

Build Intelligent Applications with AWS ML Services

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Pop-up Loft

A Long History of Machine Learning at Amazon



Personalized
recommendations



Fulfillment
automation and
inventory
management

amazon
Prime Air

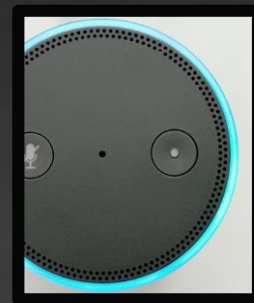
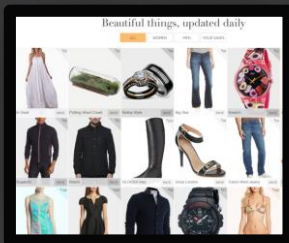
Drones

amazon alexa

Voice driven
interactions

amazon go

Inventing entirely
new customer
experiences



Machine Learning at AWS

Our mission:

Put machine learning in the hands
of every developer and data scientist

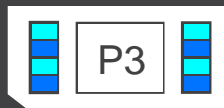
The Amazon Machine Learning Stack

APPLICATION SERVICES

PLATFORM SERVICES

FRAMEWORKS & INTERFACES

Bottom Layer: Frameworks & interfaces



NVIDIA
Tesla V100 GPUs

5,120 Tensor cores

128GB of memory

1 Petaflop of compute

NVLink 2.0

~14X faster than P2



AWS Deep Learning AMI



APPLICATION SERVICES

PLATFORM SERVICES

FRAMEWORKS & INTERFACES

AWS Deep Learning AMIs

Caffe2

CNTK

Apache
MXNet

PyTorch

TensorFlow

Torch

Keras

Gluon



Collect and prepare
training data



Choose and
optimize your ML
algorithm



Set up and manage
environments for
training



Train and tune model
(trial and error)

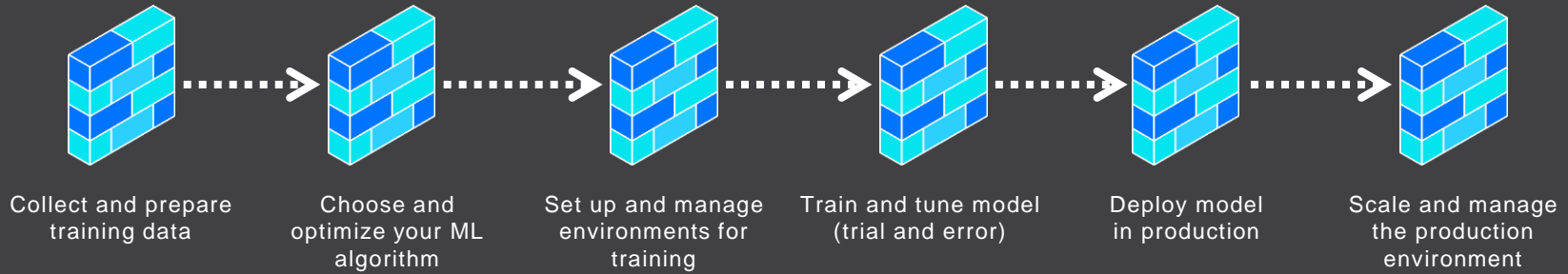


Deploy model
in production



Scale and manage
the production
environment

Easily build, train, and deploy machine learning models





Pre-built
notebooks for
common
problems



Built-in, high
performance
algorithms

ALGORITHMS

K-Means Clustering
Principal Component Analysis
Neural Topic Modelling
Factorization Machines
Linear Learner - Regression

XGBoost
Latent Dirichlet Allocation
Image Classification
Seq2Seq
Linear Learner - Classification

FRAMEWORKS

Apache MXNet
TensorFlow

Caffe2, CNTK,
PyTorch, Torch



Set up and manage
environments for
training



Train and tune
model (trial and
error)



