Google Cloud AI Overview

Google is an AI company

Search
Search Ranking
Speech Recognition

Android
Keyboard and
Speech Input

Play
App Recommendations
Game Developer Experience

Gmail
Smart Reply
Spam Classification

Drive
Intelligence in Apps

Chrome
Search by Image

Photos
Photos Search

YouTube
Video Recommendations
Better Thumbnails

Maps
Street View Image
Parsing Local Search

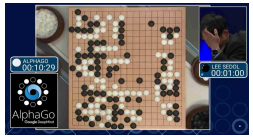
Translate
Text, Graphic and
Speech Translations

Cardboard
Smart Stitching

Ads
Richer Text Ads
Automated Bidding

Self Driving Car
1.5MM miles driven

Data Center Power Usage
Reduced cooling energy 40%



Alpha Go
First AI to beat a world Go champion (2016)

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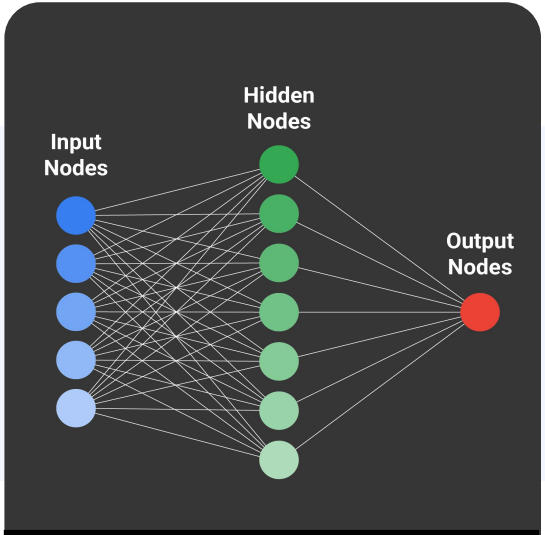
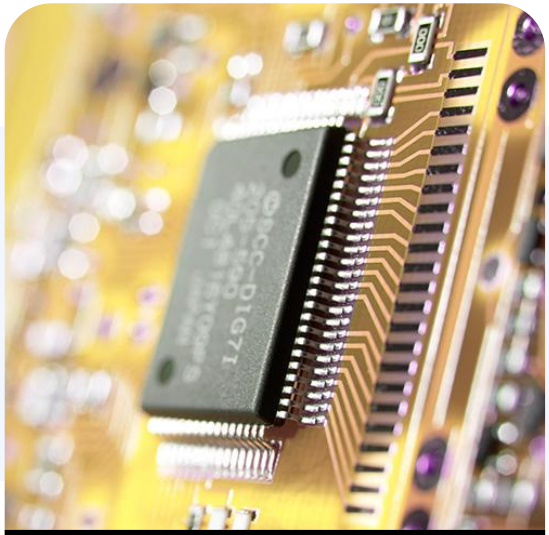
The cloud has enabled new possibilities

Large datasets



Strong ML models



Computation at scale

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Google Cloud AI - Ecosystem

BigQuery ML
Machine Learning in BigQuery

Pre-trained models
Consume by API

AutoML
Custom models with no AI expertise.

Fully custom models
Custom models by data scientists.

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BigQuery ML BETA

BigQuery ML empowers both **data analysts** and **data scientists**

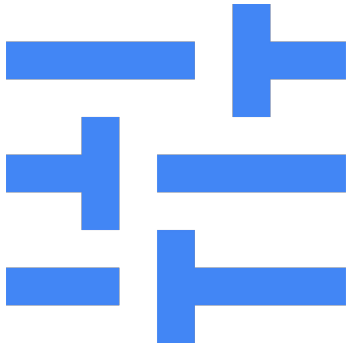
Execute ML initiatives without moving data from BigQuery

