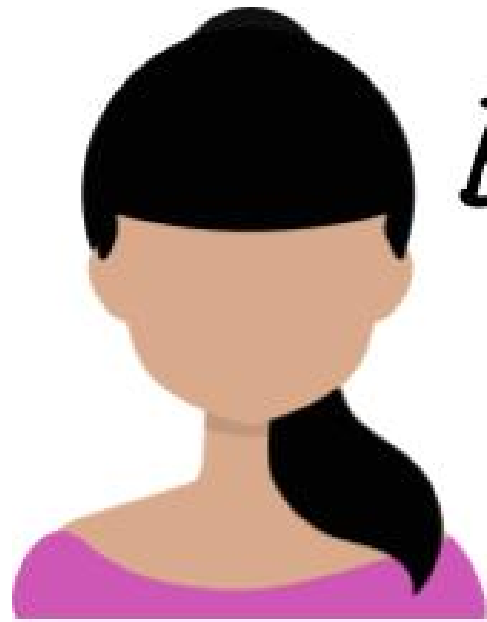
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Members of your team



Data Engineer



Data Analyst



*Machine Learning
Scientist*

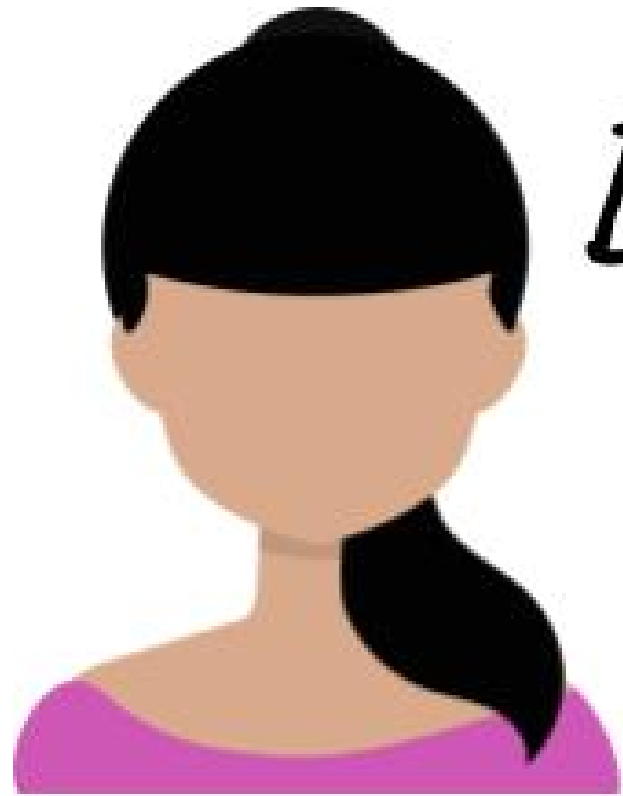
Data engineering



Data Engineer

- Information architects
- Build storage solutions
- Maintain data access

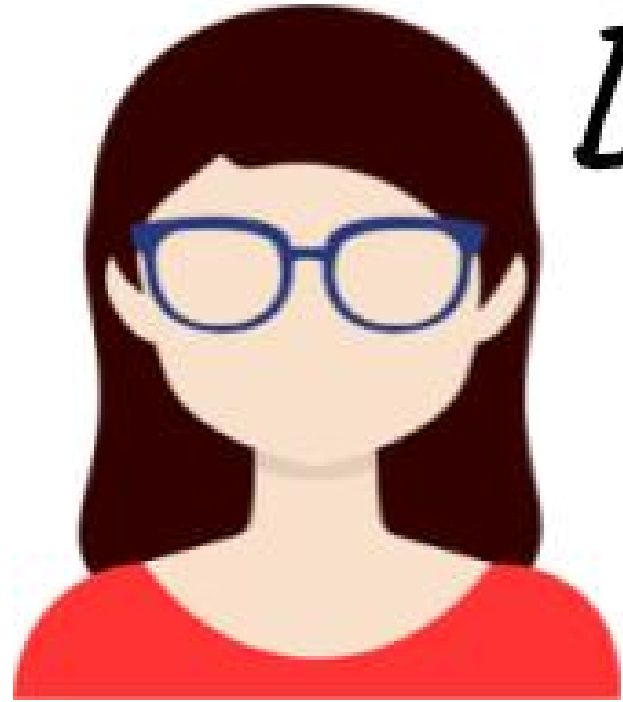
Data engineering tools



Data Engineer

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

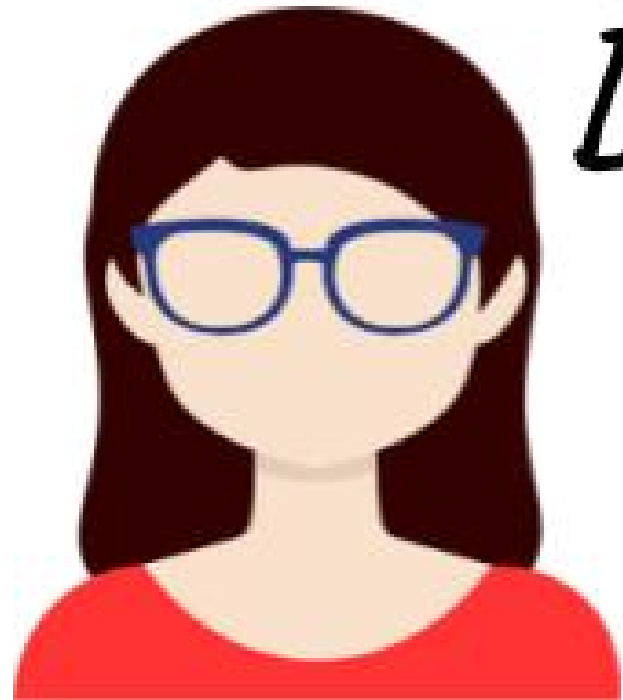
Data analysis



Data Analyst

- Creating dashboards
- Hypothesis testing
