



AI & Machine Learning at Amazon

Christian Petters cubetoon

Solutions Architect, Amazon Web Services

At Amazon,
we've been making
investments in ML for
the last 20 years...



Fulfilment & logistics



At Amazon,
we've been making
investments in ML for
the last 20 years...



Fulfilment & logistics

Search & discovery

www.amazon.com/Lean-Startup-Entrepreneurs-Continuous-Innovation/dp/0307887898/ref=sr_1_1?ie=UTF8&qid=1455532634&sr=8-1&keywords=lean+startup

The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses Hardcover – September 13, 2011

by Eric Ries • (Author)

★★★★★ • 1,043 customer reviews

See all 4 formats and editions

Hardcover \$16.49 Paperback from \$13.23 Audible \$0.00

63 Used from \$9.92 15 Used from \$13.23 Free with your Audible trial
92 New from \$10.00 4 New from \$13.23

Most startups fail. But many of those failures are preventable. The Lean Startup is a new approach being adopted across the globe, changing the way companies are built and new products are launched.

Eric Ries defines a startup as an organization dedicated to creating something new under conditions of extreme uncertainty. This is just as true for one person in a garage or a group of seasoned professionals in a Fortune 500 boardroom. What they have in common is a mission to penetrate that fog of uncertainty to discover a successful path to a sustainable business.

The Lean Startup approach fosters companies that are both more capital efficient and that leverage human creativity more effectively. Inspired by lessons from lean manufacturing, it relies on "validated learning" to iteratively refine its assumptions about what customers want.

Want to know our Editors' picks for the best books of the month? Browse [Best Books of the Month](#).

Frequently Bought Together

THE LEAN STARTUP + **ZERO ONE**

Total price: \$32.82

This item: The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful... by Eric Ries Hardcover \$16.49

Zero to One: Notes on Startups, or How to Build the Future by Peter Thiel Hardcover \$16.33

customers Who Bought This Item Also Bought

ZERO TO ONE by Peter Thiel

Business Model Generation by Alexander Osterwalder

THE STARTUP OWNER'S MANUAL by Steve Blank and Bob Dorf

HOW TO WIN FRIENDS & INFLUENCE PEOPLE by Dale Carnegie

The \$100 Startup by Guy Kawasaki

The Innovator's Dilemma by Clayton M. Christensen

Value Proposition Design by Alexander Osterwalder

THE HARD THING ABOUT HARD THINGS by Ben Horowitz

Traction by Eric Ries

The 4-Hour Workweek by Tim Ferriss

Page 1 of 10

The Four by Anthony Goulet

★★★★★ 13 \$4.99

At Amazon,
we've been making
investments in ML for
the last 20 years...



Fulfilment & logistics

Search & discovery

Existing products

Carrier 3:32 PM 100%
Page Chapter Book Done

A Dance with Dragons: A Song of Ice... All (461) People (440) Terms (21)

Daena

Daenerys Targaryen Queen Daenerys - "Dany" - "Daenerys Stormborn" - "The Unburnt" - "Mother of Dragons" - "Queen of Meereen" - "Queen of the Andals and the Rhoynar and the First Men" - "Khaleesi of Great Grass Sea" - "Breaker of Shackles" - 15 years old; Sole heir to the Targaryen dynasty who ruled Westeros for 300 years u...

Dagmer Cleftjaw

Dagon Codd

Dagon Greyjoy

Dalla Wildling Queen; Mance Rayder's wife; Perished giving birth to Mance's son

Damon One of the Bastard's Boys; Is fair haired and boyish

Dannel

Danny Flint

Dareon Sworn Brother of the Night's Watch; A handsome young singer with fair hair and hazel eyes; Was sent to the Wall accused of rape but he has always claimed he is innocent; Was sent to Eastwatch after taking his vows; Jon & Sam's friend; Jon named him a recruiter to replace Yoren who vanished on his way to the wall; He will...

