



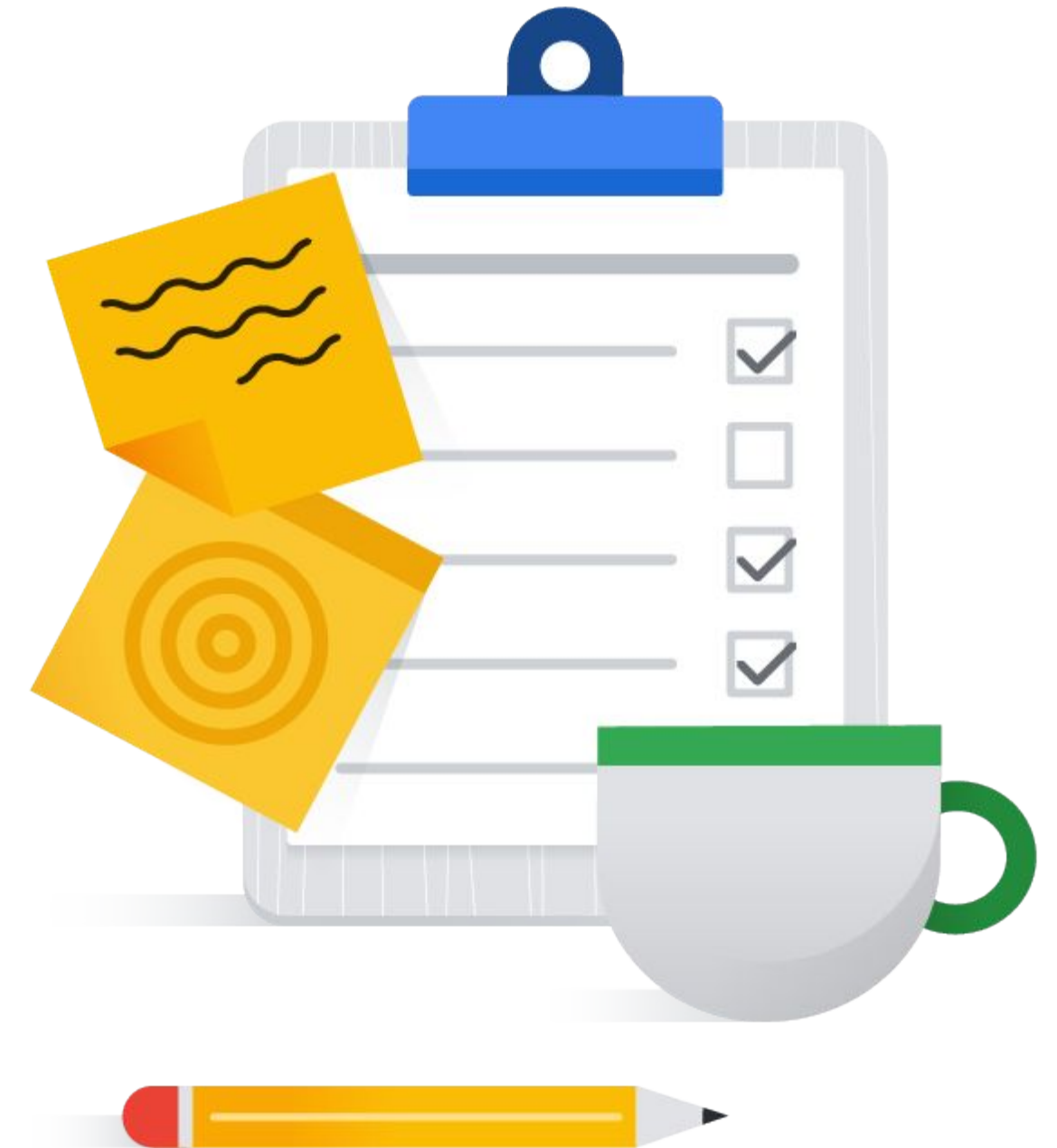
01



Introduction to Analytics and AI

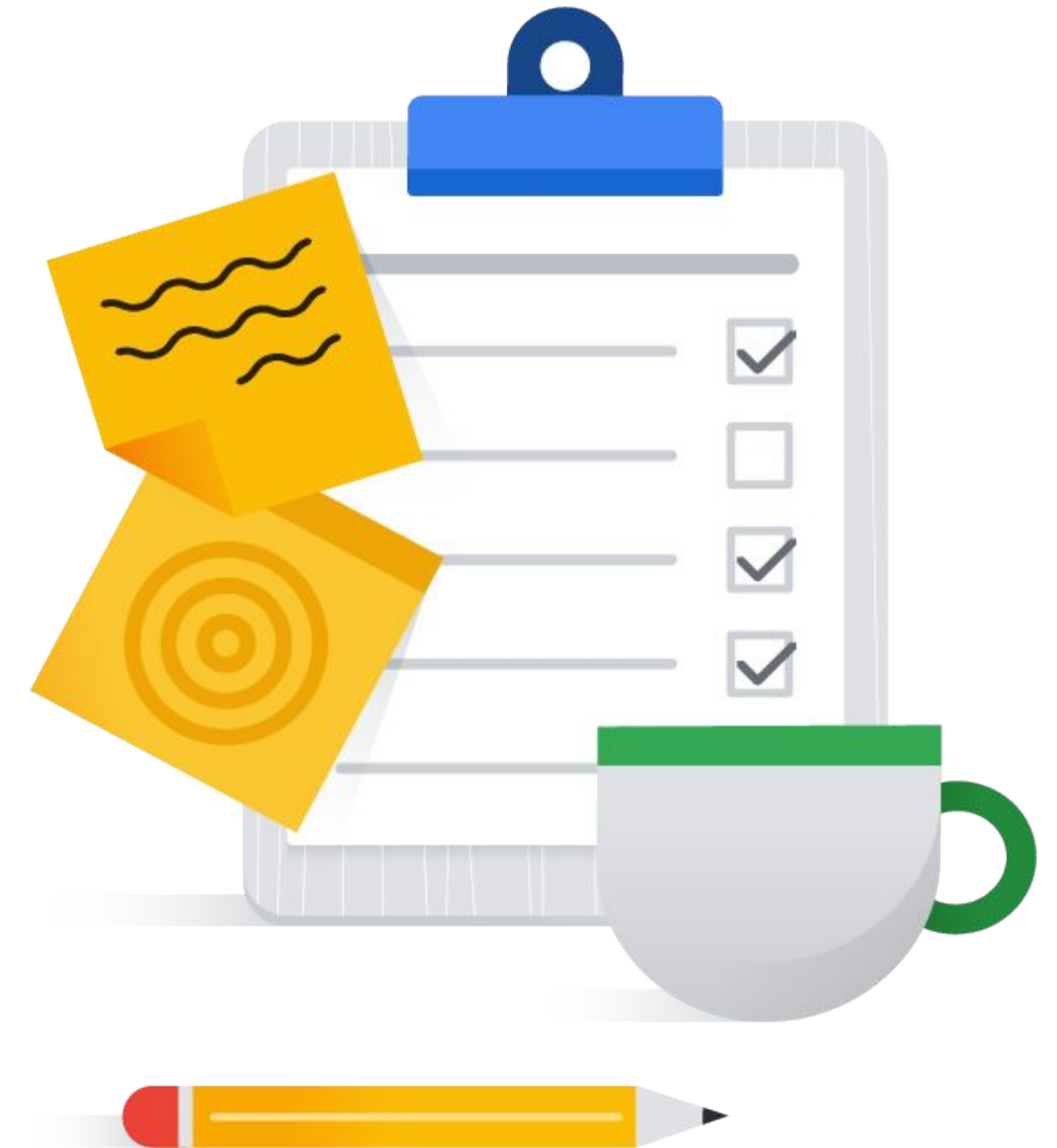
Introduction to Analytics and AI

01	What is AI?
02	From ad-hoc data analysis to data-driven decisions
03	Options for ML models on Google Cloud

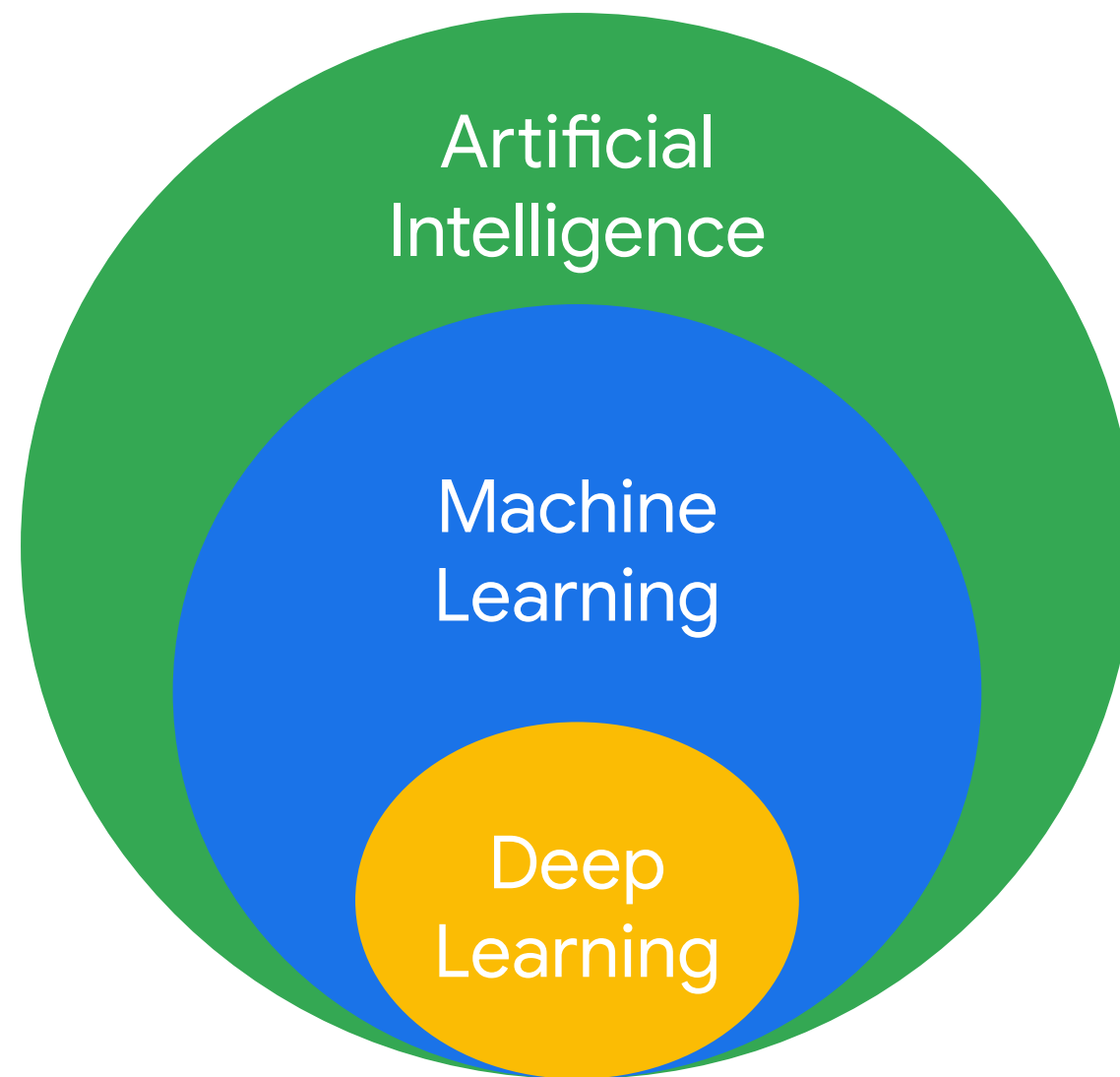


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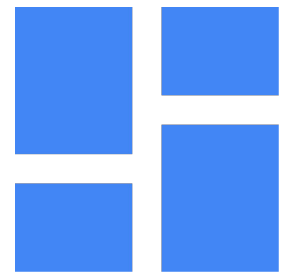


Machine Learning is a type of AI, and deep learning is a type of machine learning



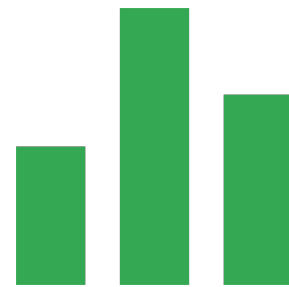
Class of problems we can solve when
computers think/act like humans

ML is a way to use standard algorithms to derive predictive insights from data and make repeated decisions