- Data visualization

Data analysis tools



Data Analyst

- 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



*Machine Learning
Scientist*

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

Machine learning tools



*Machine Learning
Scientist*

- Python and R
 - Programming languages for creating predictive models

Review: members of your team

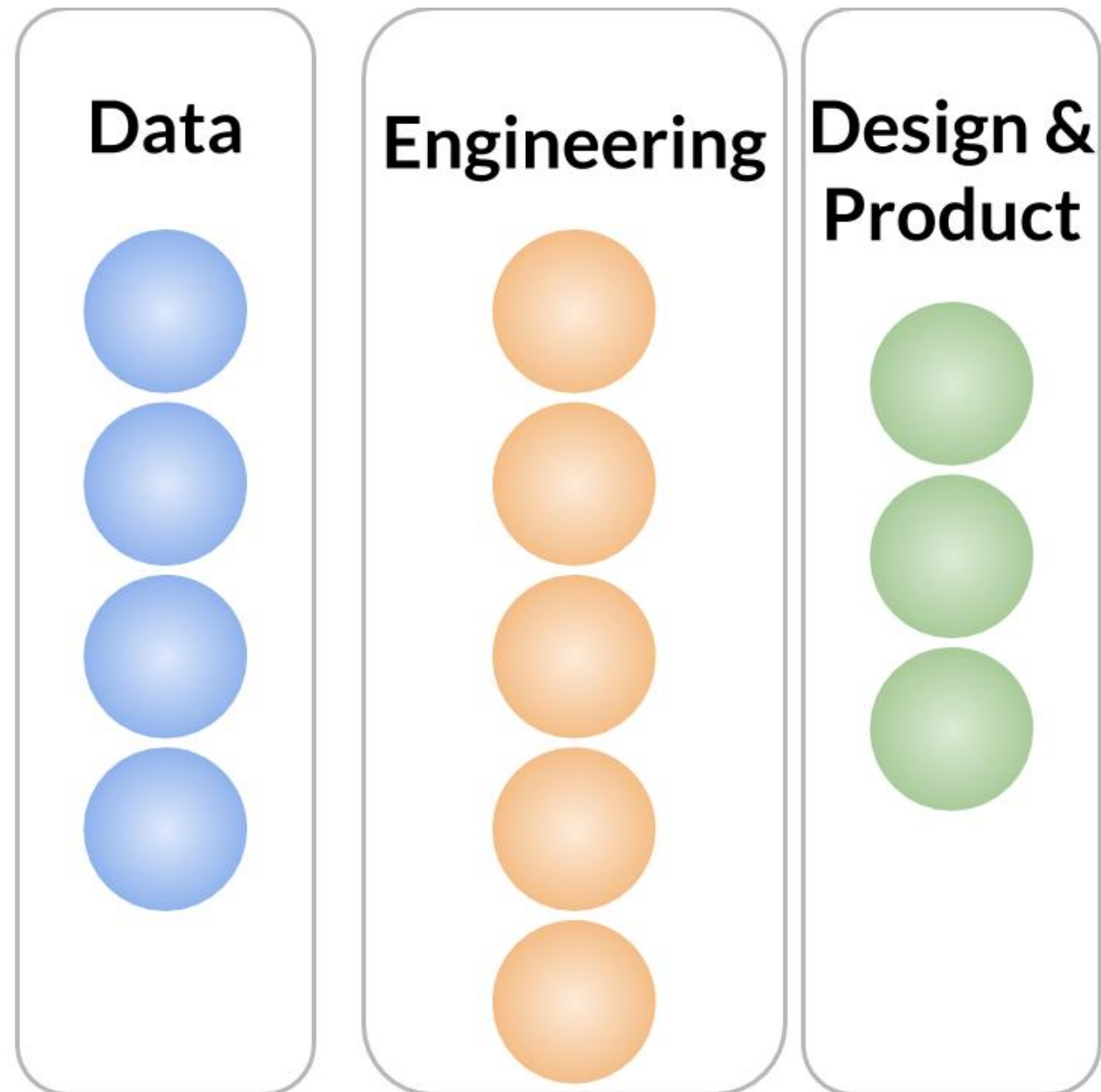


Data Engineer	Data Analyst	Machine Learning Scientist
Store and maintain data	Visualize and describe data	Model and predict with data
SQL + Java/Scala/Python	SQL + BI Tools + Spreadsheets	Python/R

