File Name: T-ICML-O_5_I1_introduction

Format: Presenter in Studio

Title: Pre-built ML Models

Presenter: Carl Osipov

Google Cloud

Pre-built ML Image Models: Cloud Vision API and AutoML

Carl Osipov

Agenda

Introduction

Pre-built ML Models

Vision API

AutoML

Agenda

Introduction

Pre-built ML Models

Vision API

AutoML

Agenda

Introduction

Pre-built ML Models

Vision API

AutoML

Agenda

Introduction

Pre-built ML Models

Vision API

AutoML

File Name: T-ICML-O_5_l2_pre_built_models

Format: Presenter in Studio

Title: Pre-built ML Models

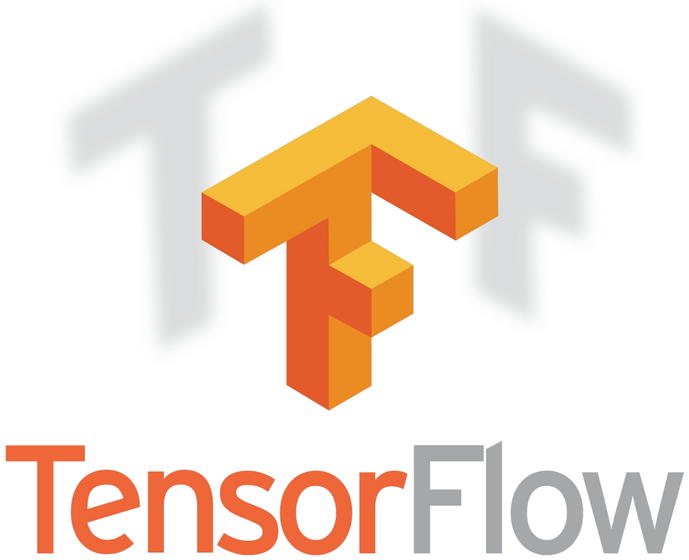
Presenter: Carl Osipov

Machine Learning is an evolving field

The GCP Machine Learning Tool Spectrum

Advanced Models	Modeling for Analysts	Pretrained Models	Minimal Effort
TensorFlow	**ML on BigQuery (beta)**	**Pretrained ML APIs**	**AutoML**
• Data Scientists • Data Engineers	• Data Scientists • Data Analysts	• Data Analysts • Data Scientists • Data Engineers	• Everyone
TensorFlow	BigQuery	Cloud Vision API	AutoML Vision