Daryn Hornwood

Davos Seaworth

Carrier 3:49 PM 100%
X-Ray Khal Drogo Done

Dany's "sun-and-stars" - Daenerys' deceased husband; A great khal of the Dothraki; Was never defeated in battle; Died of a wound that festered and was help along by Mirri Maz Duur

From Shelfari.com

Chapter 2

They had been given to her when she wed Khal Drogo. It was Drogo who had given her the pelt she wore, the head and hide of a hrakkar, the white lion of the Dothraki sea.

Page 31 • Loc 648

Chapter 5

"That did not stop you selling her to Khal Drogo ..." "Dothraki neither buy nor sell. Say rather that her brother Viserys gave her to Drogo to win the khal's friendship.

Page 73 • Loc 1470

Chapter 23

"Bring the grey linen gown with the pearls on the

aws SUMMIT

aws SUMMIT

Star Wars: Episode V - The Empire Strikes Back



The Rebel Fleet/End...
John Williams



Mark Hamill
Luke Skywalker



Carrie Fischer
Princess Leia



Anthony Daniels
C3P0



Kenny Baker
R2D2

2:01:29/2:04:19 HD

View All X-Ray

Options

At Amazon,
we've been making
investments in ML for
the last 20 years...



Fulfilment & logistics

Search & discovery

Existing products

New products

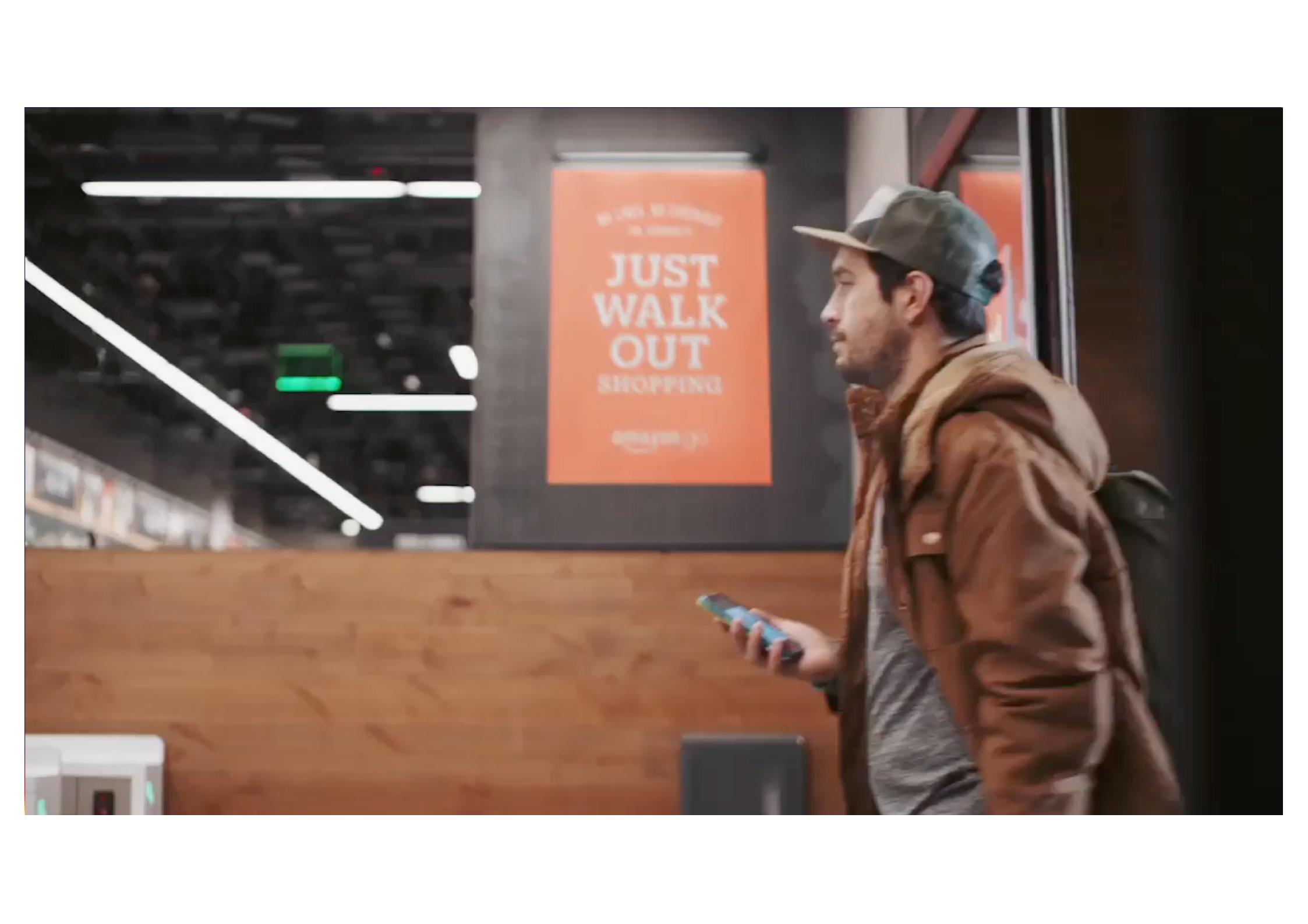


amazon





amazon echo



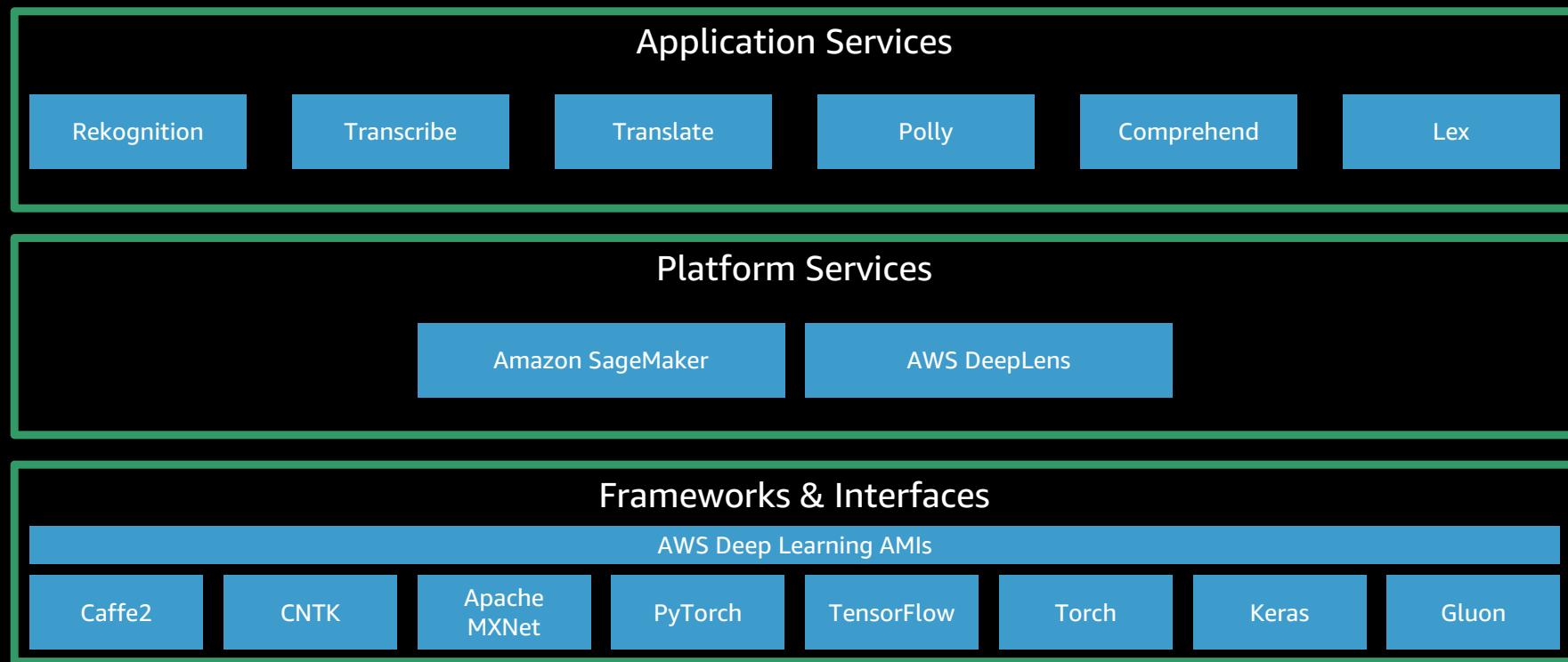
JUST
WALK
OUT
SHOPPING

amazon go

ML @ AWS: OUR MISSION

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

The Amazon ML Stack





AWS Machine Learning Language Services

Powerful 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

Benefits of ML Language Services



- **Easily add intelligence to apps**
with pre-trained APIs for speech, transcription, translation, language analysis, and chatbot functionality
- **Connect to comprehensive analytics**
including data warehousing, business intelligence, batch processing, stream processing, and workflow orchestration
- **Integrate with the most complete big data platform**
including the data lake and database tools to run machine learning workloads

