What is data science?

DATA SCIENCE FOR EVERYONE

Lis Sulmont
Curriculum Manager, DataCamp

Let's ask Google!

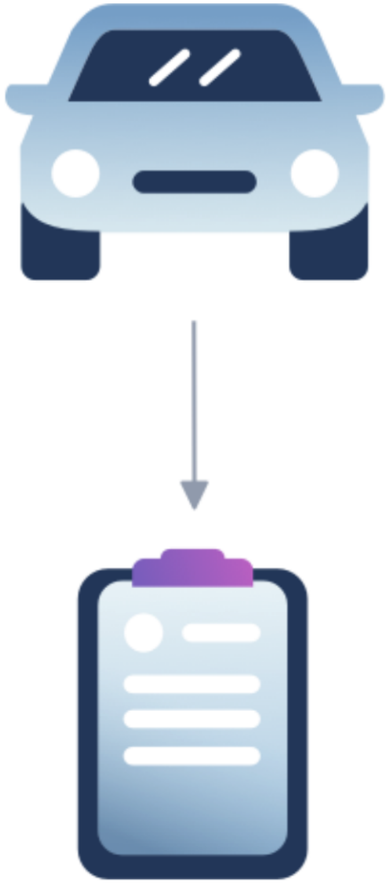
Making data work for you

Use data to better describe the present or better predict the future

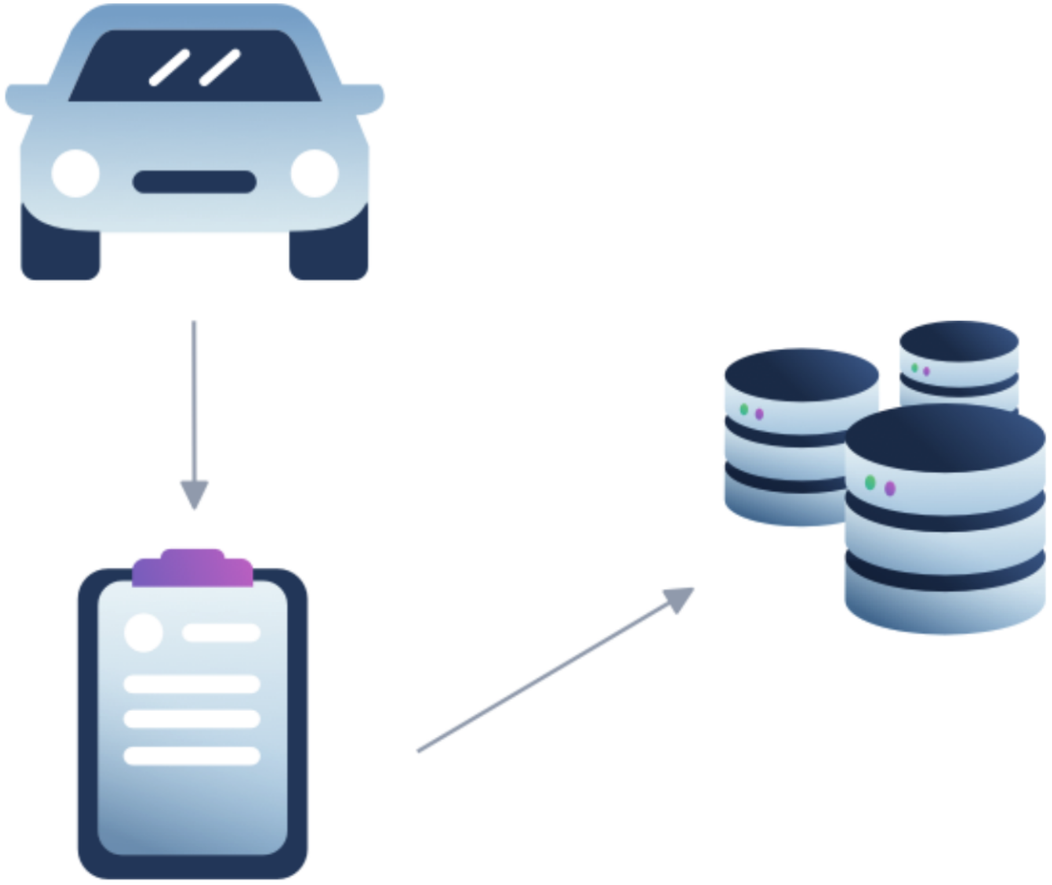
What can data do?