Create custom ML models with TensorFlow



Train and run ML in the familiar BigQuery UI

BigQuery

Access Pretrained ML APIs for common applications

Access Pretrained ML APIs for common applications

Cloud Vision API

Cloud Speech API

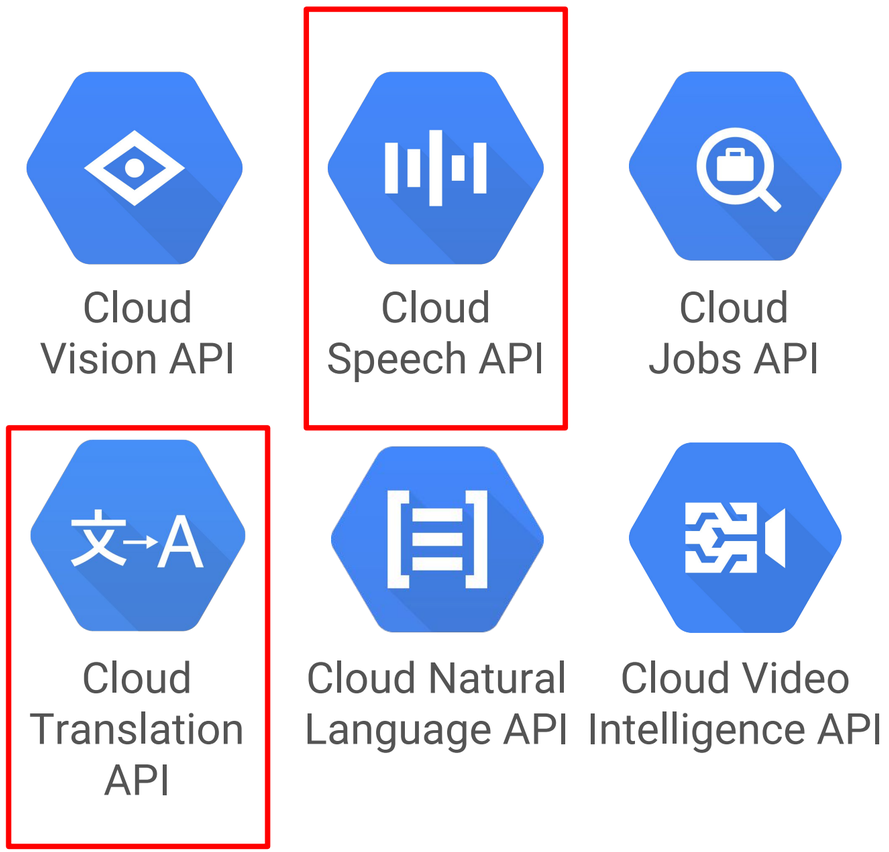
Cloud Jobs API

Cloud Translation API

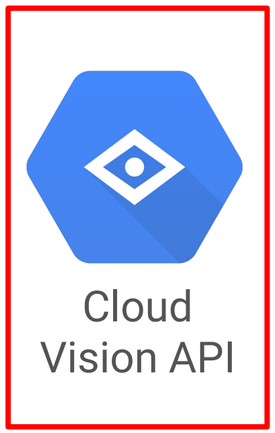
Cloud Natural Language API

Cloud Video Intelligence API

Use case:
Captioning a webinar



Use case:
Captioning a webinar



Cloud
Vision API

Cloud
Speech API

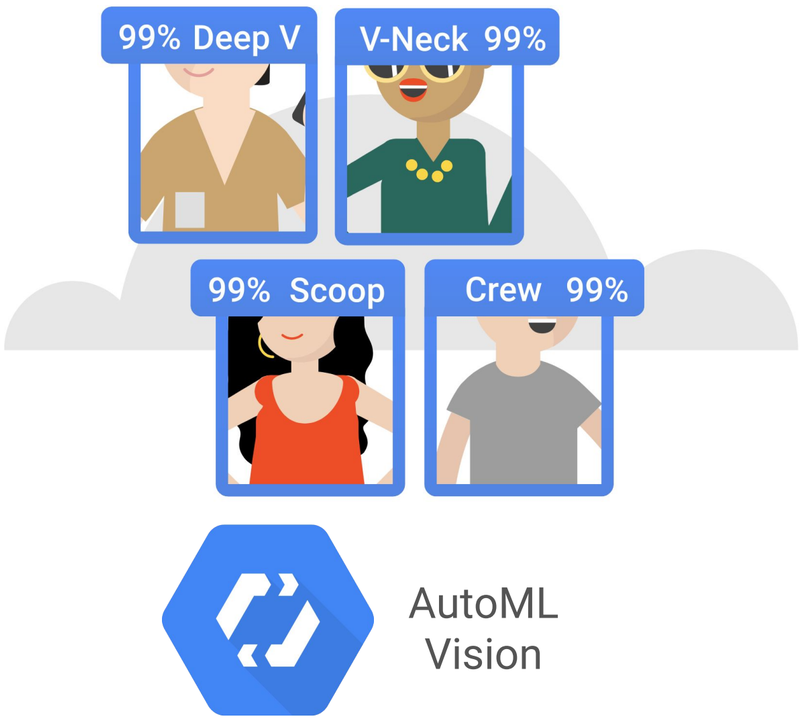
Cloud
Jobs API

Cloud
Translation
API

Cloud Natural
Language API

Cloud Video
Intelligence API

Train and run ML with minimal effort



Examples of real-world ML tool use

Custom image model to price cars

Build off NLP API to route customer emails

Use Vision API as-is to find text in memes

Use Dialogflow to create a new shopping experience

File Name: T-ICML-O_5_l3_vision_api

Format: Presenter in Studio

Title: Vision API

Presenter: Carl Osipov

Always Start with the Simplest Solution

Classifying Clouds with Vision API and AutoML

ML Frameworks:
More Control for Advanced Users

TensorFlow

Cloud ML Engine

Spark ML

Cloud Dataproc