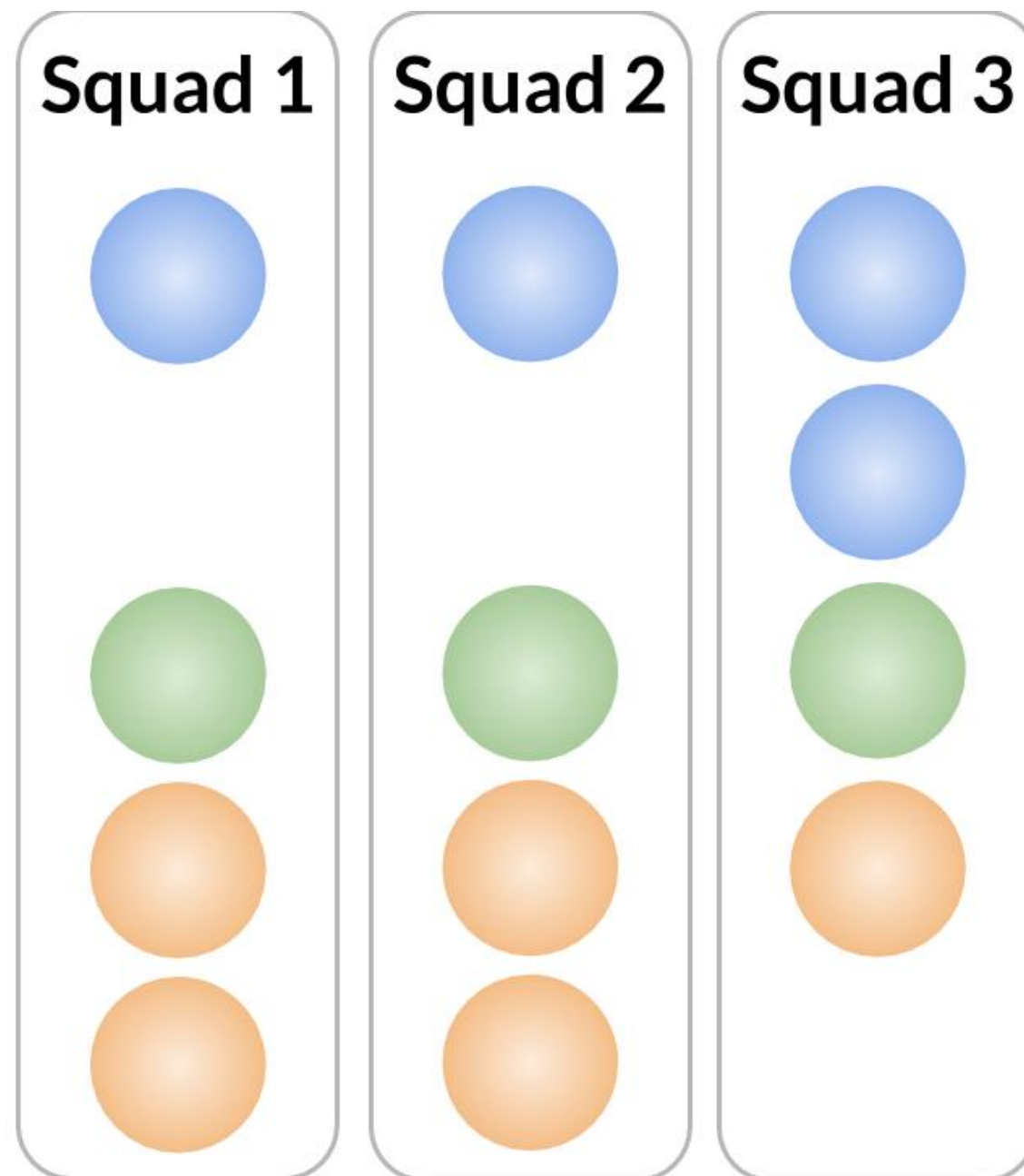
Data science team structure

- Isolated
- Embedded
- Hybrid

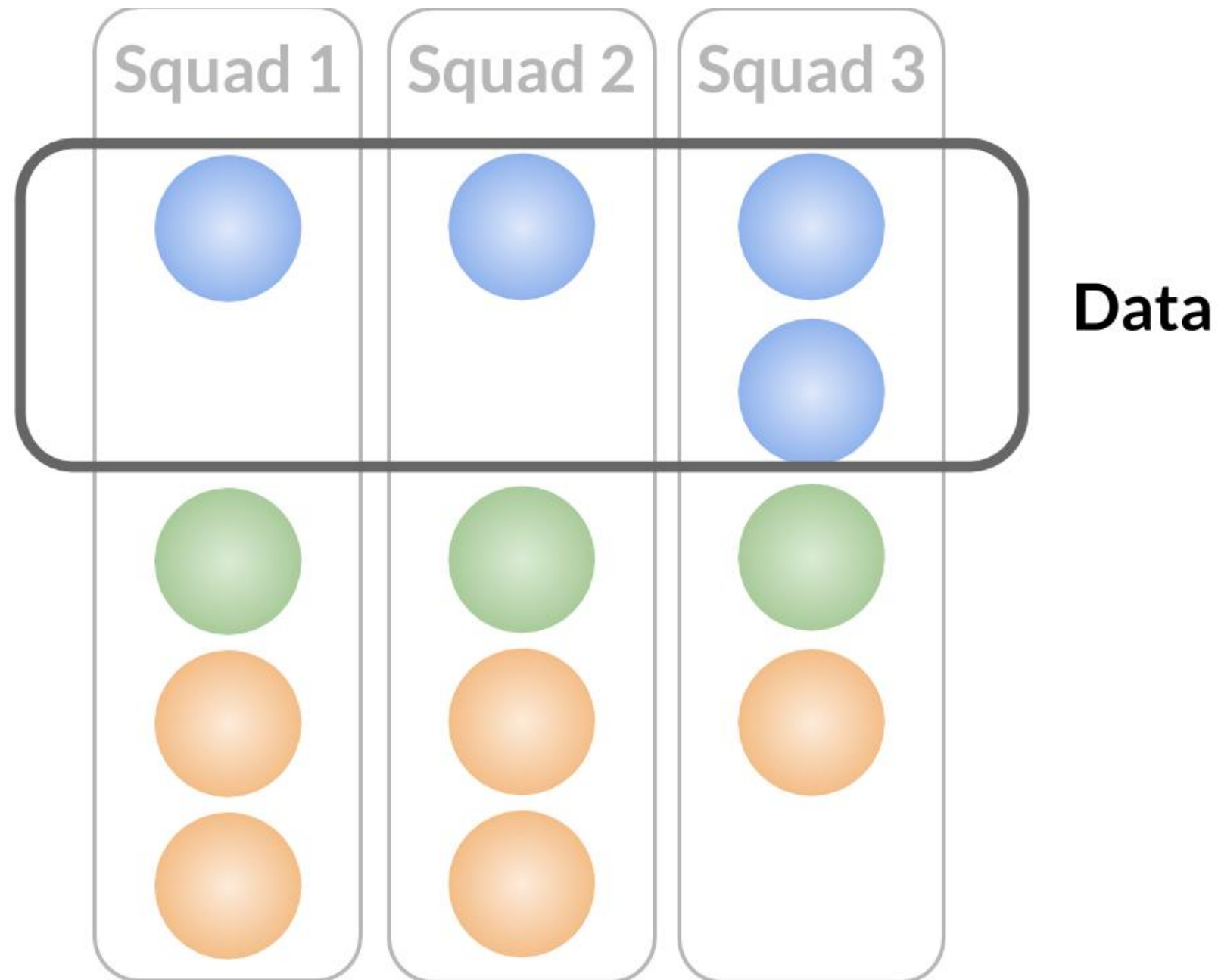
Team structure: isolated



Team structure: embedded



Team structure: hybrid



Let's practice!
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