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

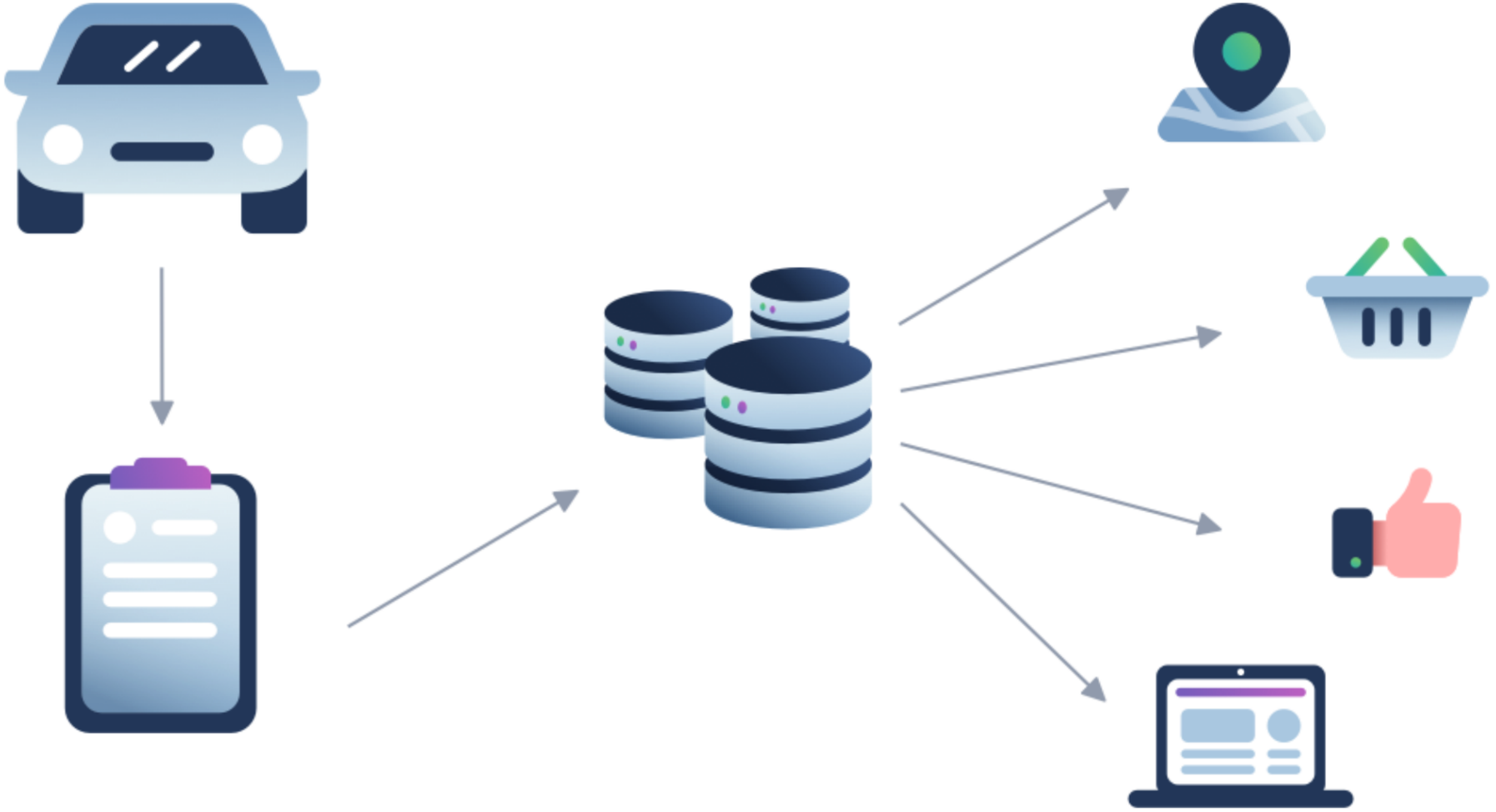
Why now?



Why now?



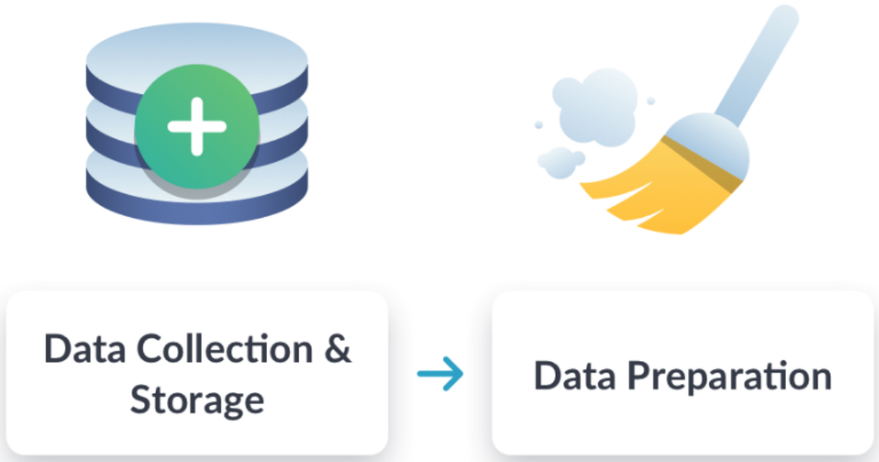
Why now?