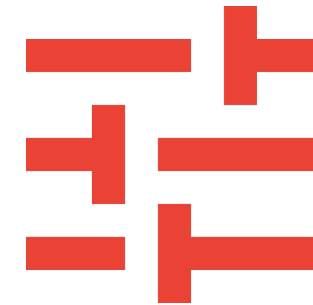
1

Algorithm



2

Data



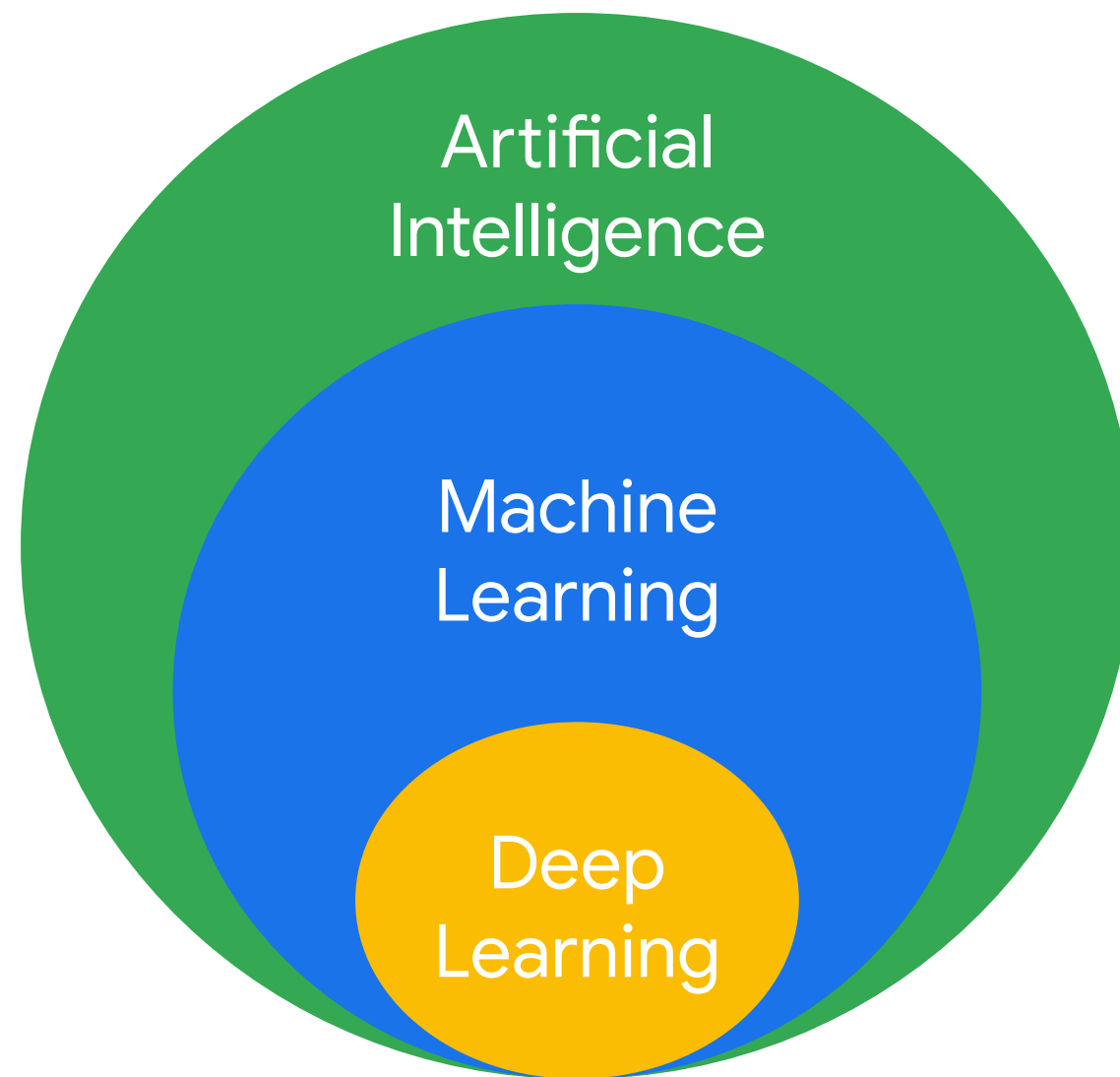
3

Predictive
Insight

4

Decision

Why are Machine Learning and Deep Learning so exciting?



Class of problems we can solve when **computers think/act like humans**

Scalably solve those problems using **data** examples (**not custom code**)

Even when that data consists of **unstructured data** like images, speech, video, natural language text, etc.

Keller Williams uses AutoML Vision to automatically recognize common elements of house furnishings and architecture



AutoML Vision

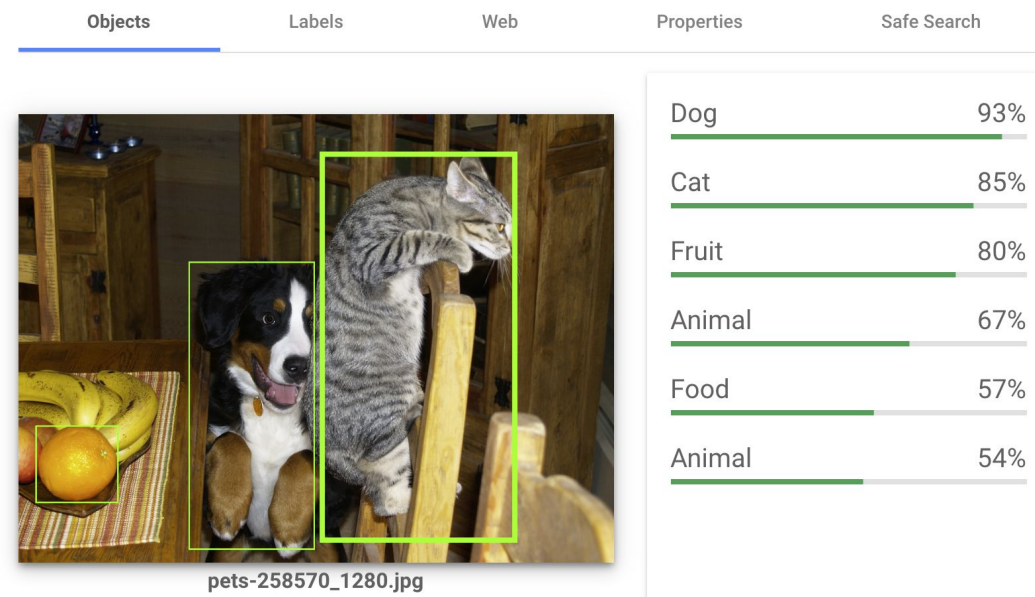
Kewpie uses ML to sort out the bad potatoes in baby food



Original process required humans to identify low-quality ingredients, which was expensive and stressful.

Machine learning was used to replicate the quality control process.

Play around with the power of AI yourself...



cloud.google.com/vision/

- Object detection
- Labeling and confidence
- Web lookup
- Pre-trained (call the API)

Try Google's natural language API

Google, headquartered in Mountain View unveiled the new Android phone for \$799 at the Consumer Electronic Show. Sundar Pichai said in his keynote that users love their new Android phones.

[See supported languages](#)

RESET

Entities Sentiment Syntax Categories

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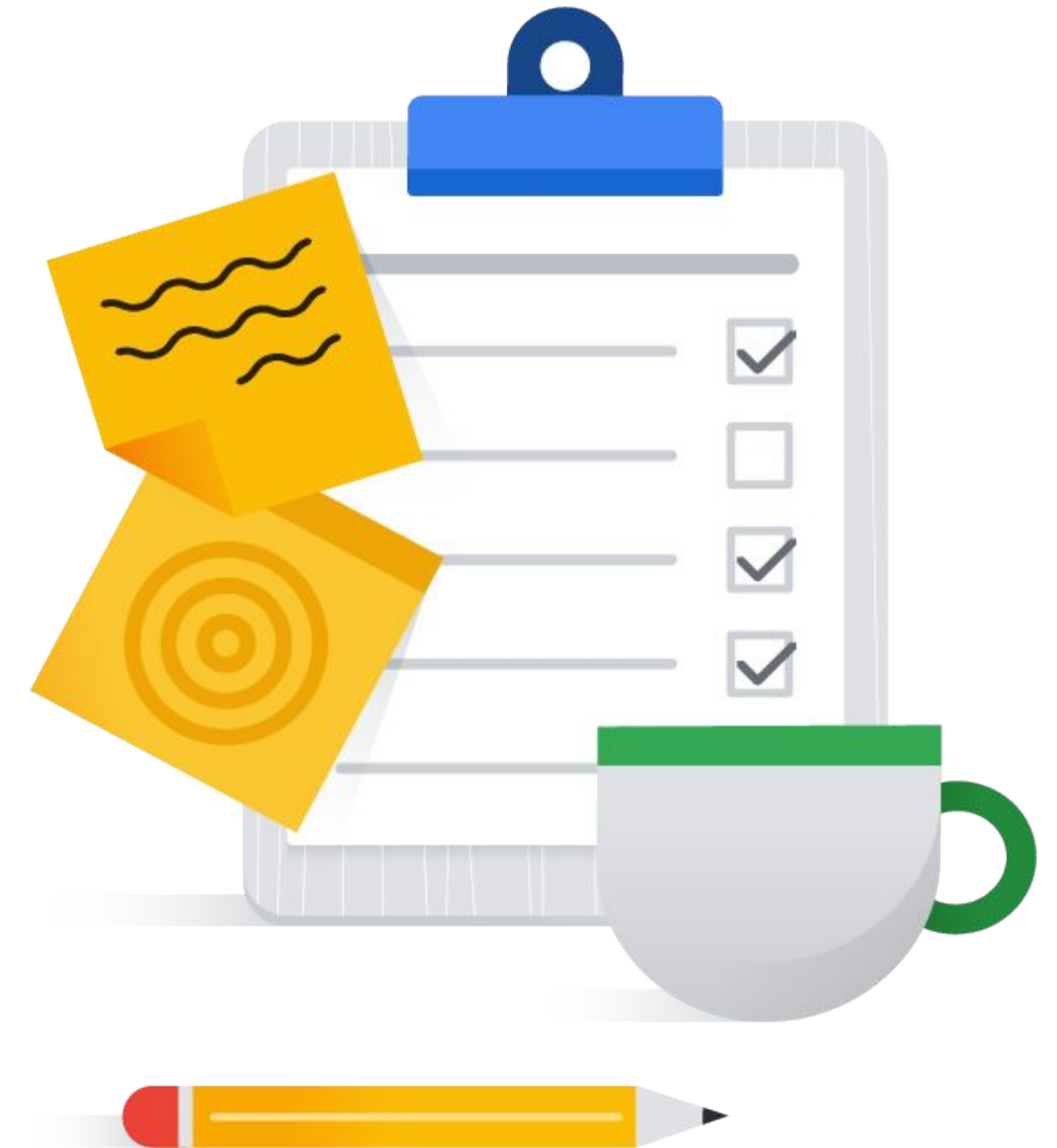
1. Google Wikipedia Article Salience: 0.26 ORGANIZATION	2. users Salience: 0.15 PERSON
3. phone Salience: 0.13 CONSUMER GOOD	4. Android Wikipedia Article Salience: 0.12 CONSUMER GOOD
5. Sundar Pichai Wikipedia Article Salience: 0.11 PERSON	6. Mountain View Wikipedia Article Salience: 0.10 LOCATION