Iterate on models in SQL in BigQuery to increase development speed

Automate model selection, and hypertuning

BigQuery ML BETA

Supported features



- Standard SQL and UDFs within the ML queries
- Linear regression (forecasting)
- Binary logistic regression (classification)
- Model evaluation functions for standard metrics, Including the ROC curve
- Model weight inspection
- Feature distribution analysis through standard functions

Build using Create Model

```
#standardSQL
CREATE OR REPLACE MODEL demo1.numbike_model
OPTIONS
  (model_type='linear_reg', labels=['num_trips']) AS

WITH bike_data AS
(
SELECT
  COUNT(*) as num_trips,
  avg(EXTRACT(DAYOFWEEK from starttime)) as day_of_week,
  EXTRACT(DATE from starttime) as trip_date
```

Use the model with ml.PREDICT

```
#StandardSQL
SELECT
 predicted_label as predicted_num_trips, num_trips, trip_date
FROM
 ml.PREDICT(MODEL `demo1.numbike_model`, (WITH bike_data AS
(
SELECT
  COUNT(*) as num_trips,
  avg(EXTRACT(DAYOFWEEK from starttime)) as day_of_week,
  EXTRACT(DATE from starttime) as trip_date
FROM `bigquery-public-data.new_york.citibike_trips`
```

BQML Demo

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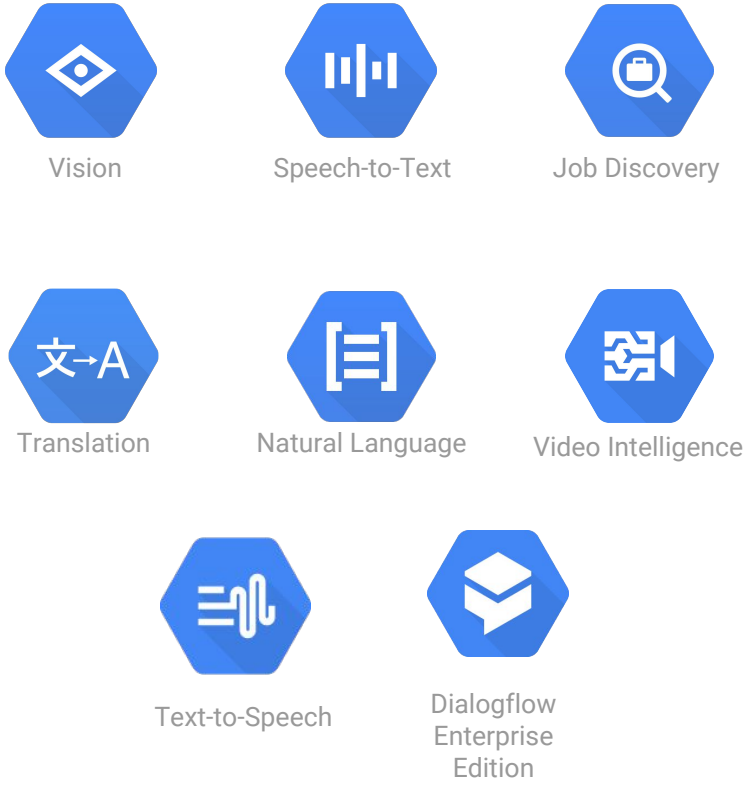
Ready-to-use APIs



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Cloud AutoML
Your Data + Our Models