AutoML:
Bring Your Own Data

Machine Learning APIs:
Ready to Go

Cloud Vision API

Cloud Speech API

Cloud Jobs API

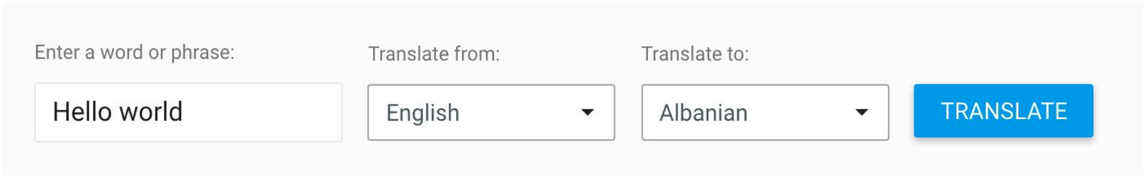
Cloud Translation API

Cloud Natural Language API

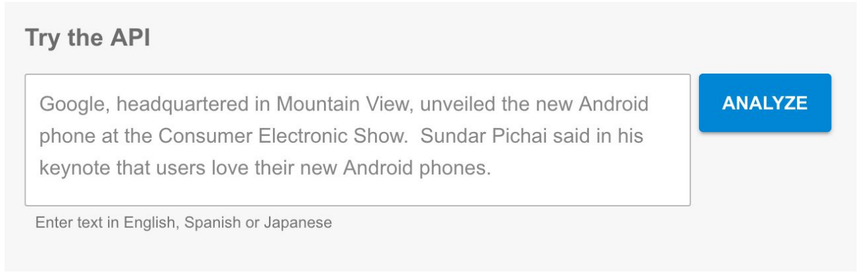
Cloud Video Intelligence API

Experiment with ML APIs in your browser

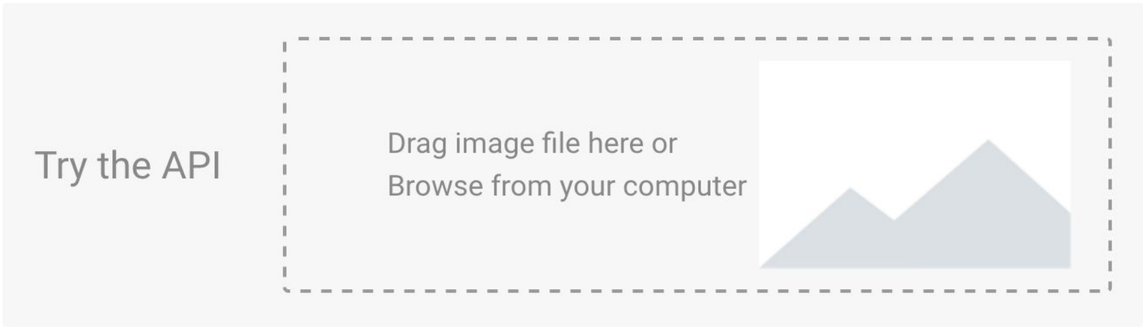
cloud.google.com/translate/



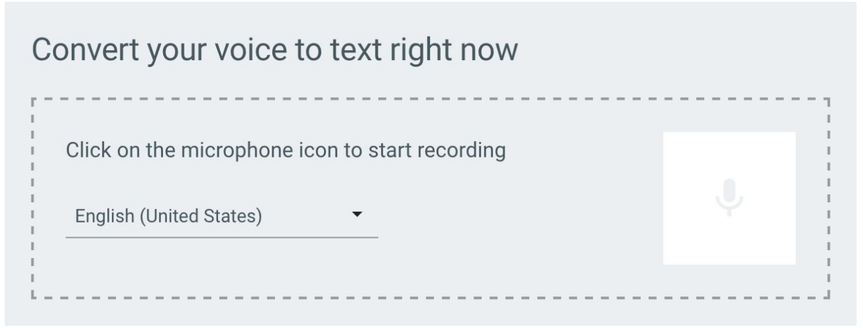
cloud.google.com/natural-language/



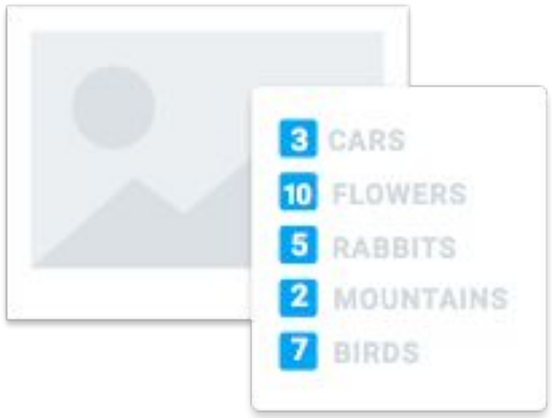
cloud.google.com/vision/



cloud.google.com/speech/



Use the Cloud Vision API to understand image content



Detect and Label

Extract Text

Identify Entities

File Name: T-ICML-O_5_l4_demo_vision_api

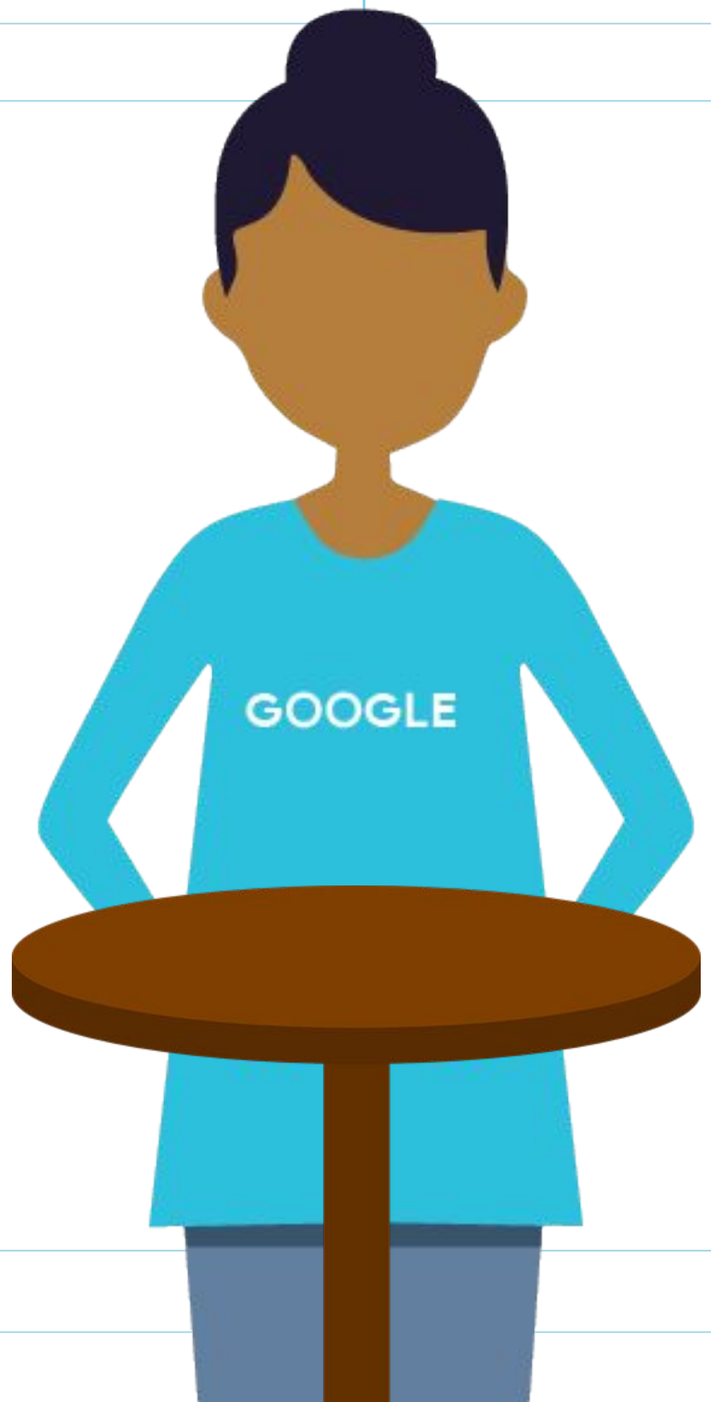
Format: Presenter in Studio

Title: Demo: Vision API

Presenter: Carl Osipov

Demo:
Classifying Clouds with Vision API

Try it yourself!
cloud.google.com/vision



Title Safe >

< Action Safe

T-GCPNET-I

File Name: T-ICML-O_5_l5_automl

Format: Presenter in Studio

Title: AutoML

Presenter: Alex Hanna

Classifying images with custom labels (without coding)

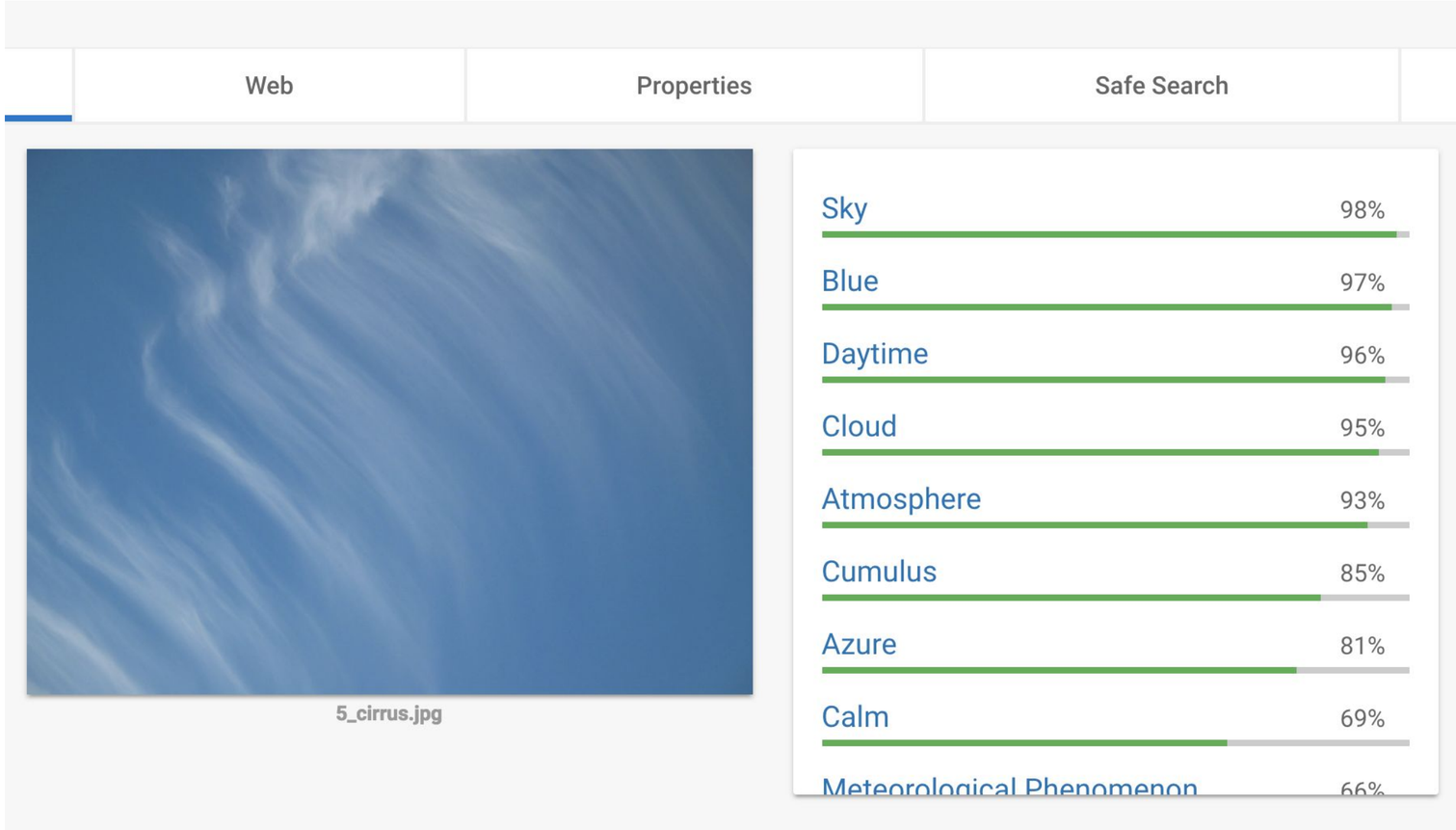
Yes it’s a cloud, but what *type*?