cloud.google.com/natural-language/

- Entity extraction
- Sentiment analysis
- Sentence structure
- Pre-trained (call the API)

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Imagine you're the owner of a bicycle rental business (in London). How do you stock enough bicycles?

Commuter Bikes



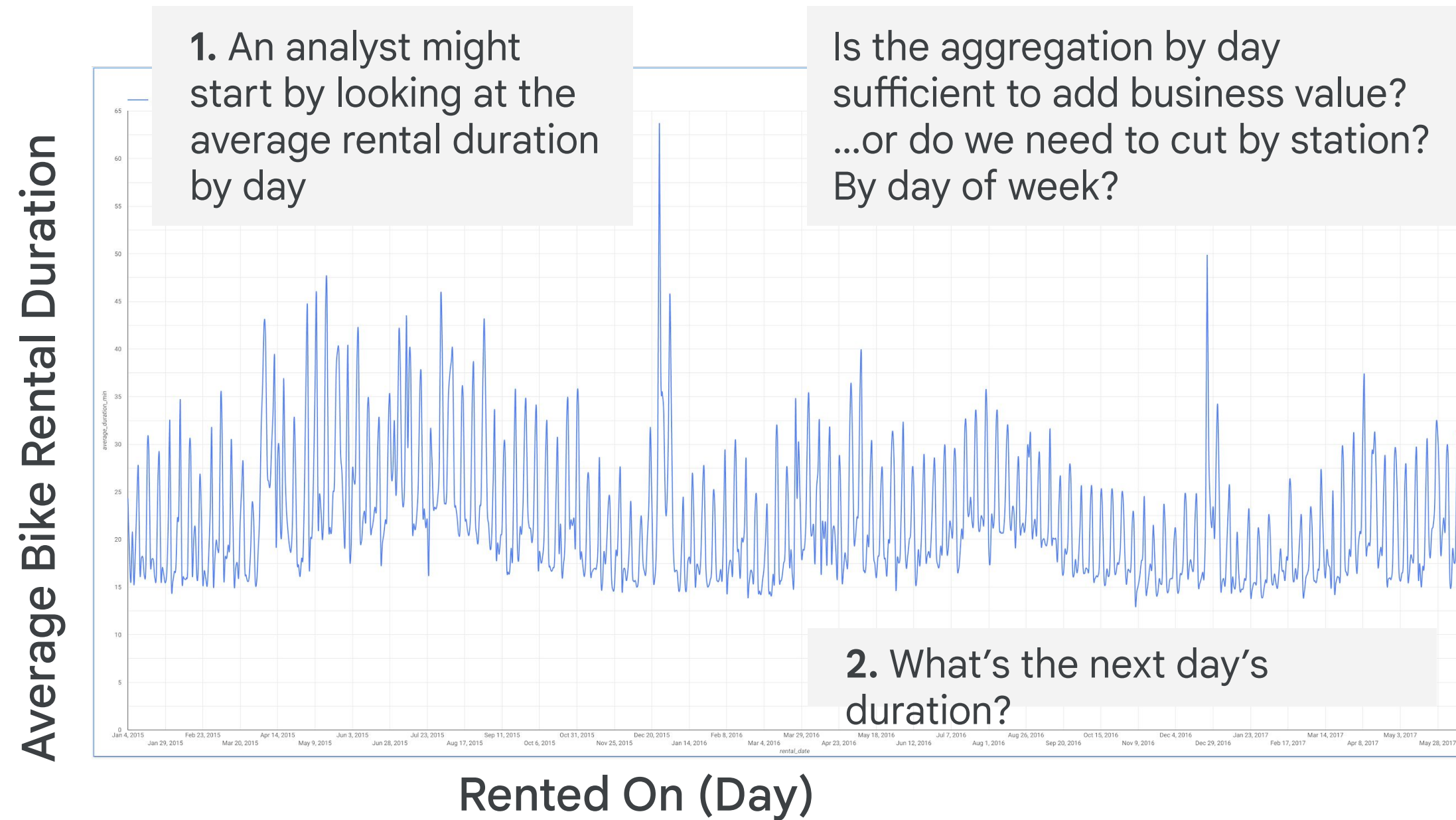
If rental is likely to be for a **short duration**, we need to have commuter bikes in stock