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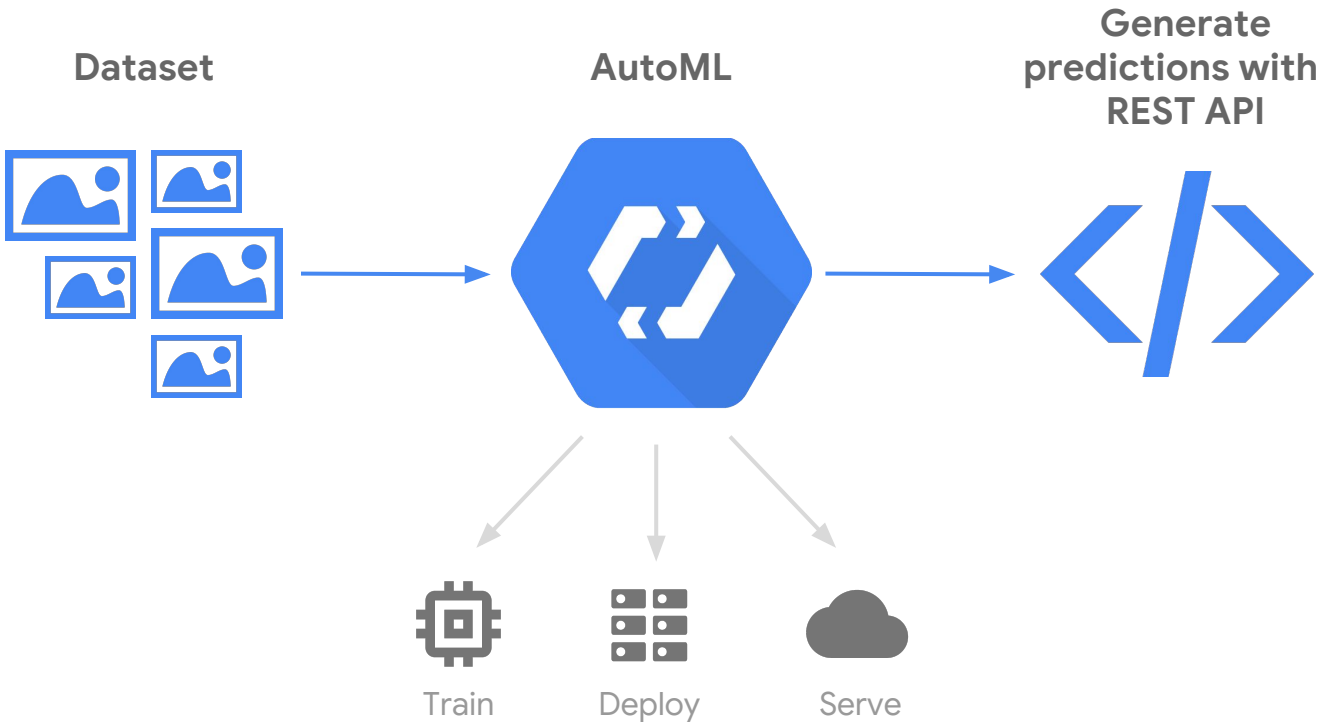
Create your own Machine Learning solutions



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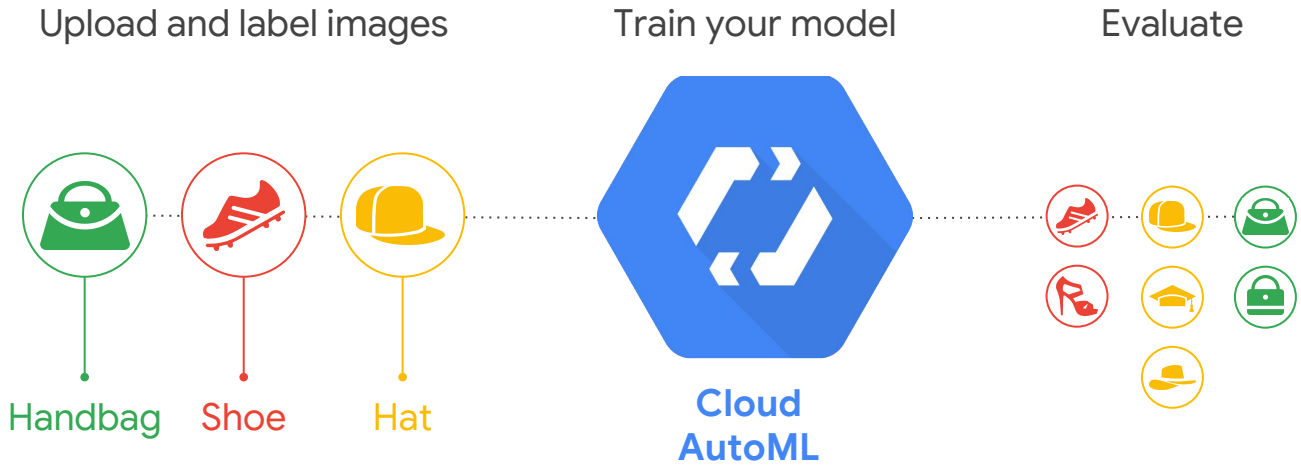
AutoML Vision