Cumulonimbus

VS

Cirrus

We need the ability to train on custom labels



ML Frameworks:
More Control for Advanced Users

TensorFlow

Cloud ML Engine

Spark ML

Cloud Dataproc

AutoML:
Bring Your Own Data

Machine Learning APIs:
Ready to Go

Cloud Vision API

Cloud Speech API

Cloud Jobs API

Cloud Translation API

Cloud Natural Language API

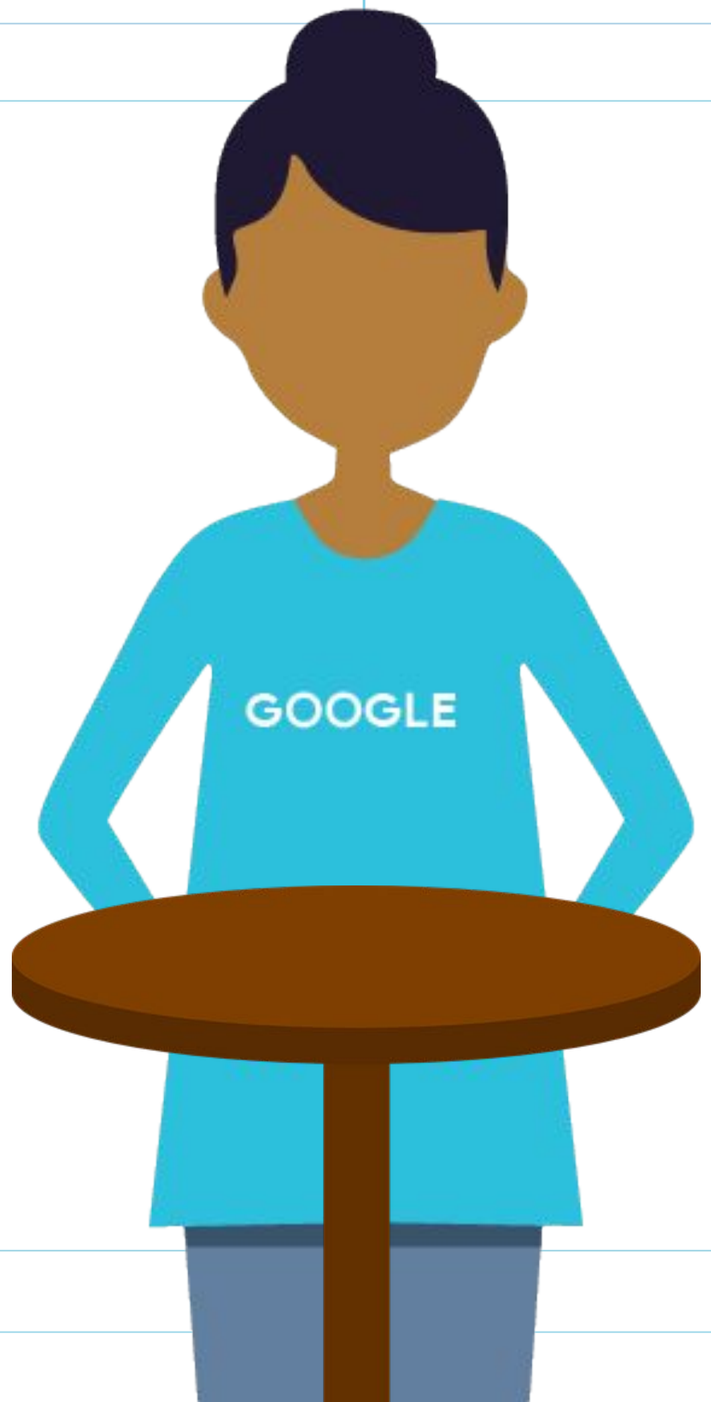
Cloud Video Intelligence API

File Name: T-ICML-O_5_l6_demo_automl

Format: Presenter in Studio

Title: Demo: AutoML

Presenter: Alex Hanna



Title Safe >

< Action Safe

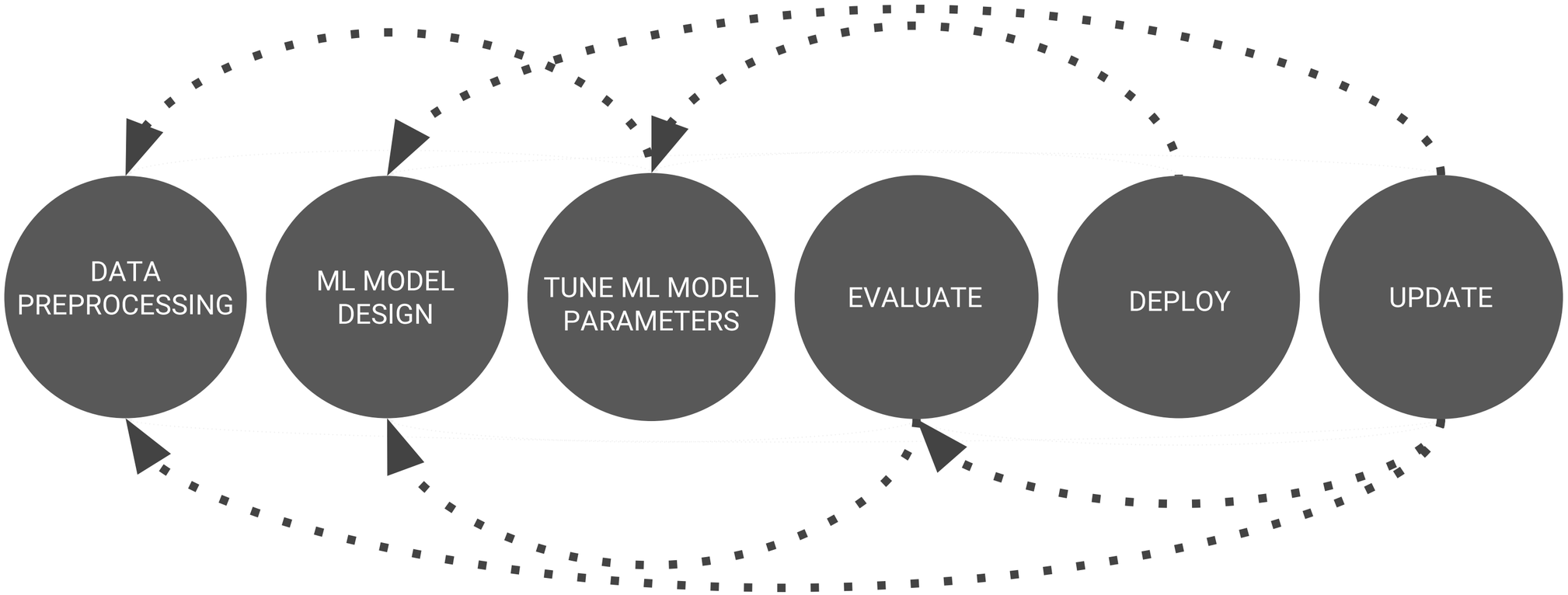
File Name: T-ICML-O_5_l7_automl_advantages