Road Bikes



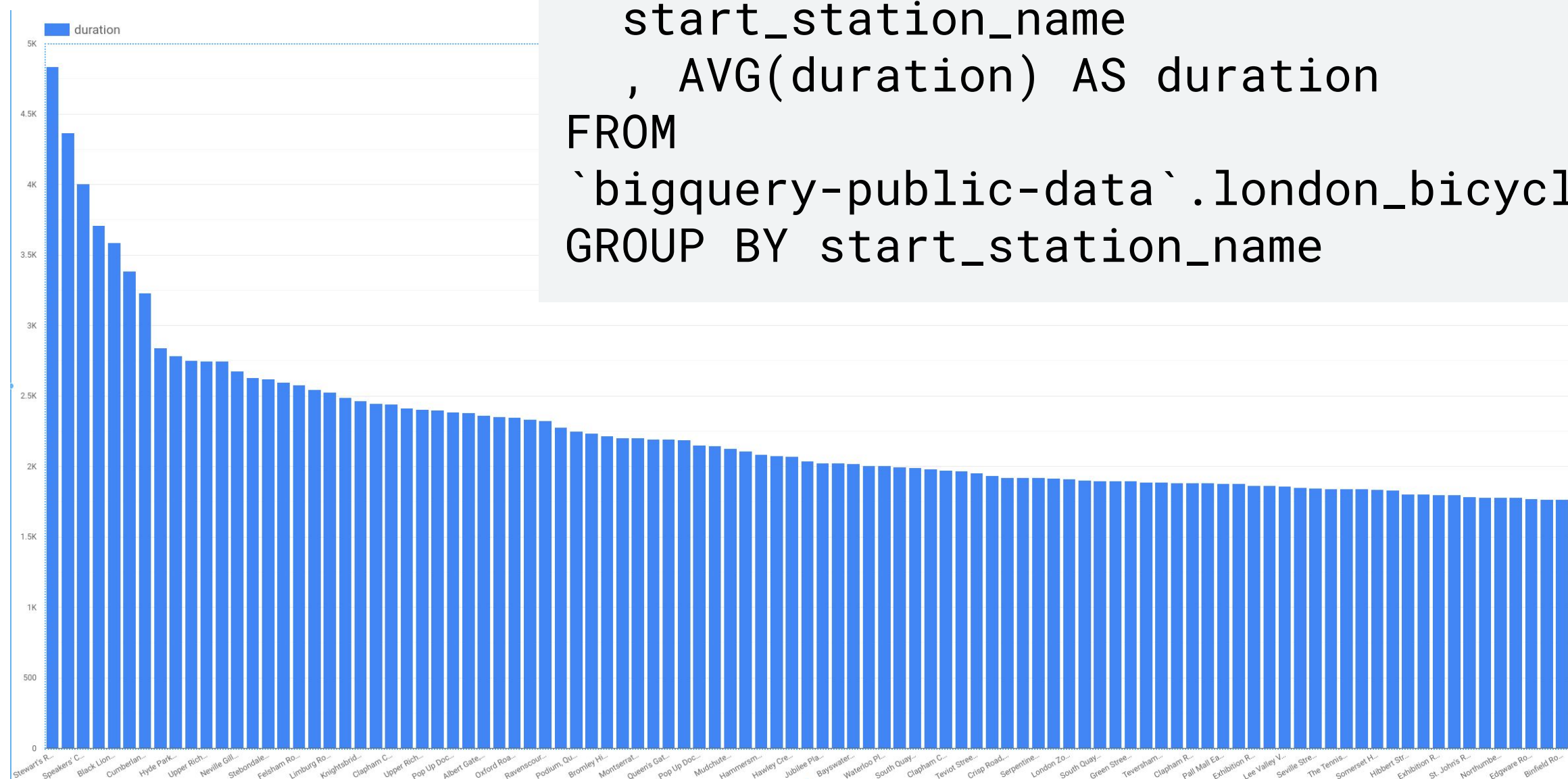
If rental is likely to be for a **long duration**, we need to have road bikes in stock

You hire a data analyst to help get you insights on how to keep the right bicycles in stock

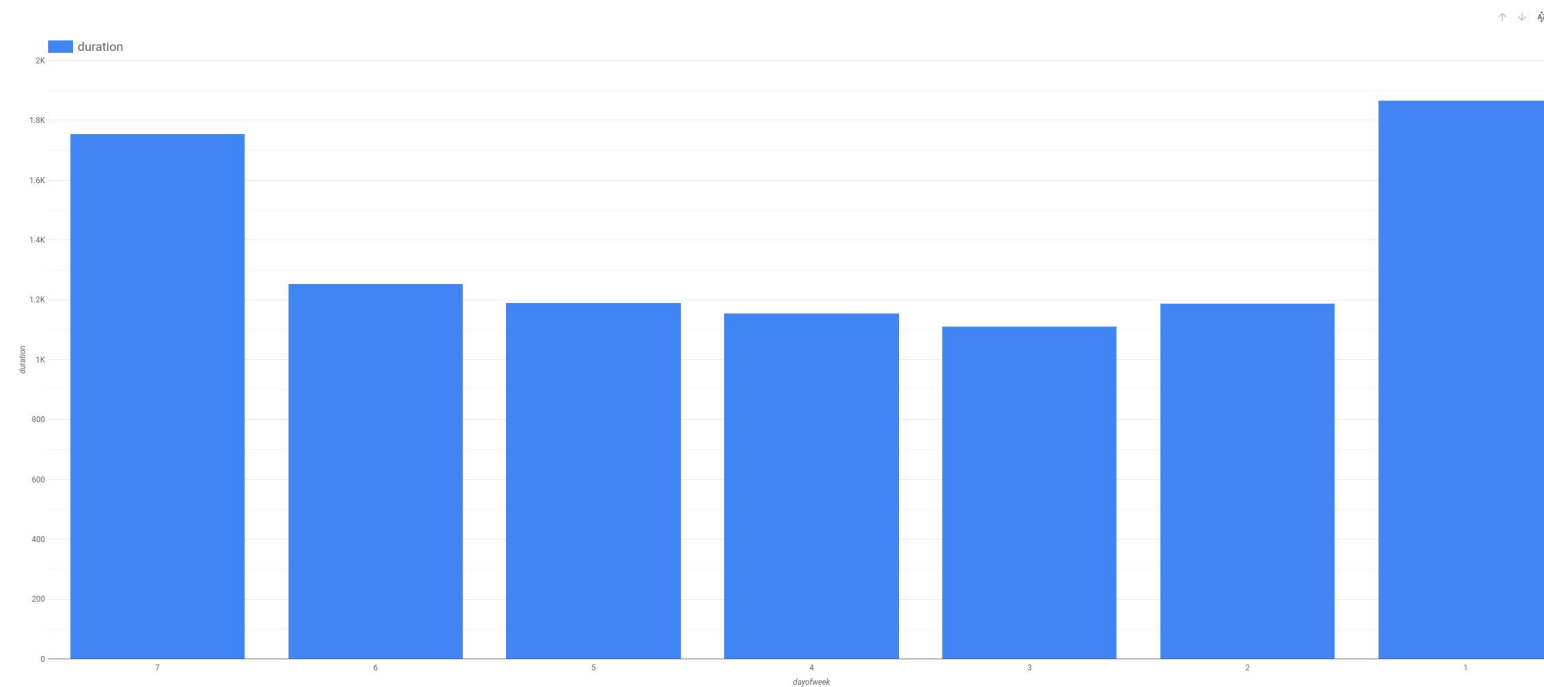


Does the duration of a rental vary by station?