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stom Models > Datasets > clouds

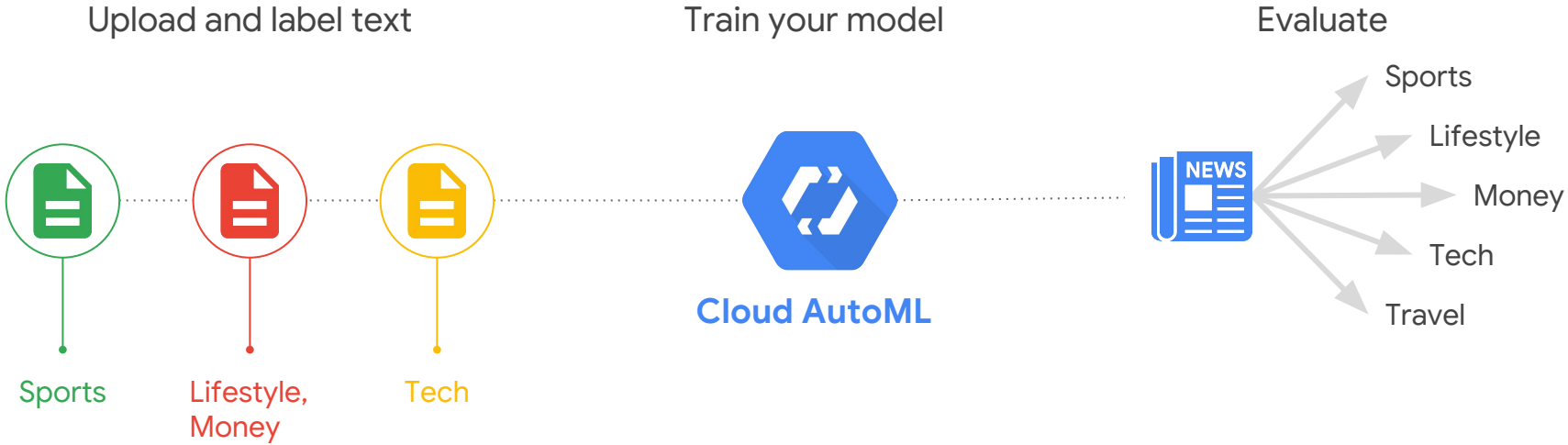
Dataset: clouds

IMPORT LABEL TRAIN EVALUATE PREDICT EXPORT

Query online

0.993 cirrus

AutoML Natural Language



Model is now trained and ready to make predictions
This model can scale as needed to adapt to customer demands