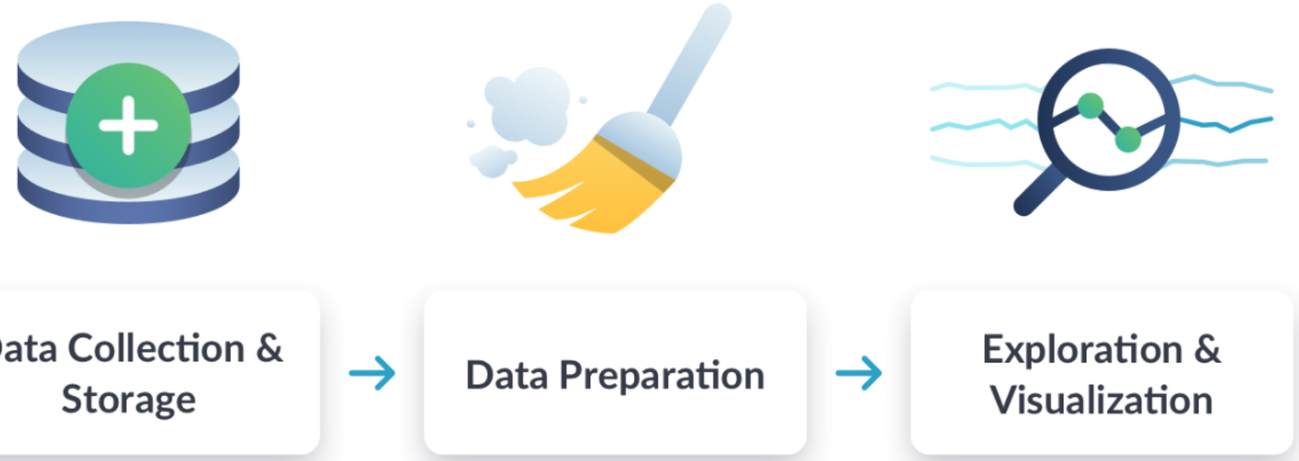
The data science workflow

Data Collection & Storage

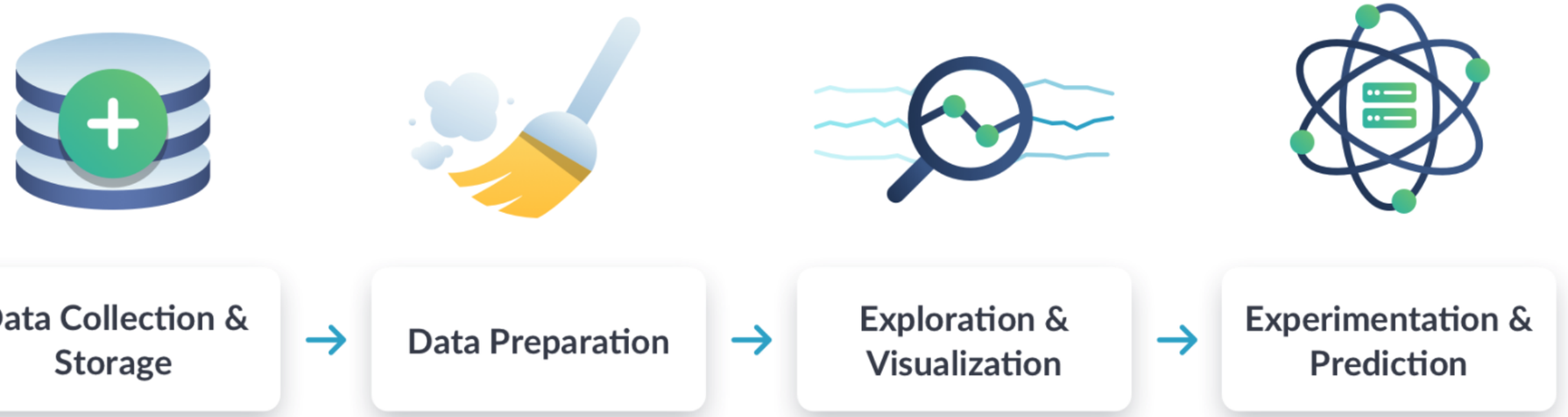
The data science workflow



The data science workflow



The data science workflow



Let's practice!