Deploy model
in production



Scale and manage the
production environment

BUILD



Pre-built
notebooks for
common
problems



Built-in, high
performance
algorithms



One-click
training



Hyperparameter
optimization



Deploy model
in production



Scale and manage
the production
environment

BUILD

TRAIN



Pre-built
notebooks for
common
problems



Built-in, high
performance
algorithms



One-click
training



Hyperparameter
optimization



One-click
deployment



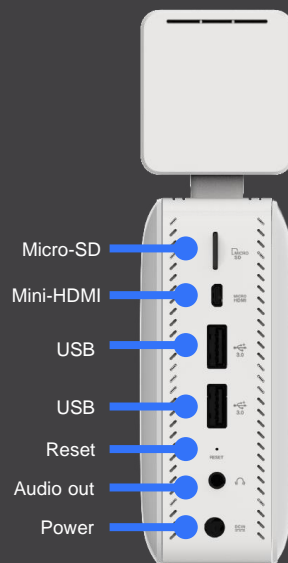
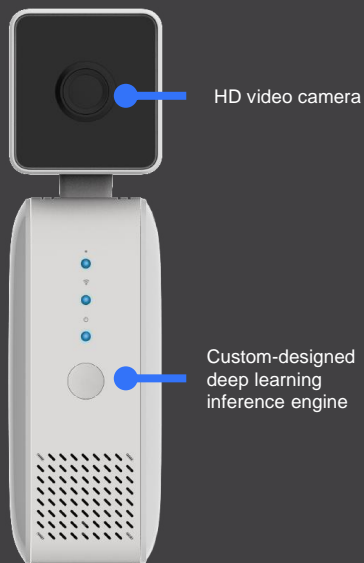
Fully managed
hosting with auto-
scaling

BUILD

TRAIN

DEPLOY

**Can we do more to put ML in the hands of
all developers (literally)?**



HD video camera
with on-board
compute optimized
for deep learning

Integrates with Amazon
SageMaker and AWS
Lambda



From unboxing to
first inference in
<10 minutes



Tutorials, examples,
demos, and pre-built
models

APPLICATION SERVICES

PLATFORM SERVICES

Amazon SageMaker

AWS DeepLens

FRAMEWORKS & INTERFACES

AWS Deep Learning AMLs

Caffe2

CNTK

Apache
MXNet

PyTorch

TensorFlow

Torch

Keras

Gluon

The Amazon Machine Learning Stack

APPLICATION SERVICES

Rekognition

Transcribe

Translate

Polly

Comprehend

Lex

PLATFORM SERVICES

Amazon SageMaker

AWS DeepLens

FRAMEWORKS & INTERFACES

AWS Deep Learning AMIs

Caffe2

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Gluon

AWS Machine Learning Services for Computer Vision

Amazon Rekognition

Easy-to-use deep learning-based computer vision analysis



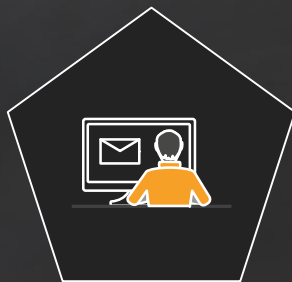
Fully
managed
service



Image
analysis



Video
analysis



Easy-to-use
API



Real-time
and batch
analysis



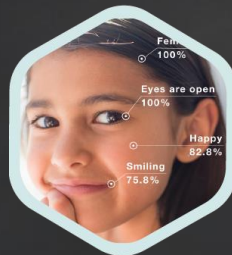
Low cost

Amazon Rekognition Image

Detect objects, scenes, and faces, extract text and identify unsafe content in images