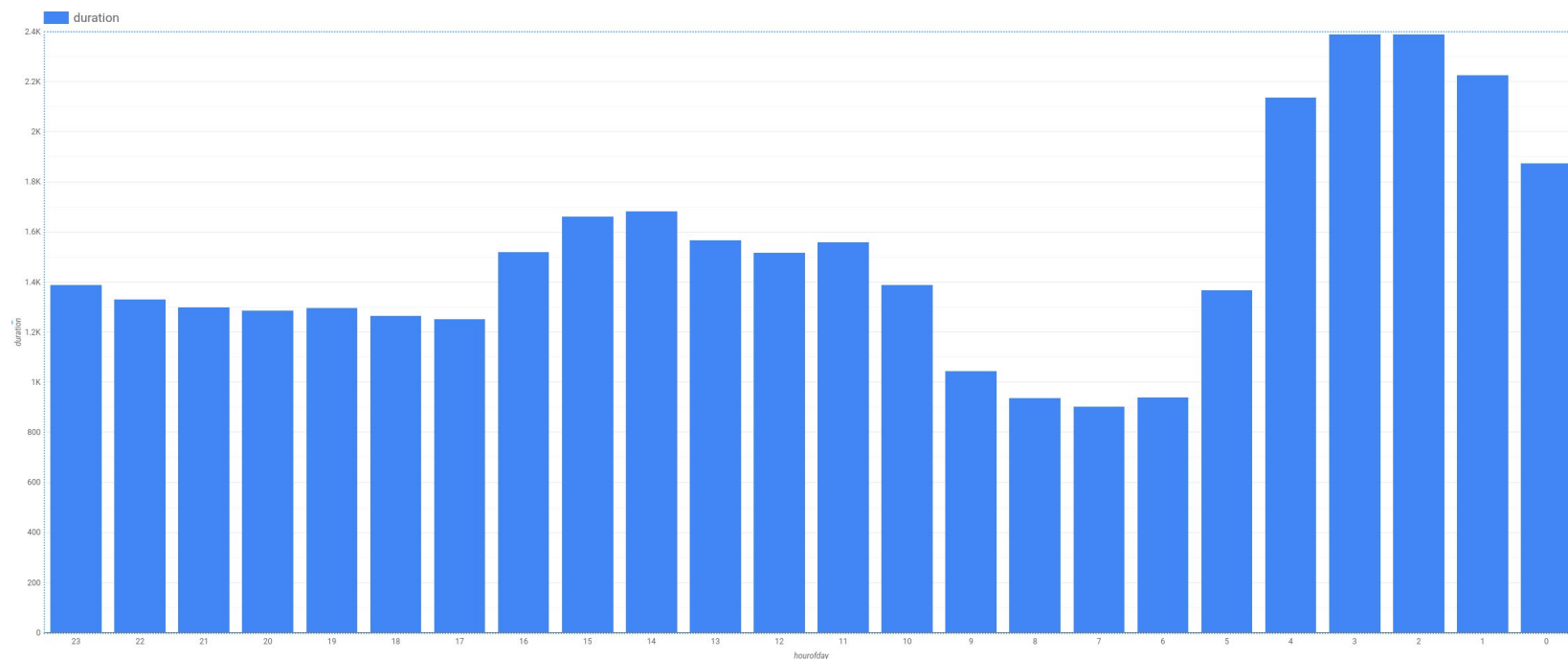
```
SELECT
  start_station_name
  , AVG(duration) AS duration
FROM
  `bigquery-public-data`.london_bicycles.cycle_hire
GROUP BY start_station_name
```



How about the day of the week? Hour of day?



```
SELECT
  EXTRACT(dayofweek
    FROM
      start_date) AS dayofweek,
  AVG(duration) AS duration
FROM
  `bigquery-public-data`.london_bicycles.cycle_hire
GROUP BY
  dayofweek
```



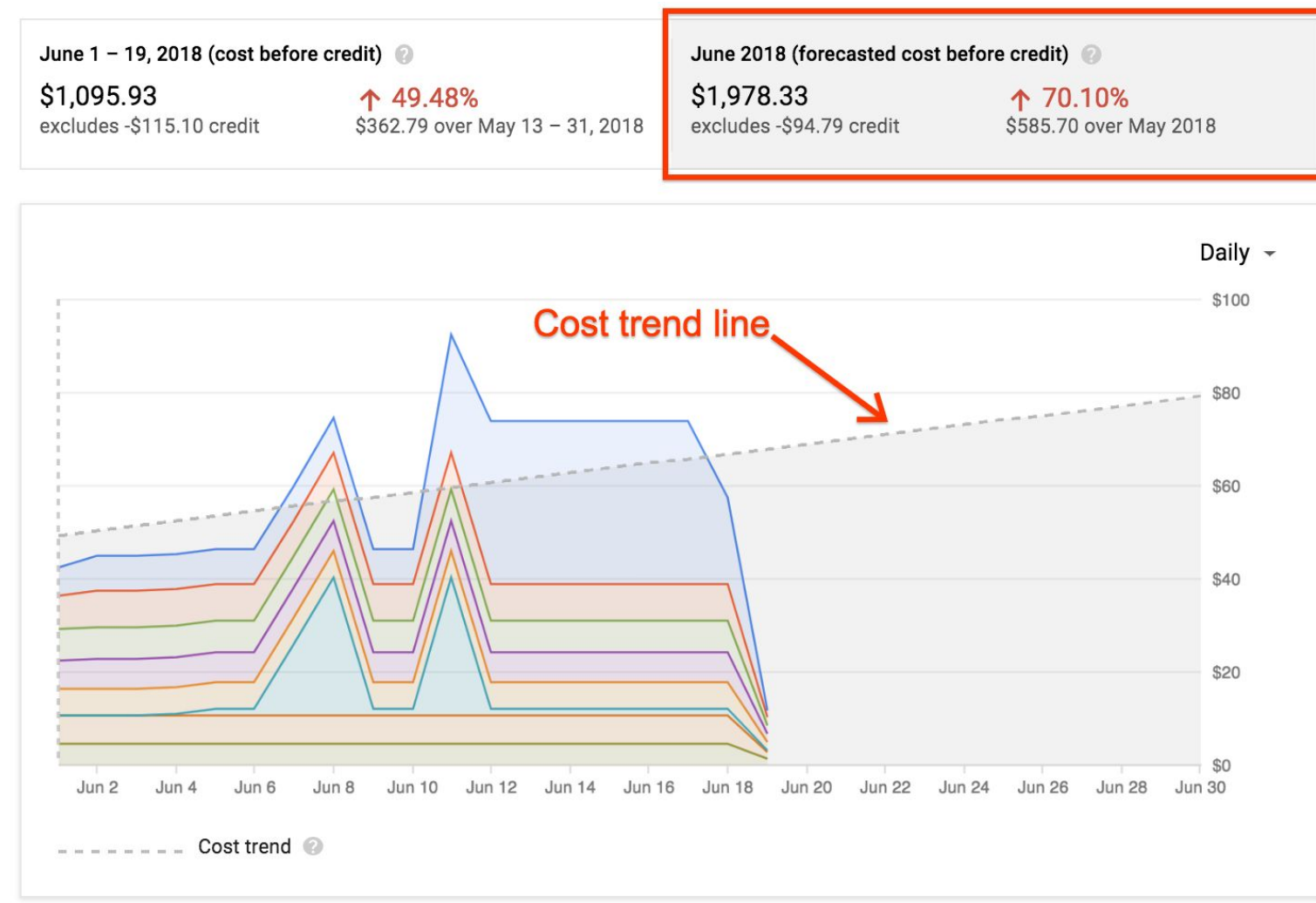
```
SELECT
  EXTRACT(hour
    FROM
      start_date) AS hourofday,
  AVG(duration) AS duration
FROM
  `bigquery-public-data`.london_bicycles.cycle_hire
GROUP BY
  hourofday
```


This ad-hoc analysis is great but...

- A lot of manual, repetitive work involved for the data analyst
- Any decisions made will be based on hunches on how all these factors interact
- Wouldn't it be better if we could automate this analysis?

... what we need is an ML model to be able to make predictions

Goal: Augment our dashboards with predicted values e.g. prediction for the duration of a rental



As an example, Google augments Google Cloud cost dashboards (descriptive) with forecasted (predictive) usage costs.