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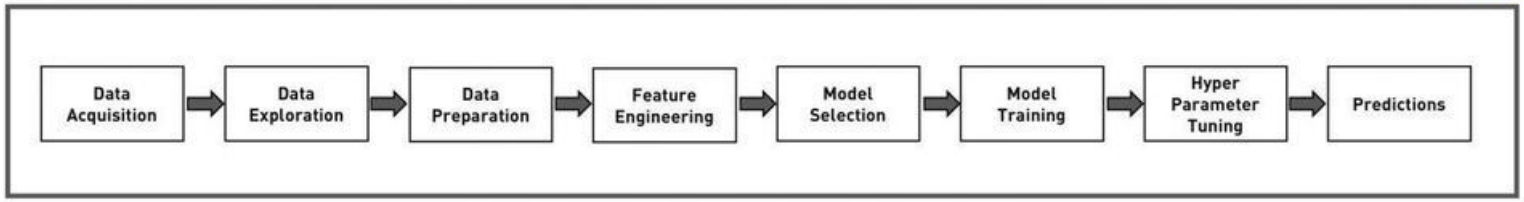
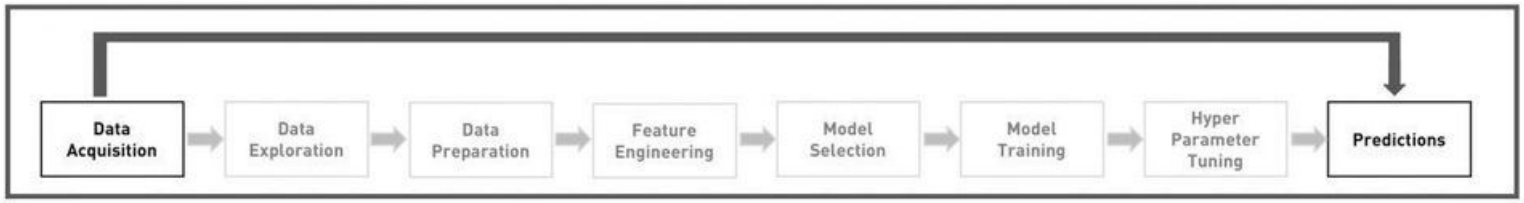
Introducing Cloud AutoML

A technology that can automatically create a Machine Learning Model



Traditional Machine Learning Workflow



AutoML Workflow

Source: [Why AutoML Is Set To Become The Future Of Artificial Intelligence, Janakiram MSV.]

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That’s a wrap.

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Backup slides

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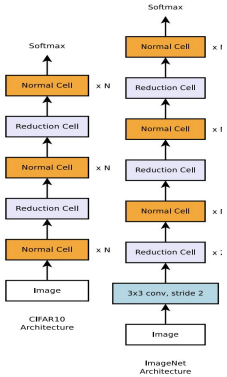
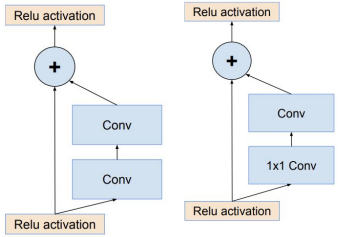
Cloud AutoML - Best in Class Research

Learning to learn



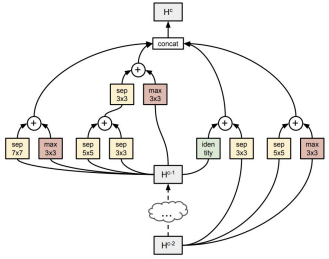
[Learning Transferable Architectures for Scalable Image Recognition, 2017.]

Transfer Learning



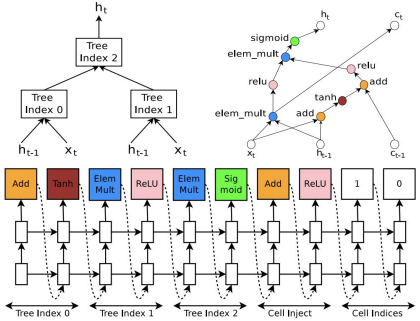
[Inception-v4, Inception-ResNet and the Impact of Residual Connections on Learning, AAAI, 2017.]

[Large-Scale Evolution of Image Classifiers, *ICML 2017*.]



[Progressive Neural Architecture Search, Arxiv, 2017]

Hyperparameter Tuning



[Neural Architecture Search with Reinforcement Learning. ICLR 2017]

[Bayesian Optimization for a Better Dessert]

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