DATA SCIENCE FOR EVERYONE

Applications of data science

DATA SCIENCE FOR EVERYONE

Lis Sulmont
Curriculum Manager, DataCamp

datacamp

More case studies

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

Case study: fraud detection

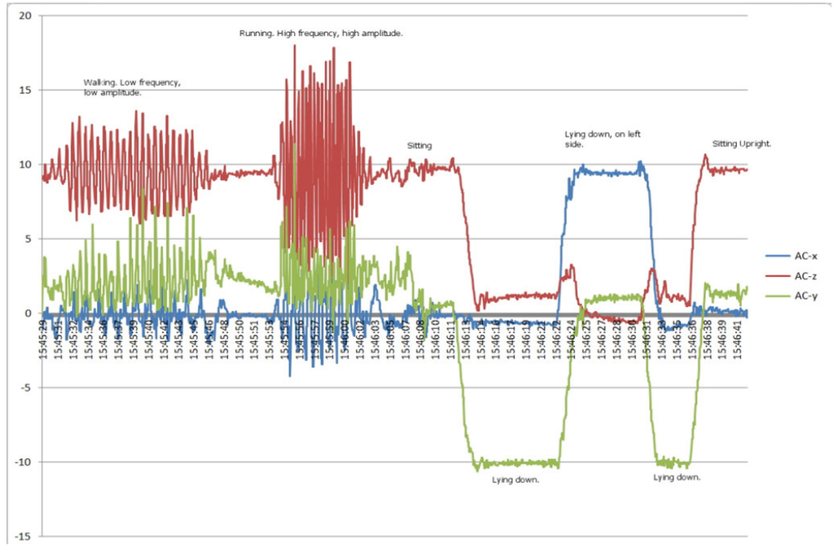
Case study: fraud detection

Amount	Date	Location	...
149.62	2019-05-23	London	...
2.69	2018-10-03	Birmingham	...
378.66	2019-06-15	Liverpool	...
123.5	2019-01-12	London	...
69.99	2018-06-16	São Paolo	...
3.67	2019-03-06	Brussels	...
...	...	...	...

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

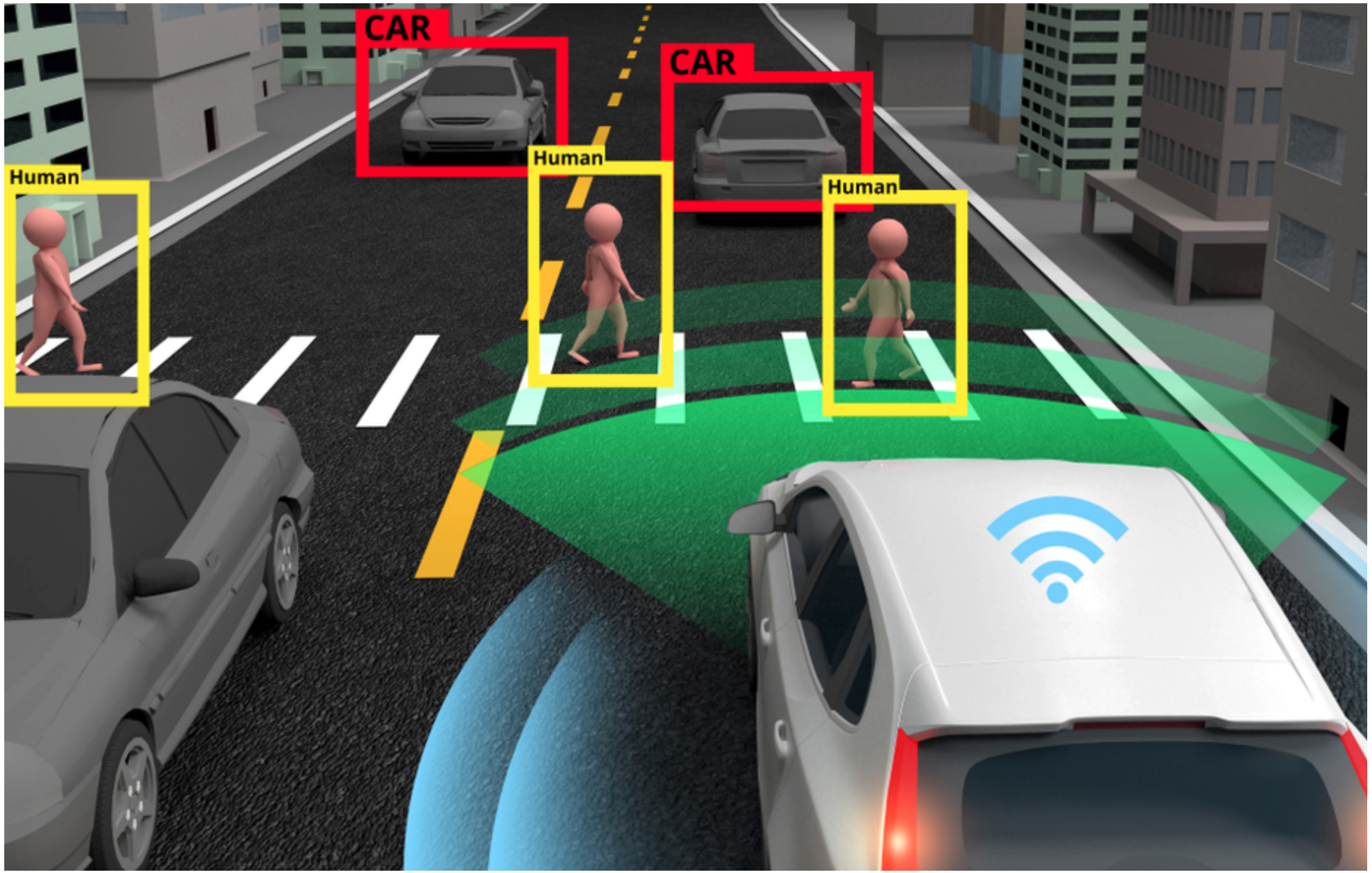


Internet of Things (IoT)