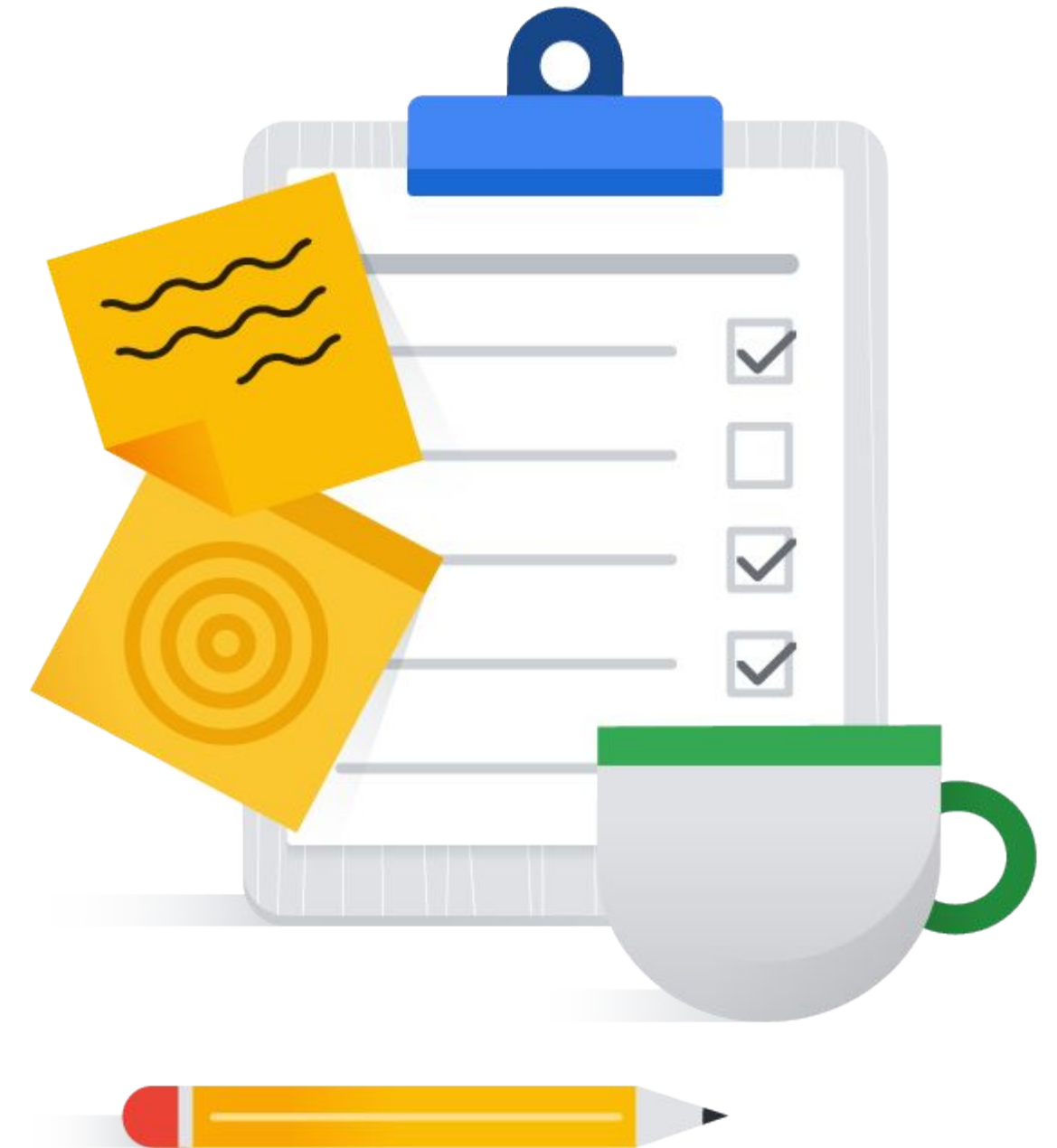
Use the ML model to anticipate what type of bike/how many to stock at your locations

- The ML model takes some of the drudgery out of ad-hoc analysis to help you make truer data-driven decisions.
- Can build a ML model in BigQuery or Vertex AI.

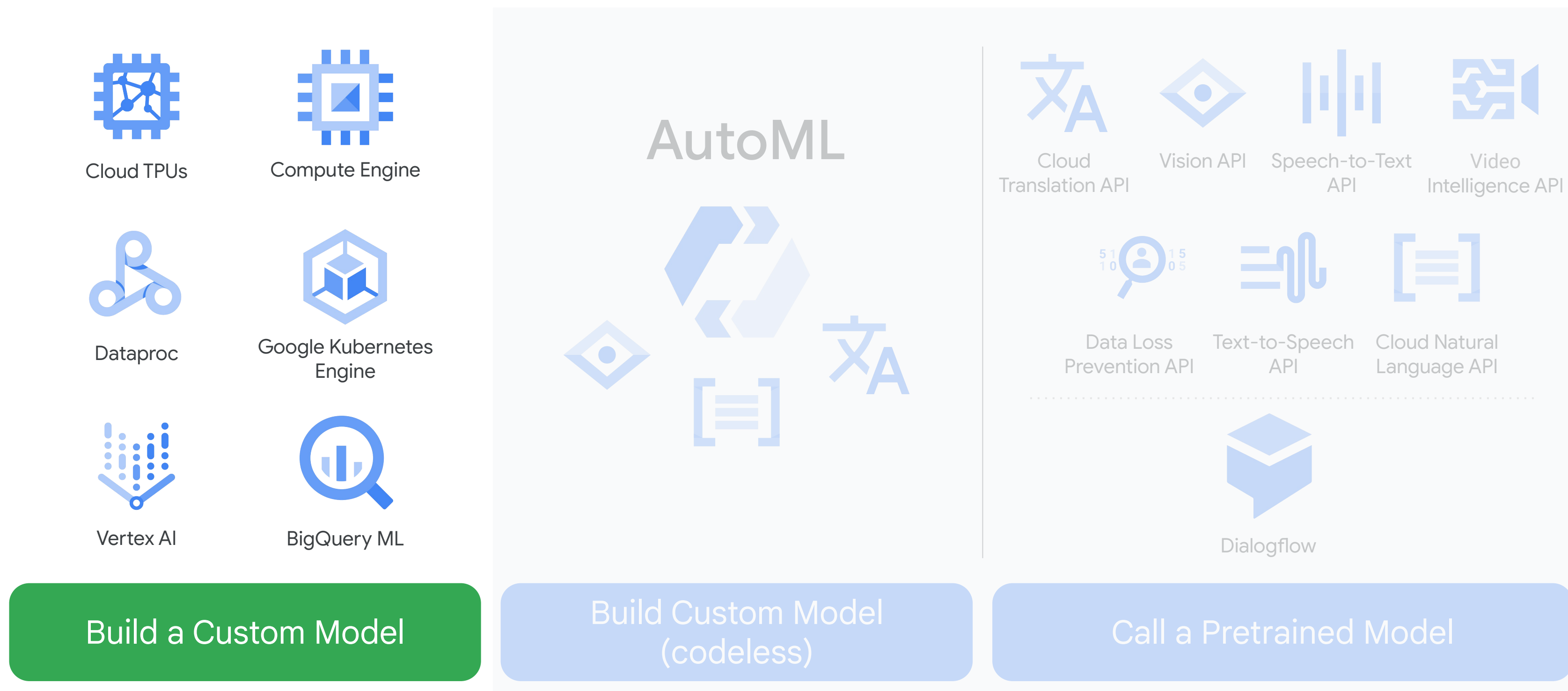
```
CREATE OR REPLACE MODEL
bike_model.model_bucketized TRANSFORM(* EXCEPT(start_date),
IF
  (EXTRACT(dayofweek
    FROM
      start_date) BETWEEN 2 AND 6,
    'weekday',
    'weekend') AS dayofweek,
ML.BUCKETIZE(EXTRACT(HOUR
  FROM
    start_date),
  [5, 10, 17]) AS hourofday )
OPTIONS
  (input_label_cols=['duration'],
  model_type='linear_reg') AS
SELECT
  duration,
  start_station_name,
  start_date
FROM
  `bigquery-public-data`.london_bicycles.cycle_hire
```