Format: Presenter in Studio

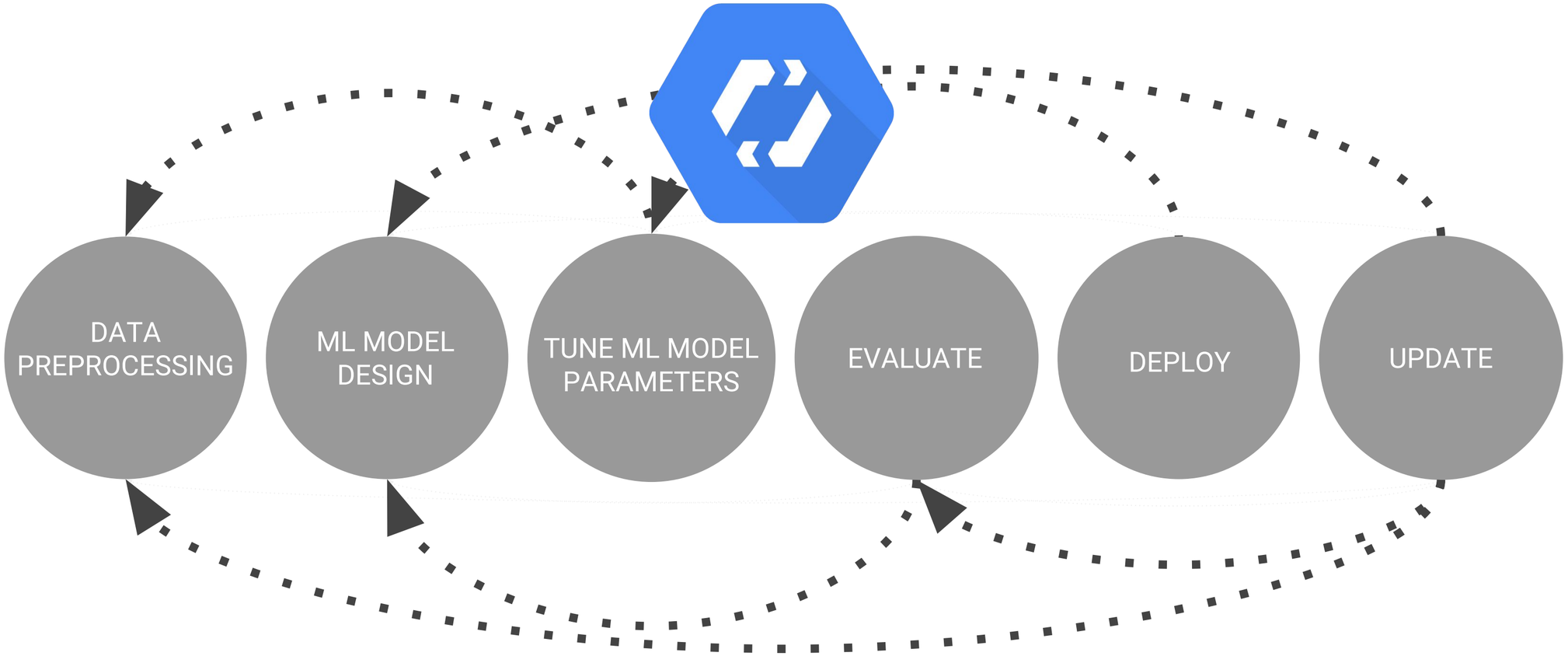
Title: Demo: AutoML

Presenter: Alex Hanna

Coding a custom image model can be time intensive

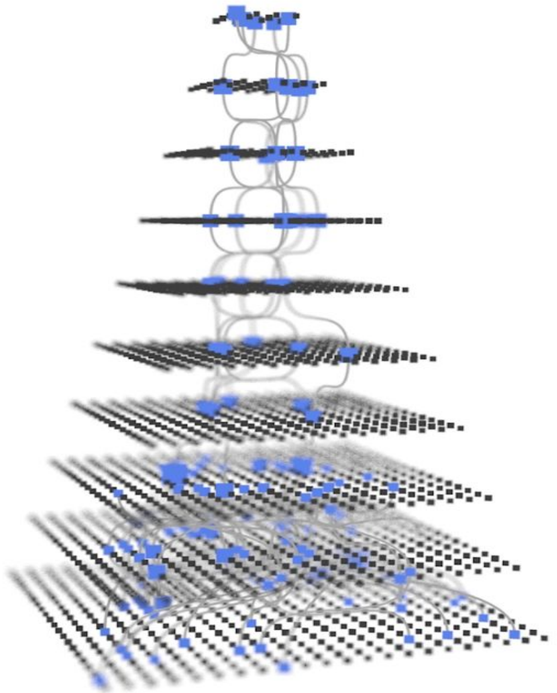


Codeless model building with AutoML



AutoML is built with Neural Architecture Search

Controller: proposes ML models

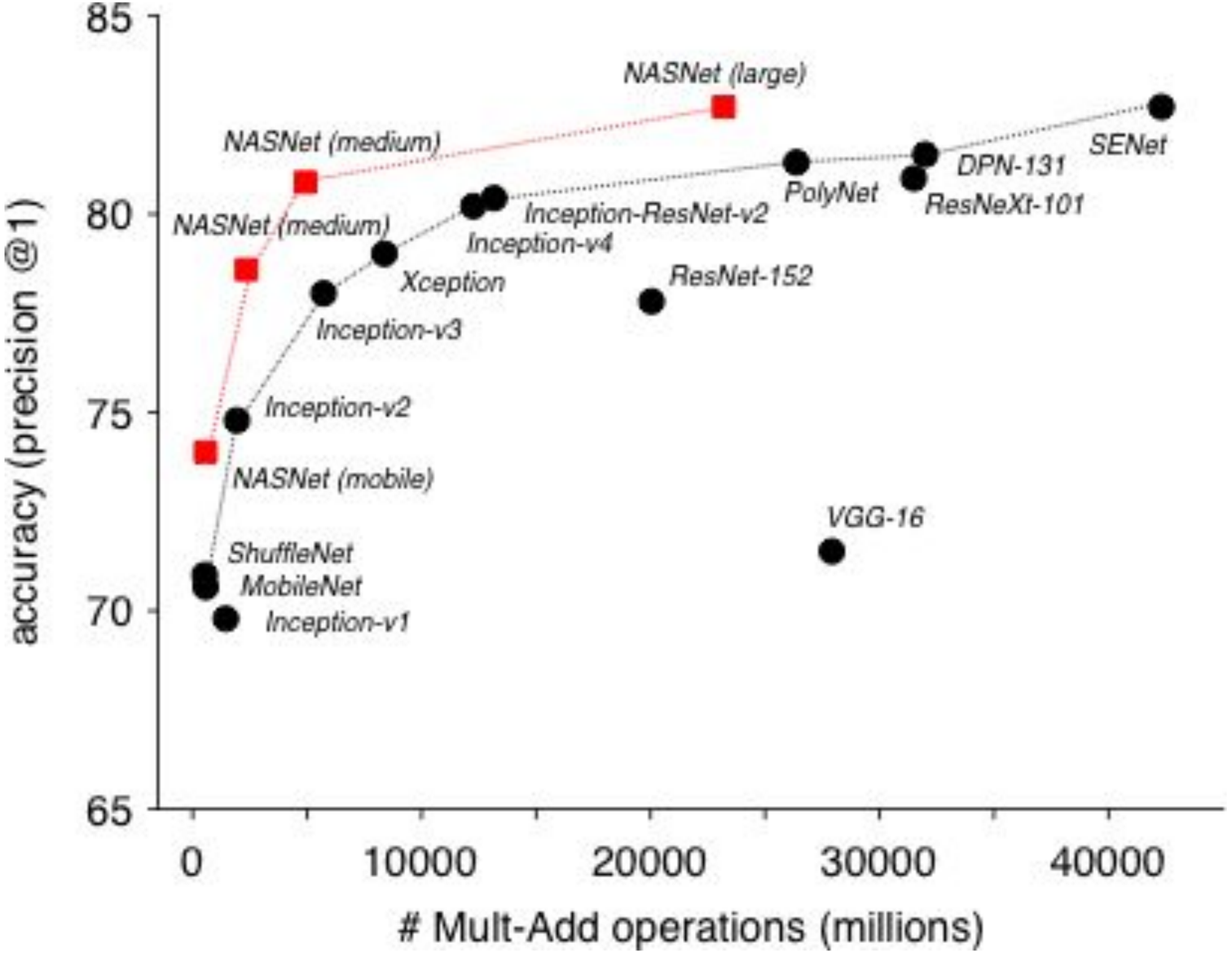


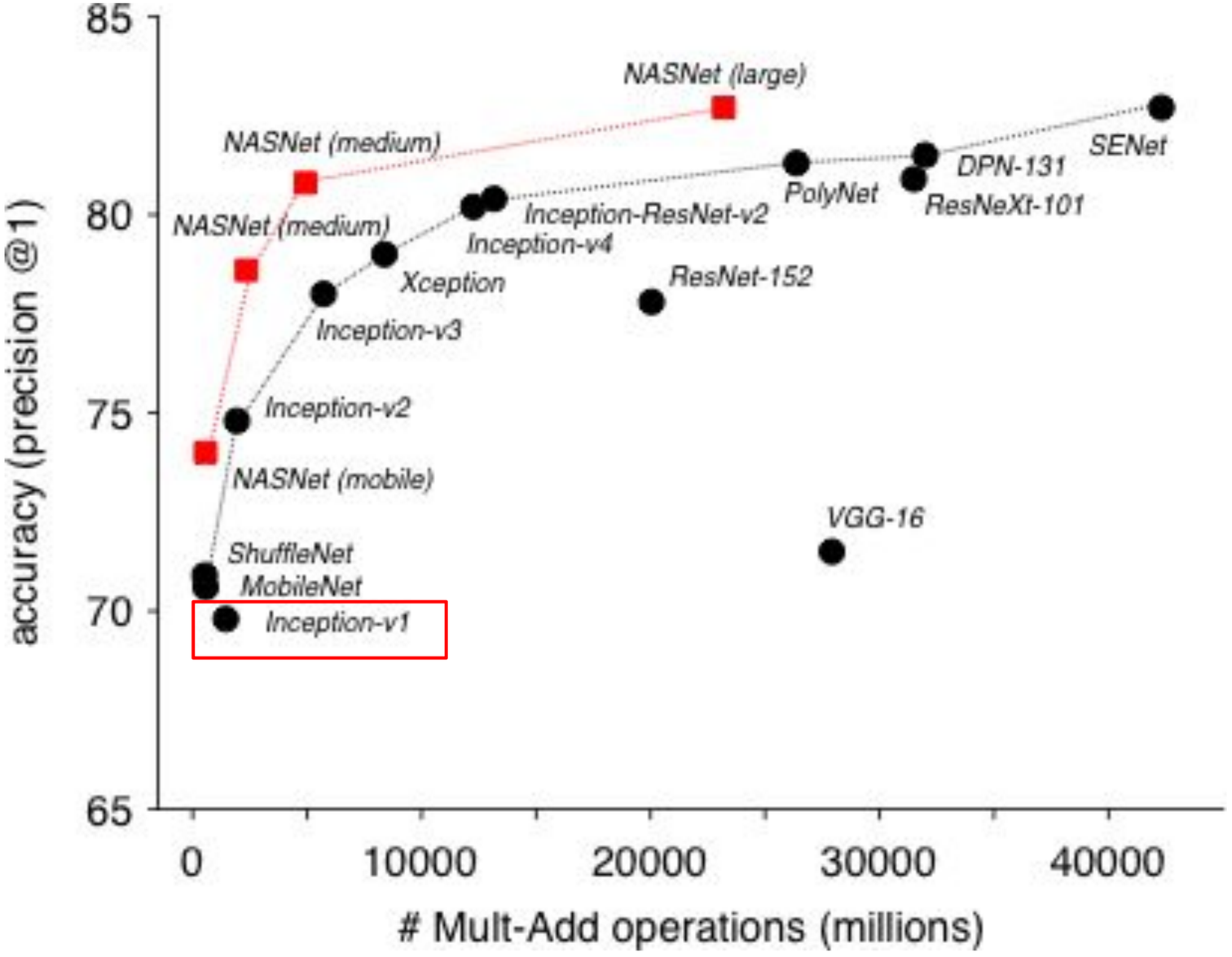
20K times

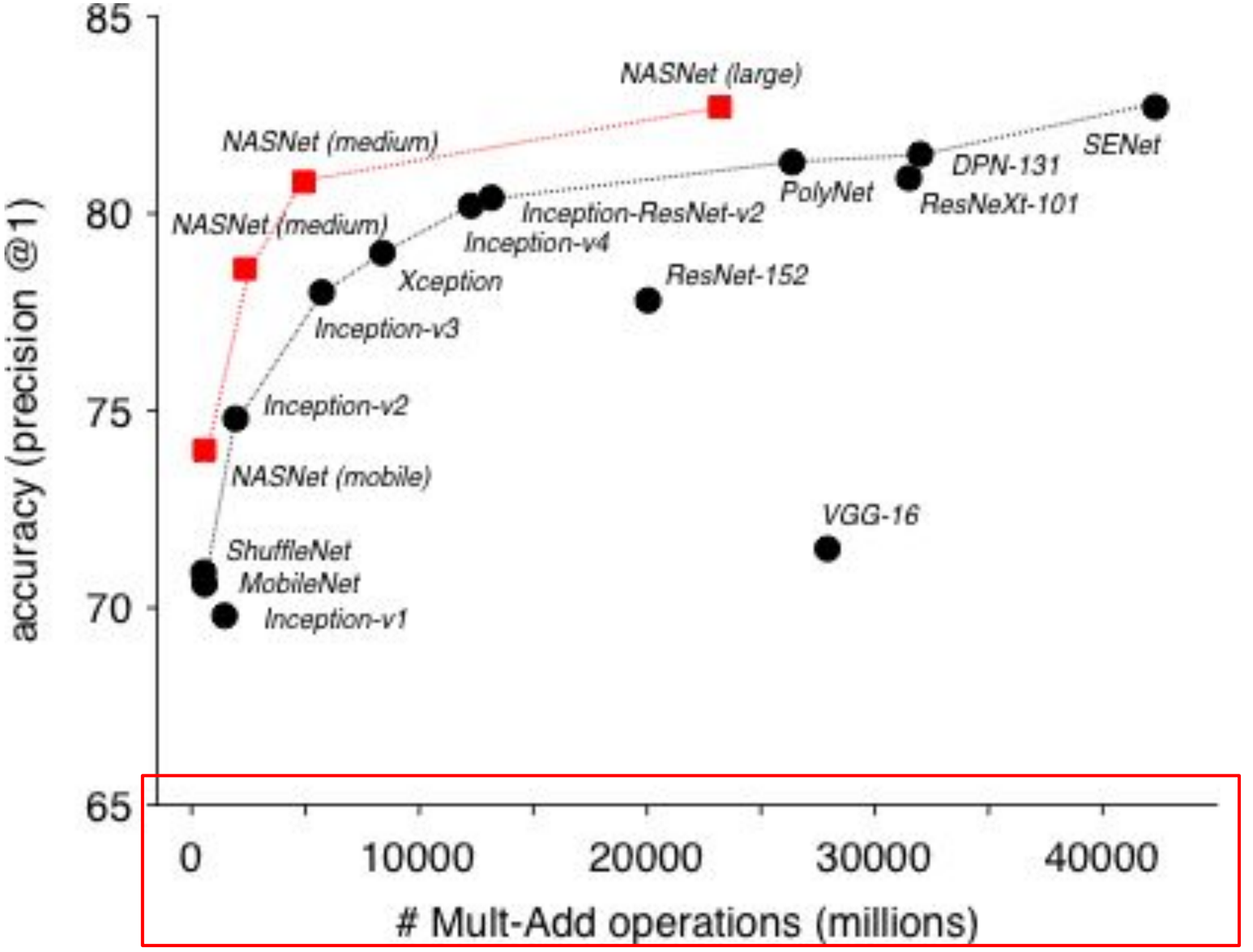
Iterate to find the most accurate model

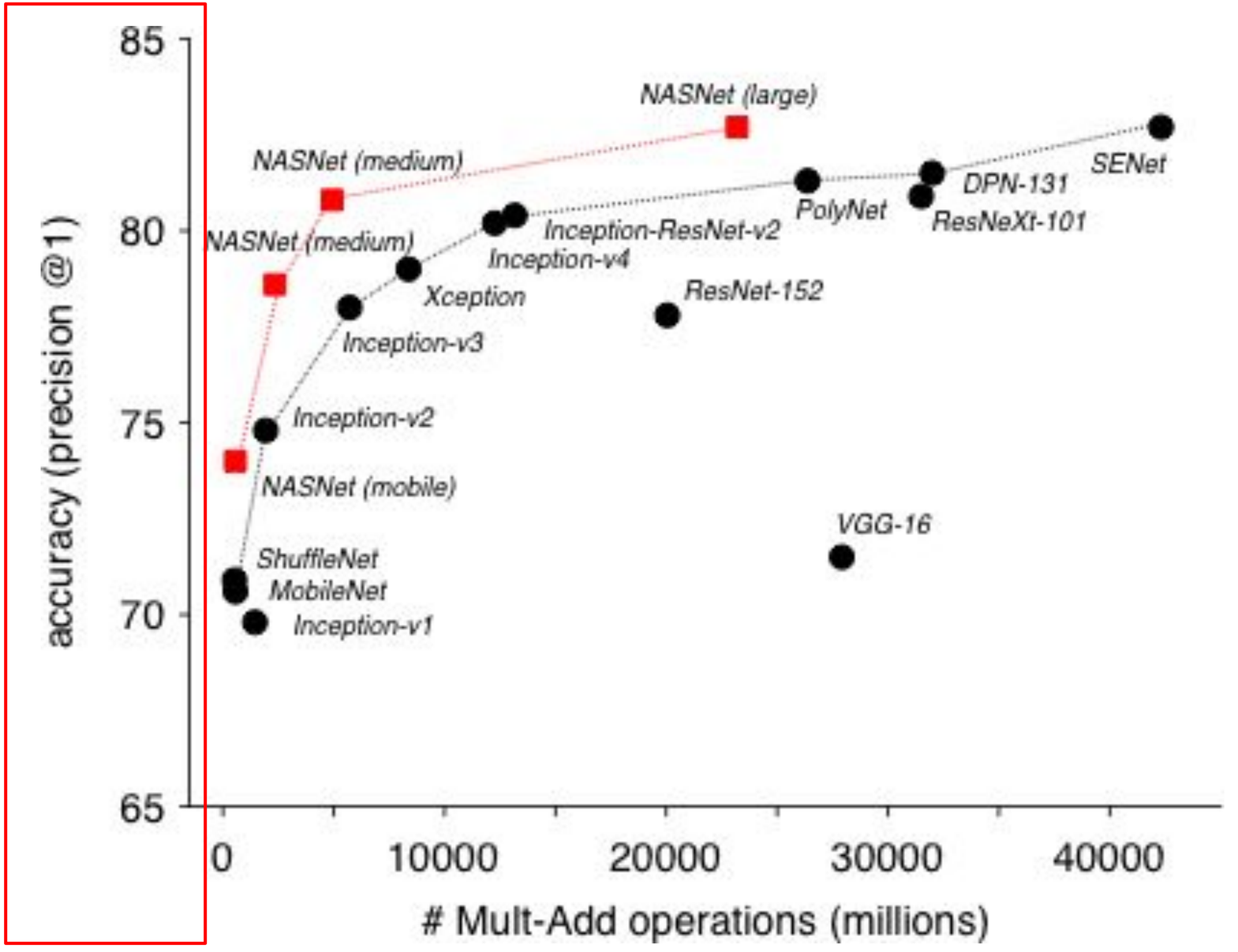
Train & evaluate models

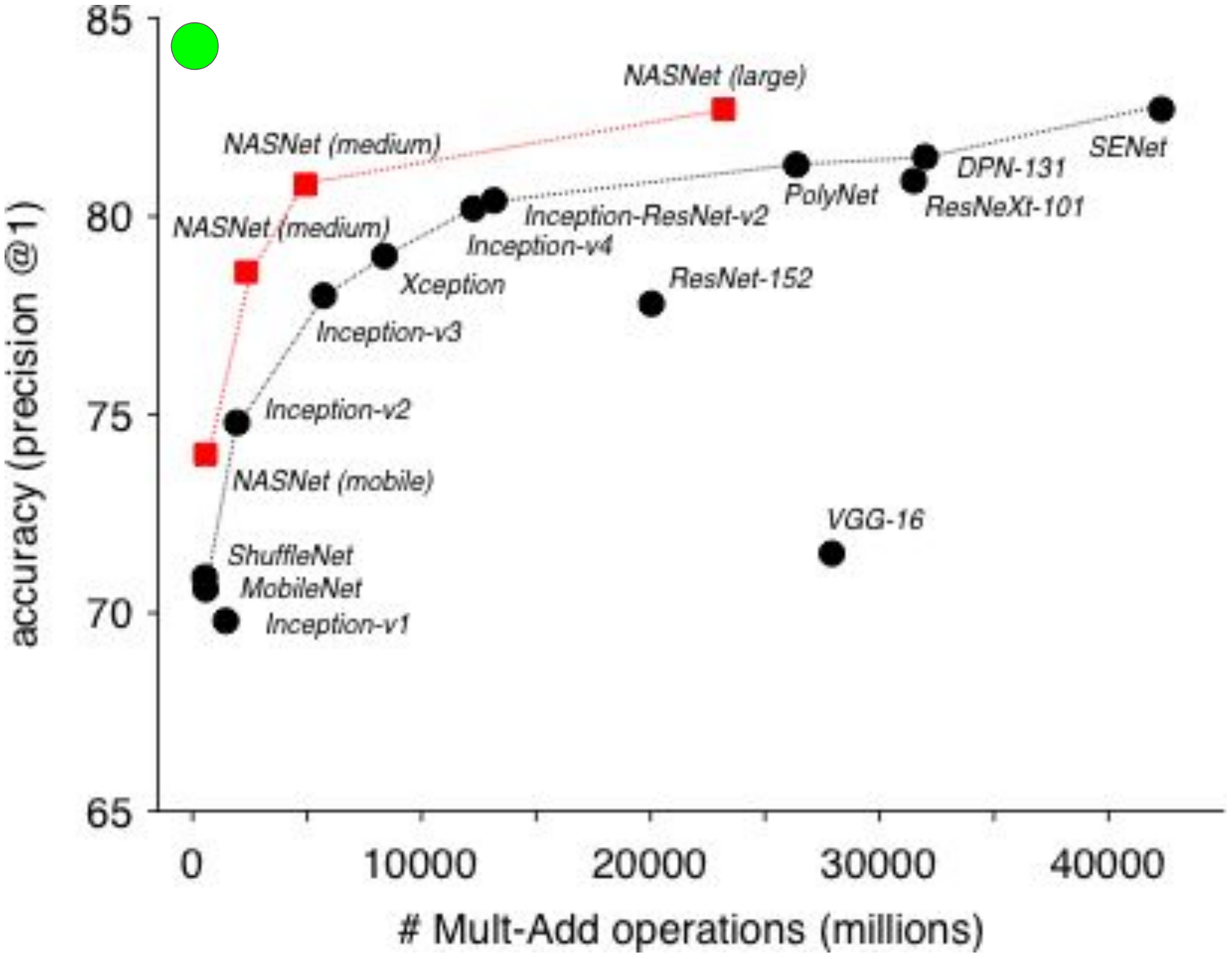
ML Models Creating ML Models

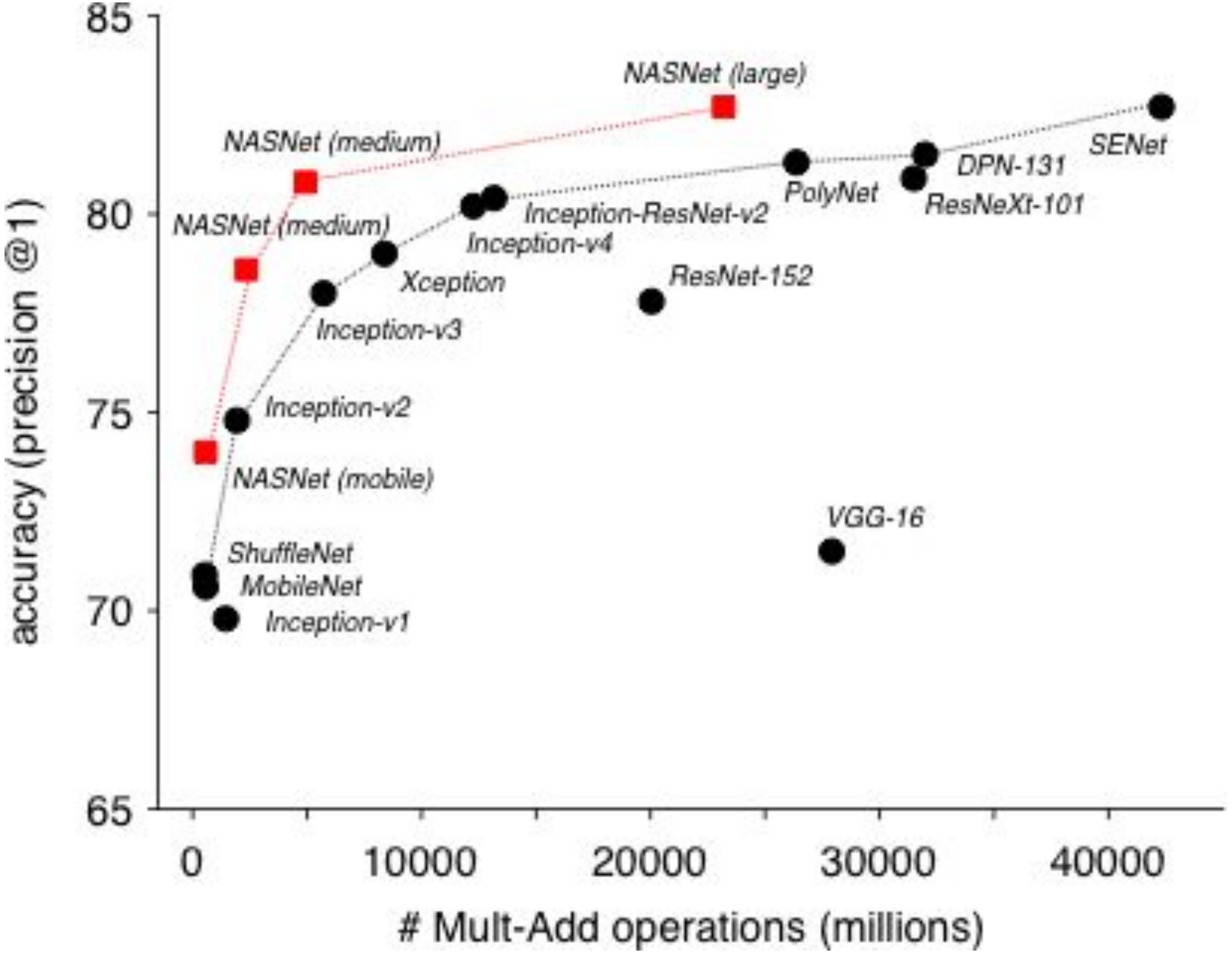

85
80
75
70
65
accuracy (precision @1)
0
10000
20000
30000
40000
Mult-Add operations (millions)
NASNet (large)
NASNet (medium)
NASNet (medium)
NASNet (mobile)