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

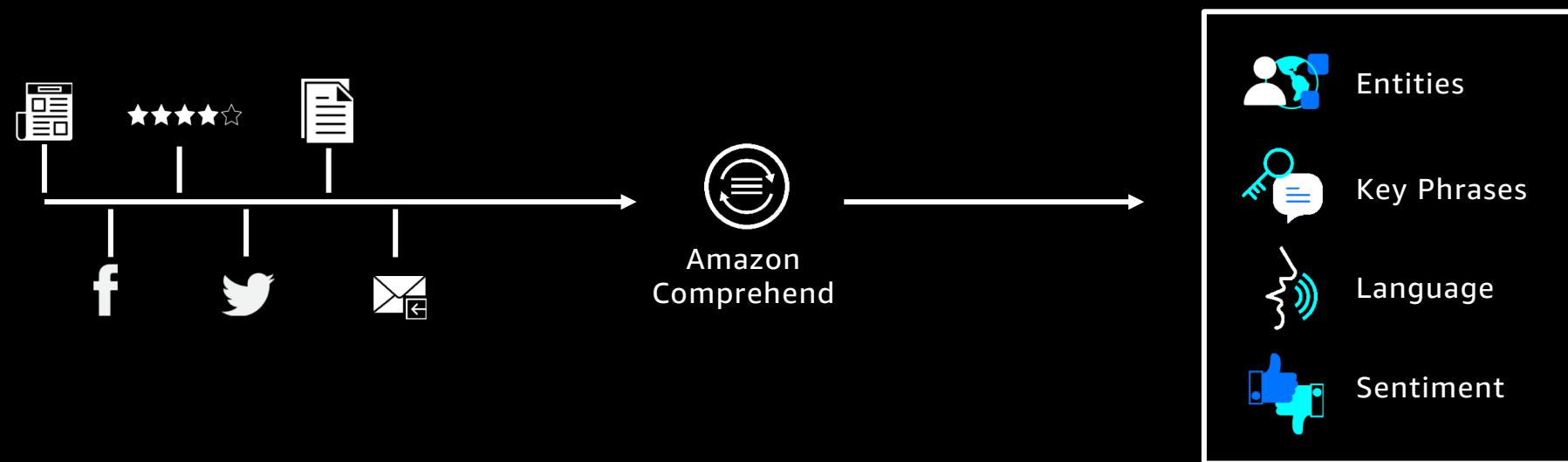


Localization

Deep dive/Components

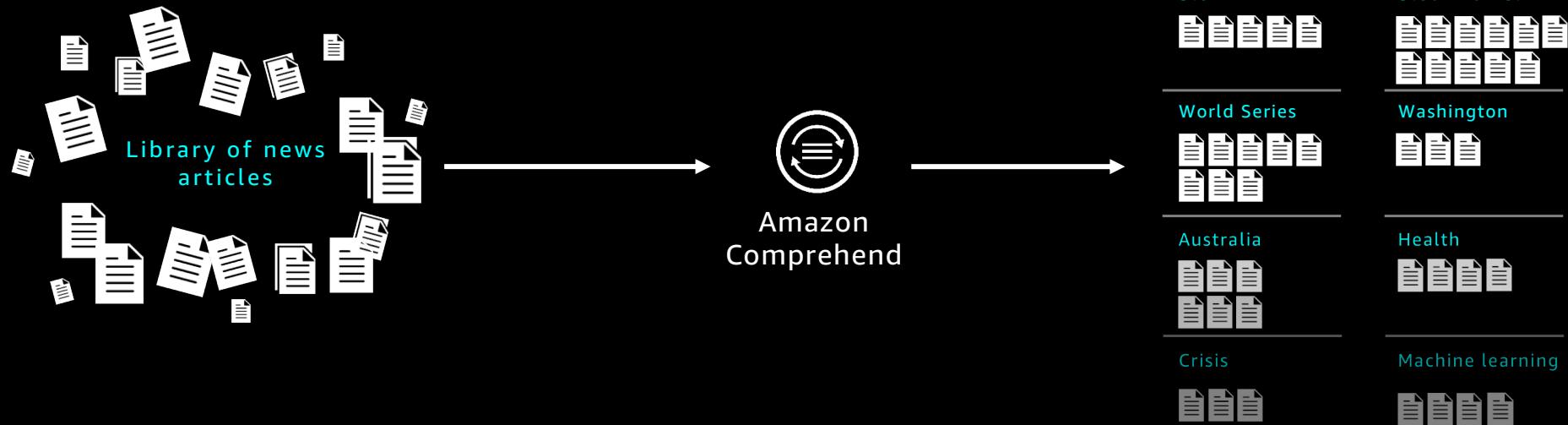
Amazon Comprehend

Discover insights and relationships in text using deep learning



Amazon Comprehend

Discover insights and relationships in text using deep learning



Amazon Transcribe

Automatic conversion of speech into accurate, grammatically correct text



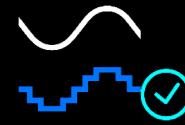
Multiple languages



Intelligent punctuation and formatting



Timestamp generation



Support for telephony audio



Recognize multiple speakers



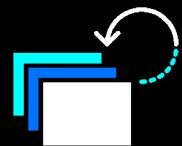
Custom vocabulary

Amazon Translate

Natural and fluent language translation



Real-time
translation



Batch analysis



Automatic language
recognition



Low cost

Amazon Polly

Turn text into lifelike speech using deep learning



Wide selection of
voices and languages



Synchronize
speech



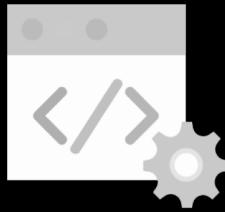
Fine-grained
control



Unlimited replay

Amazon Lex

Building conversational interfaces into any application using voice and text



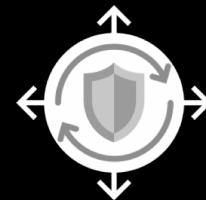
Integrated development in the AWS console