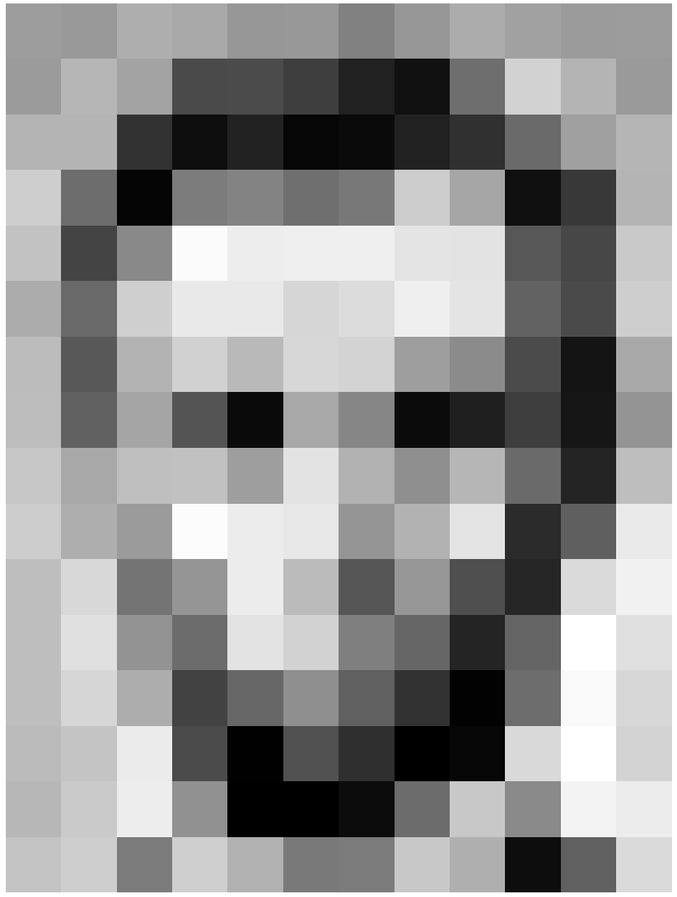
Refers to gadgets that aren't standard computers

- 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



157	153	174	168	150	152	129	151	172	161	155	156
155	182	163	74	75	62	33	17	110	210	180	154
180	180	50	14	34	6	10	33	48	106	159	181
206	109	5	124	131	111	120	204	166	15	56	180
194	68	137	251	237	239	239	228	227	87	71	201
172	105	207	233	233	214	220	239	228	98	74	206
188	88	179	209	185	215	211	158	139	75	20	169
189	97	165	84	10	168	134	11	31	62	22	148
199	168	191	193	158	227	178	143	182	106	36	190
205	174	155	252	236	231	149	178	228	43	95	234
190	216	116	149	236	187	86	150	79	38	218	241
190	224	147	108	227	210	127	102	36	101	255	224
190	214	173	66	103	143	96	50	2	109	249	215
187	196	235	75	1	81	47	0	6	217	255	211
183	202	237	145	0	0	12	108	200	138	243	236
195	206	123	207	177	121	123	200	175	13	96	218

157	153	174	168	150	152	129	151	172	161	155	156
155	182	163	74	75	62	33	17	110	210	180	154
180	180	50	14	34	6	10	33	48	106	159	181
206	109	5	124	131	111	120	204	166	15	56	180
194	68	137	251	237	239	239	228	227	87	71	201
172	105	207	233	233	214	220	239	228	98	74	206
188	88	179	209	185	215	211	158	139	75	20	169
189	97	165	84	10	168	134	11	31	62	22	148
199	168	191	193	158	227	178	143	182	106	36	190
205	174	155	252	236	231	149	178	228	43	95	234
190	216	116	149	236	187	86	150	79	38	218	241
190	224	147	108	227	210	127	102	36	101	255	224
190	214	173	66	103	143	96	50	2	109	249	215
187	196	235	75	1	81	47	0	6	217	255	211
183	202	237	145	0	0	12	108	200	138	243	236
195	206	123	207	177	121	123	200	175	13	96	218

Deep learning

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

Let's practice!