Inception-ResNet-v2
Inception-v4
Xception
Inception-v3
Inception-v2
ResNet-152
PolyNet
DPN-131
ResNeXt-101
SENet
VGG-16
ShuffleNet
MobileNet
Inception-v1


85
80
75
70
65
accuracy (precision @1)
0
10000
20000
30000
40000
Mult-Add operations (millions)
NASNet (large)
NASNet (medium)
NASNet (medium)
NASNet (mobile)
Inception-ResNet-v2
Inception-v4
Xception
Inception-v3
Inception-v2
ResNet-152
PolyNet
DPN-131
ResNeXt-101
SENet
VGG-16
ShuffleNet
MobileNet
Inception-v1


85
80
75
70
65
accuracy (precision @1)
NASNet (large)
NASNet (medium)
NASNet (medium)
Inception-ResNet-v2
PolyNet
DPN-131
SENet
ResNeXt-101
Inception-v4
Xception
ResNet-152
Inception-v3
Inception-v2
NASNet (mobile)
VGG-16
ShuffleNet
MobileNet
Inception-v1
0
10000
20000
30000
40000
Mult-Add operations (millions)


85
80
75
70
65
accuracy (precision @1)
0
10000
20000
30000
40000
Mult-Add operations (millions)
NASNet (large)
NASNet (medium)
NASNet (medium)
NASNet (mobile)
Inception-ResNet-v2
Inception-v4
Xception
Inception-v3
Inception-v2
ResNet-152
PolyNet
DPN-131
ResNeXt-101
SENet
VGG-16
ShuffleNet
MobileNet
Inception-v1


85
80
75
70
65
accuracy (precision @1)
0
10000
20000
30000
40000
Mult-Add operations (millions)
NASNet (large)
NASNet (medium)
NASNet (medium)
NASNet (mobile)
Inception-ResNet-v2
Inception-v4
Xception
Inception-v3
Inception-v2
ResNet-152
PolyNet
DPN-131
ResNeXt-101
SENet
VGG-16
ShuffleNet
MobileNet
Inception-v1


85
80
75
70
65
accuracy (precision @1)
0
10000
20000
30000
40000
Mult-Add operations (millions)
NASNet (large)
NASNet (medium)
NASNet (medium)
NASNet (mobile)
Inception-ResNet-v2
Inception-v4
Xception
Inception-v3
Inception-v2
ResNet-152
PolyNet
DPN-131