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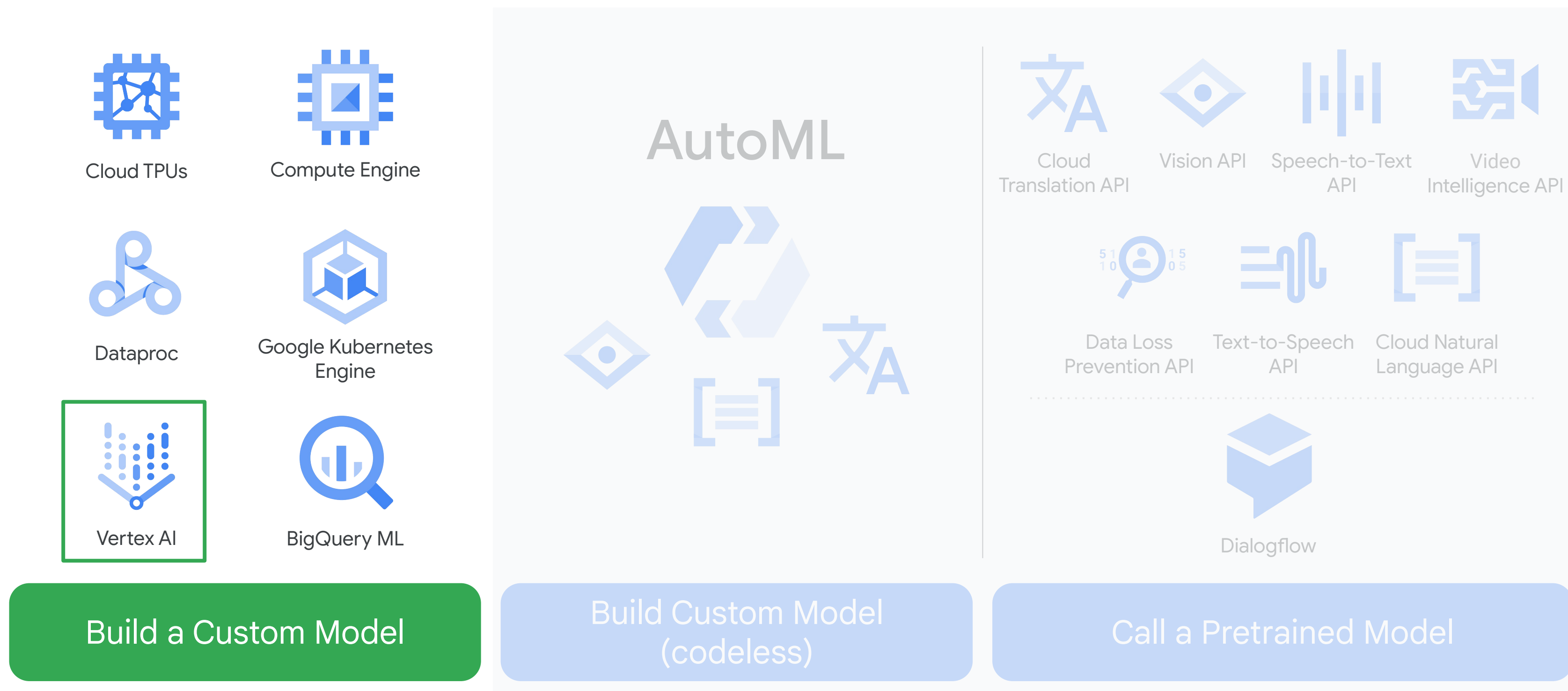
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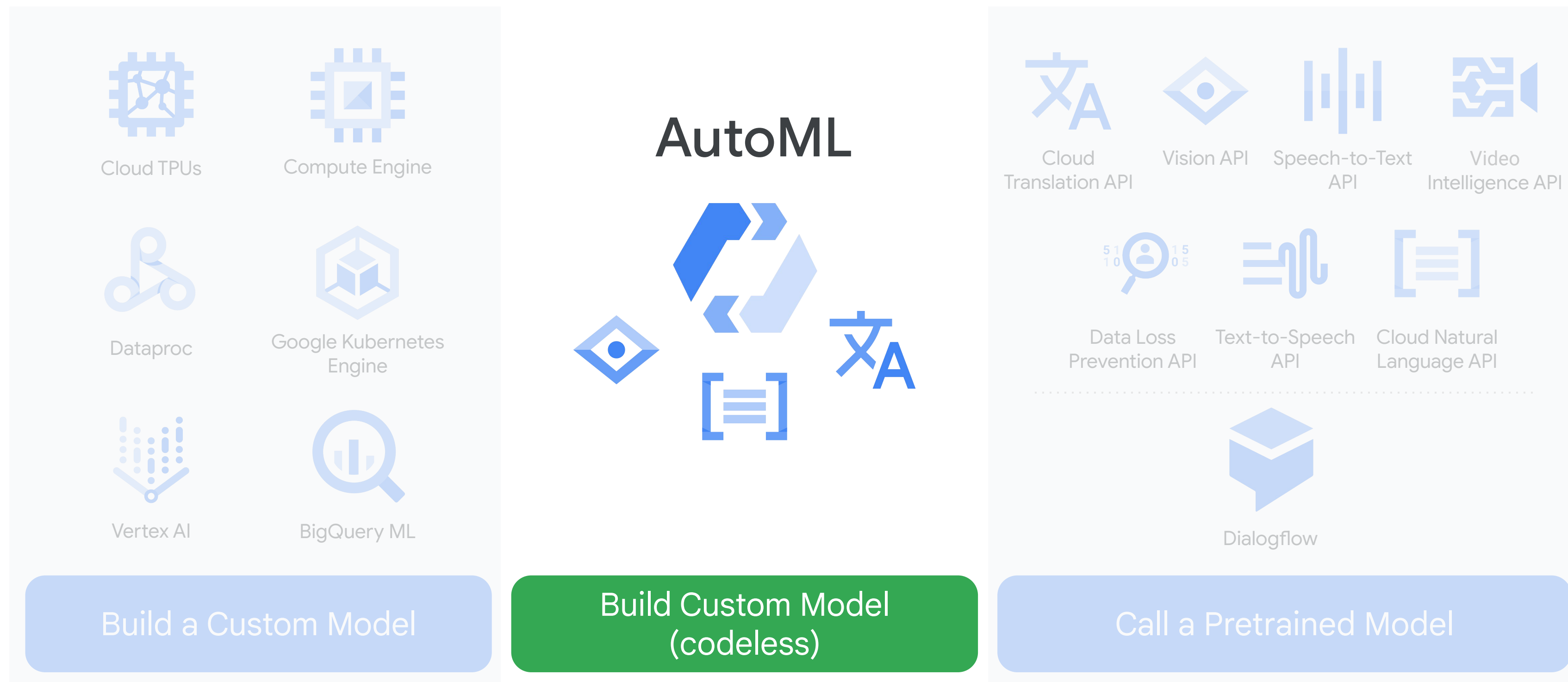
Leverage pre-trained models or build your own



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