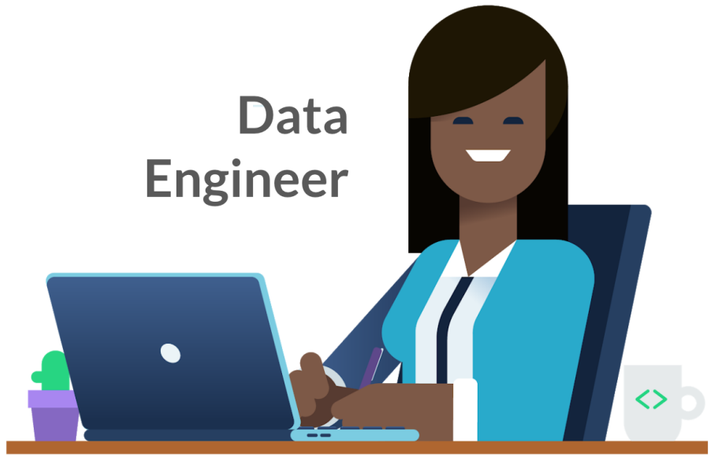
DATA SCIENCE FOR EVERYONE

Data science roles and tools

DATA SCIENCE FOR EVERYONE

Lis Sulmont
Curriculum Manager, DataCamp

datacamp


Data
Engineer

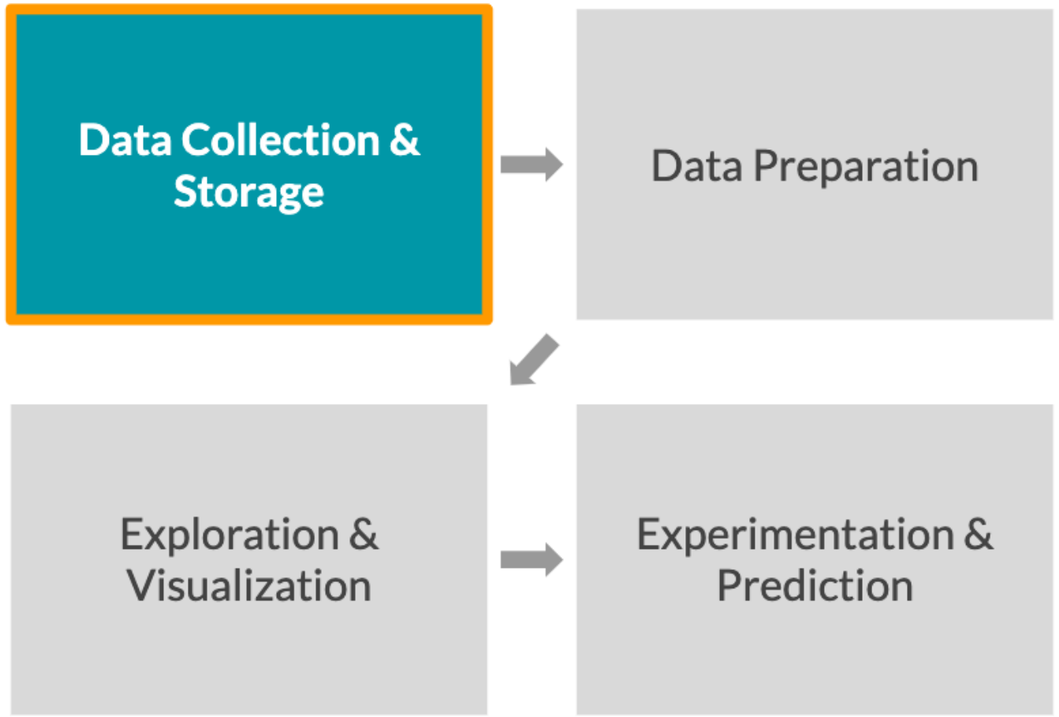

Data
Analyst


Data
Scientist


Machine Learning
Scientist

Data engineer

- Information architects
- Build data pipelines and storage solutions
- Maintain data access