Object and Scene
Detection



Facial
Analysis



Face
Recognition



Unsafe Image
Detection



Celebrity
Recognition



Text in Image



Face
Comparison



Demo

Rekognition Console

Demo

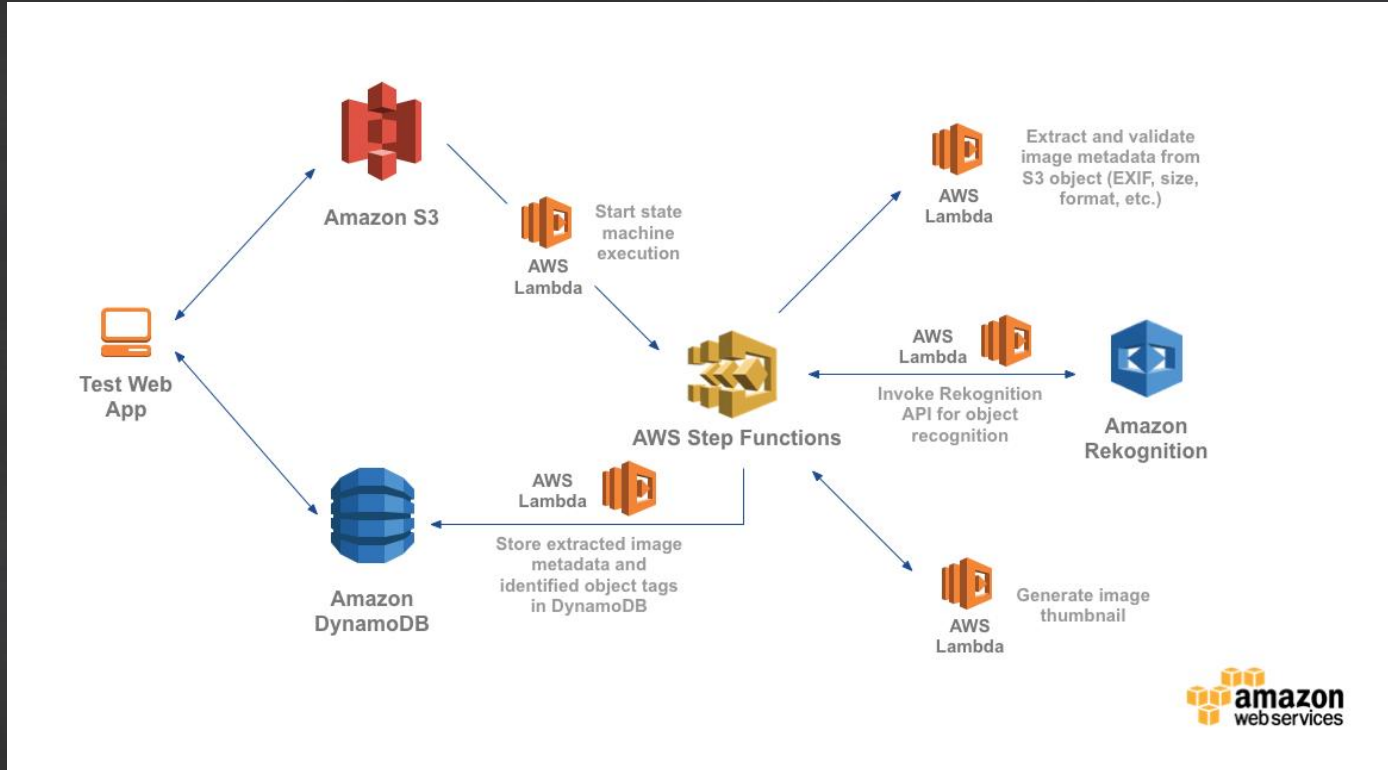
<https://amzn.to/takeselfie>

Demo

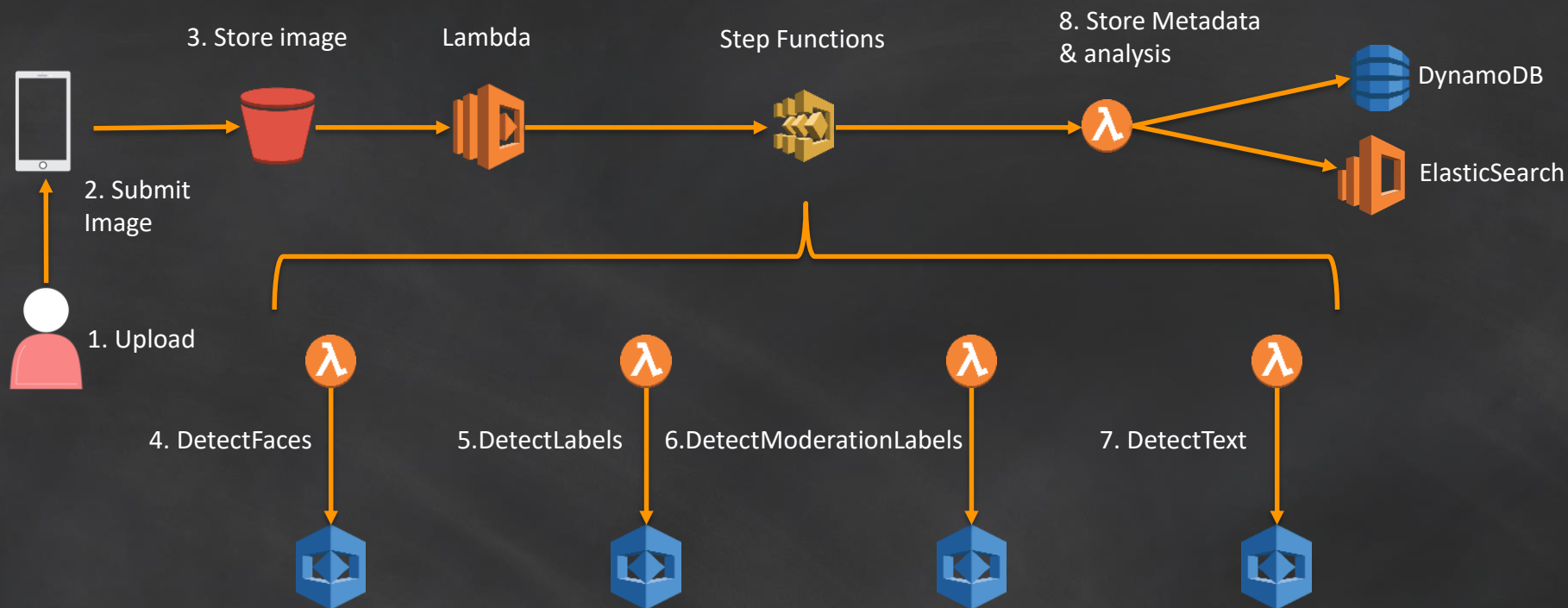
Rekognition API

Example: Serverless Image Processing Workflow

<https://github.com/aws-samples/lambda-refarch-imagerecognition/>



Analyze User Generated Content



Video Analysis

Limitations of traditional solutions



Temporal
information lost



Motion
context lost



Manually intensive



Slow and error-prone



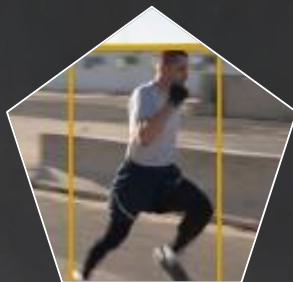
Expensive

Amazon Rekognition Video

Analyze activity, recognize, and track people in stored and live video



Object and activity detection



Person tracking



Real-time live stream



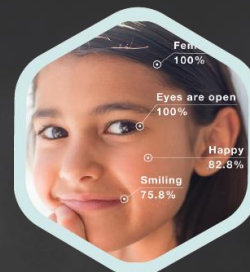
Celebrity recognition



Unsafe video detection



Face recognition



Facial Analysis

Traffic Cam 352 - Riverview West

Northbound



03:15:05:41

Mon, Nov 27, 2017

Language and Speech Services

Common Language Use Cases



**Voice of Customer
Applications**



Knowledge Management



Education



**Customer Service/
Call Centers**



Semantic Search



Accessibility



**Enterprise
Digital Assistant**



Captioning Workflows



Information Bots



Personalization



Localization

Powerful speech and language capabilities

Amazon Transcribe

Automatic conversion of speech into accurate, grammatically correct text

Amazon Translate

Natural and fluent language translation