ResNeXt-101
SENet
VGG-16
ShuffleNet
MobileNet
Inception-v1

File Name: T-ICML-O_5_l8_lab_intro_vision

Format: Presenter in Studio

Title: Lab Intro: Training with Pre-built ML Models using Cloud Vision API and AutoML

Presenter: Alex Hanna

Lab

Training with Pre-built ML Models using Cloud Vision API and AutoML

Alex Hanna

Lab Steps

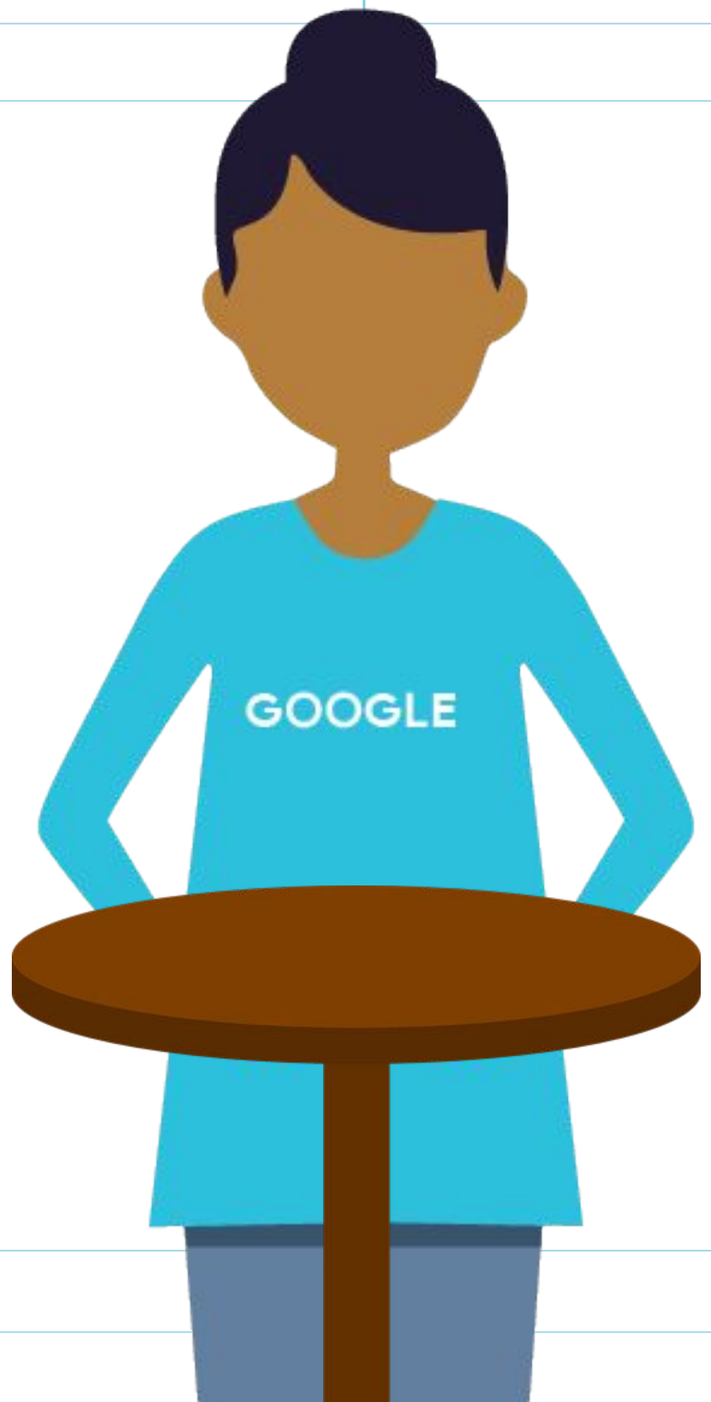
- Setup API key for ML Vision API
- Invoke the pretrained ML Vision API to classify images
- Review label predictions from Vision API
- Train and evaluate custom AutoML Vision image classification model
- Predict with AutoML on new image

File Name: T-ICML-O_5_l9_lab_solution_vision

Format: Presenter in Studio

Title: Lab Solution: Training with Pre-built ML Models using Cloud Vision API and AutoML

Presenter: Alex Hanna



Title Safe >

< Action Safe