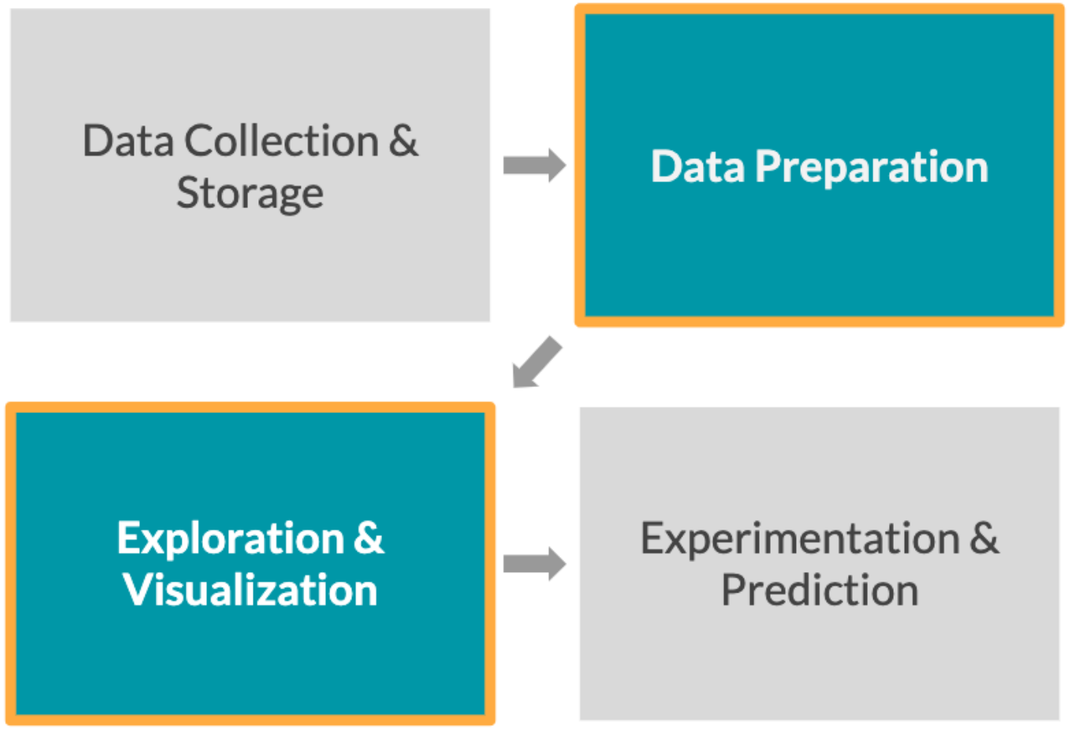


Data engineering tools

- **SQL**
  - To store and organize data
- **Java**, **Scala**, or **Python**
  - Programming languages to process data
- **Shell**
  - Command line to automate and run tasks
- **Cloud computing**
  - AWS, Azure, Google Cloud Platform

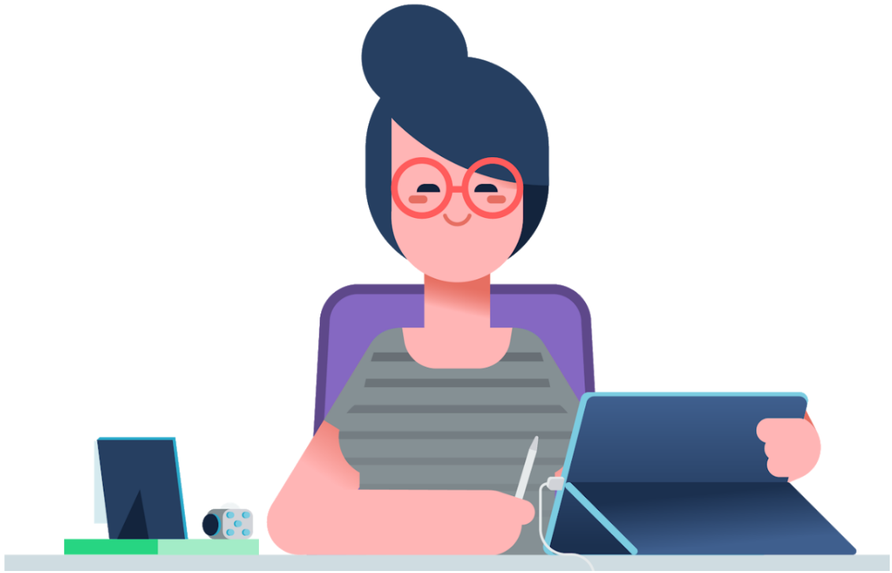
Data analyst

- Perform simpler analyses that describe data
- Create reports and dashboards to summarize data
- Clean data for analysis