Amazon Polly

Turn text into lifelike speech using deep learning

Amazon Comprehend

Discover insights and relationships in text

Amazon Lex

Conversational interfaces for text-based and voice-based applications

Amazon Transcribe

Automatic conversion of speech into accurate, grammatically correct text



Multiple
languages



Intelligent
punctuation and
formatting



Timestamp
generation



Support for
telephony
audio

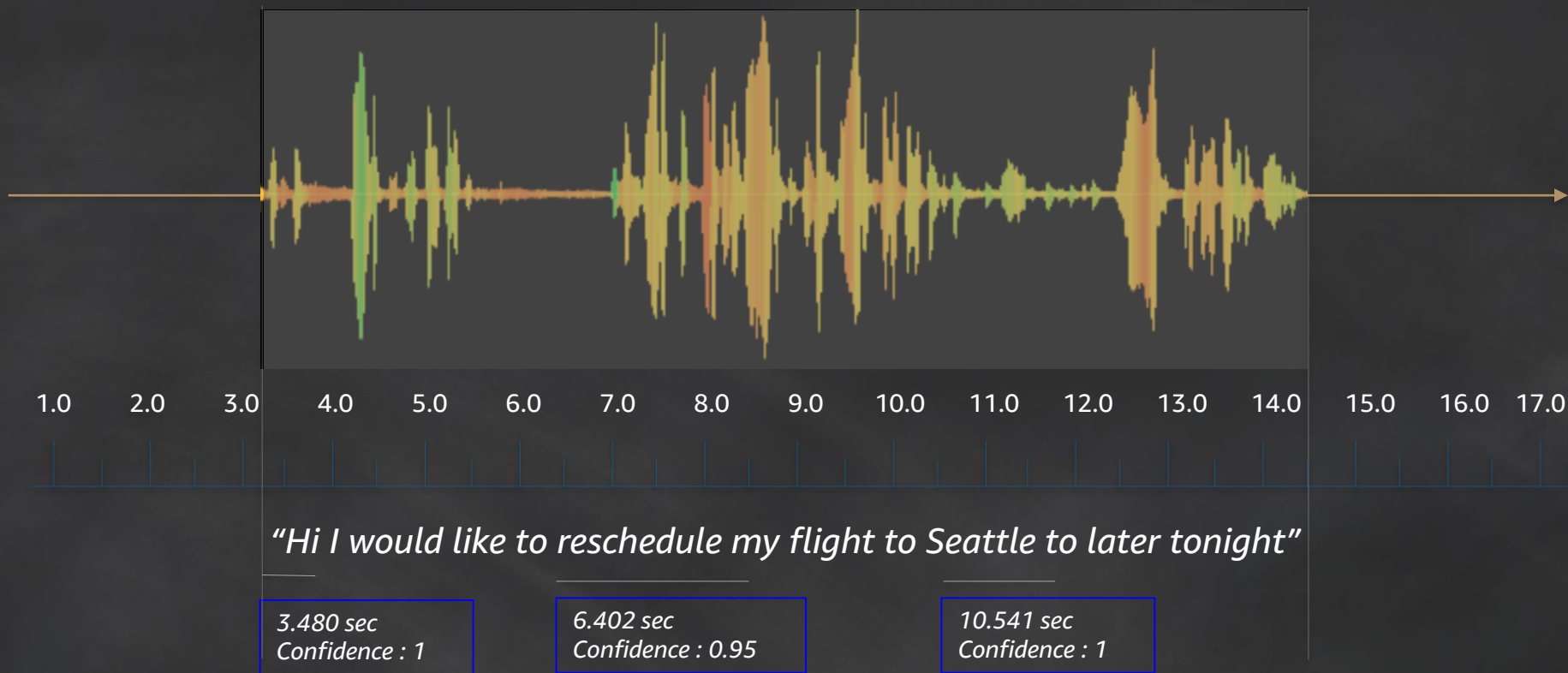


Recognize
multiple
speakers



Custom
vocabulary

Timestamping and Confidence Score



Amazon Transcribe Demo

Amazon Translate

Natural and fluent language translation



Real-time
translation



Batch analysis



Automatic language
recognition



Low cost

Amazon Translate Demo

- Translate a greeting
- Speak the greeting
- Add SSML for further control

Amazon Polly

Turn text into lifelike speech using deep learning



Wide selection of
voices and languages



Synchronize
speech



Fine-grained
control



Unlimited replay

Amazon Polly Demo

- Call Amazon Polly
- Save output locally as mp3 files

Demo: Translate a chat channel using Amazon Translate

Amazon Comprehend

Discover insights and relationships in text using deep learning



Amazon Comprehend

Discover insights and relationships in text using deep learning



Text Analysis

Amazon.com, Inc. is located in Seattle, WA and was founded July 5th, 1994 by Jeff Bezos. Our customers love buying everything from books to blenders at great prices

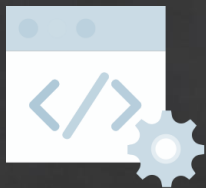
- Named Entities
 - Amazon.com: Organization
 - Seattle, WA : Location
 - July 5th, 1994: Date
 - Jeff Bezos : Person
- Keyphrases
 - Our customers
 - books
 - blenders
 - great prices
- Sentiment
 - Positive
- Language
 - English

Amazon Comprehend Demo

- Download Amazon Video review data
- Use Amazon Comprehend
 - detect sentiment
 - identify key phrases

Amazon Lex

Building conversational interfaces into any application using voice and text



Integrated
development in
the AWS console



Trigger
Lambda
functions



Multi-step
conversations



One-click
deployment



Enterprise
connectors



Fully
managed

Demo

- Create an Amazon Lex chatbot for ordering coffee
- Call the chatbot

The broadest ML platform, that's easiest to use, and has the most customers

Complementary Services

DATA LAKE STORAGE

Amazon S3

SECURITY

Access Control Amazon Macie
Encryption AWS Organizations

COMPUTE

Powerful GPU and CPU Instances

ANALYTICS

Amazon Athena
Amazon Redshift and Redshift Spectrum
Amazon EMR
(Spark, Hive, Presto, Pig)
AWS Glue
Amazon Kinesis
Amazon QuickSight

AWS ML Platform

APPLICATION SERVICES

Amazon Lex Amazon Transcribe
Amazon Polly Amazon Rekognition Image
Amazon Comprehend Amazon Rekognition Video
Amazon Translate

PLATFORM SERVICES

Amazon SageMaker AWS DeepLens

FRAMEWORKS AND INTERFACES

AWS Deep Learning AMI

Apache MXNet
Caffe2
CNTK
PyTorch
TensorFlow
Theano
Torch

Gluon
Keras

AWS ML Customers



Try it yourself!

<https://github.com/aws-samples/aws-ai-bootcamp-labs>



Pop-up Loft

Everything and Anything Startups Need to Get Started on AWS

aws.amazon.com/activate