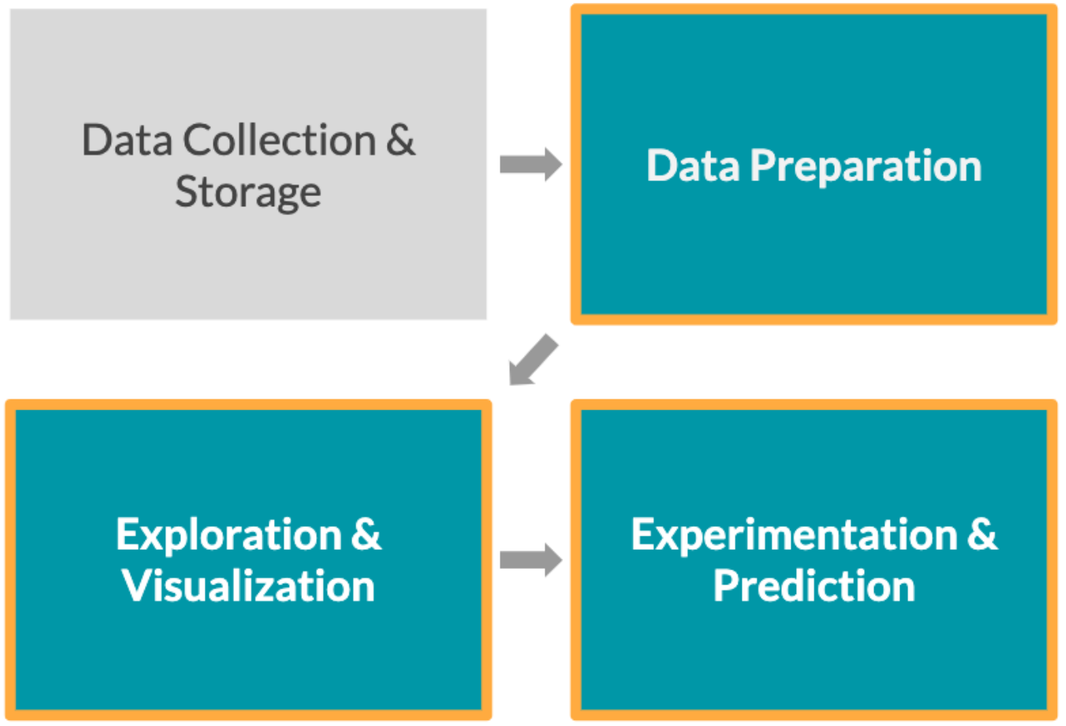
Data analyst tools

- **SQL**
  - Retrieve and aggregate data
- **Spreadsheets (Excel or Google Sheets)**
  - Simple analysis
- **BI tools (Tableau, Power BI, Looker)**
  - Dashboards and visualizations
- *May have:* Python or R
  - Clean and analyze data



Data scientist

- Versed in statistical methods
- Run experiments and analyses for insights
- Traditional machine learning

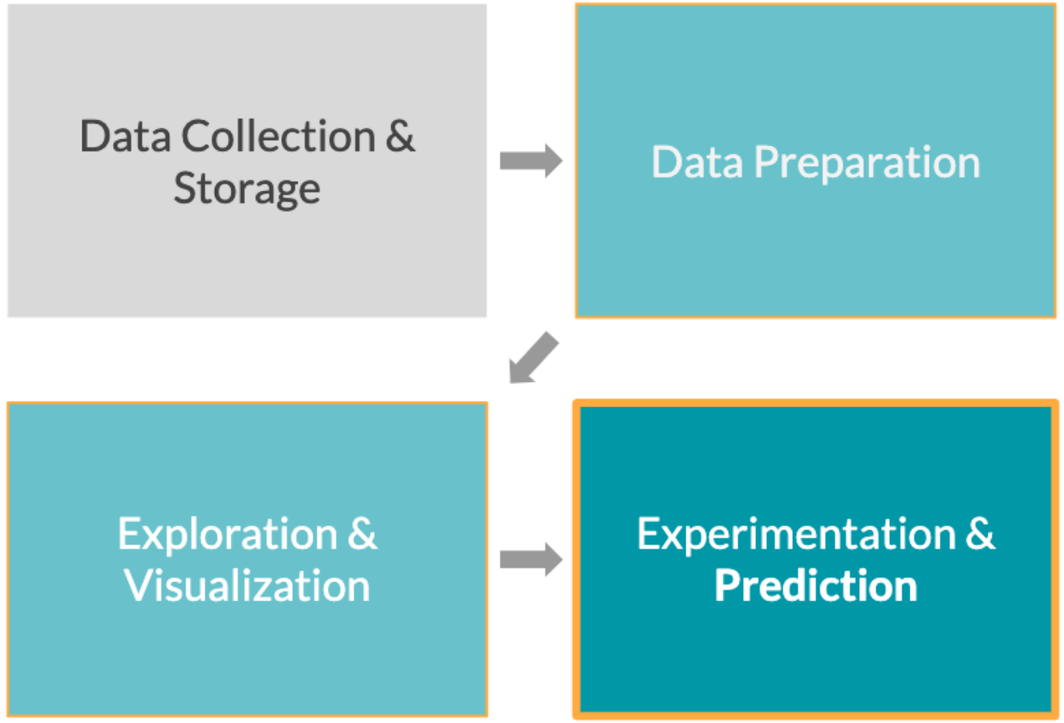


Data scientist tools

- **SQL**
  - Retrieve and aggregate data
- **Python and/or R**
  - Data science libraries, e.g., `pandas` (Python) and `tidyverse` (R)

Machine learning scientist

- Predictions and extrapolations
- Classification
- Deep learning
  - Image processing
  - Natural language processing



Machine learning tools

- **Python and/or R**
  - Machine learning libraries, e.g., TensorFlow or Spark

Data Engineer	Data Analyst	Data Scientist	Machine Learning Scientist
Store and maintain data	Visualize and describe data	Gain insights from data	Predict with data
SQL + Java/Scala/Python	SQL + BI Tools + Spreadsheets	Python/R	Python/R

Let's practice!

DATA SCIENCE FOR EVERYONE