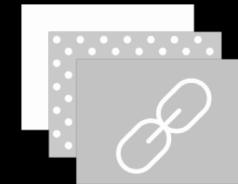
Trigger Lambda functions



Multi-step conversations



One-click deployment

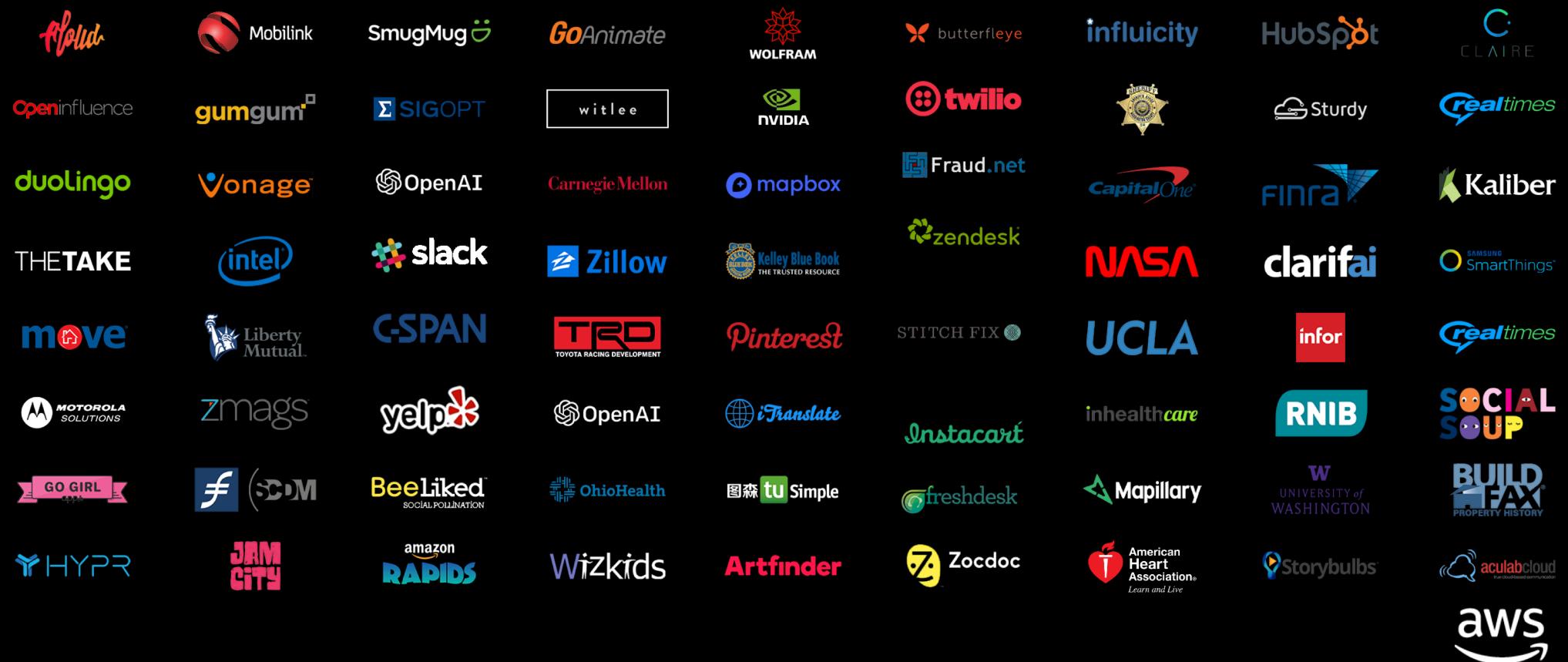


Enterprise connectors



Fully managed

CUSTOMERS RUNNING MACHINE LEARNING ON AWS TODAY



AWS ML Language Services Customers



*"Building intelligent applications to help customers drive their businesses is our entire focus. **Amazon Comprehend** allows us to analyze unstructured text within search, chat, and documents to understand intent and sentiment. This capability enables us to train our Coleman AI skillset, and also provide a truly focused and tailored search experience for our customers."*

Manjunath Ganimasty, V.P. Software Development with Infor



*"Through **Amazon Lex**, we're adding sophisticated natural language processing capabilities that help GrowthBot provide a more intuitive UI for our users. Amazon Lex lets us take advantage of advanced AI and machine learning without having to code the algorithms ourselves"*

Dharmesh Shah, HubSpot CTO and Founder



*"I can't think of many use cases where accurate pronunciation is more important than when you're learning a new language. We have found that the **Amazon Polly** voices are not just high in quality, but are as good as natural human speech for teaching a language."*

Severin Hacker, CTO, Duolingo



*"At Isentia, we built our media intelligence software in a single language. Having tried multiple Machine Translation services in the past, we are impressed with how easy it is to integrate **Amazon Translate** into our pipeline and its ability to scale to handle any volume we throw at it. The translations also came out more accurate and nuanced and met our high standards for clients."*

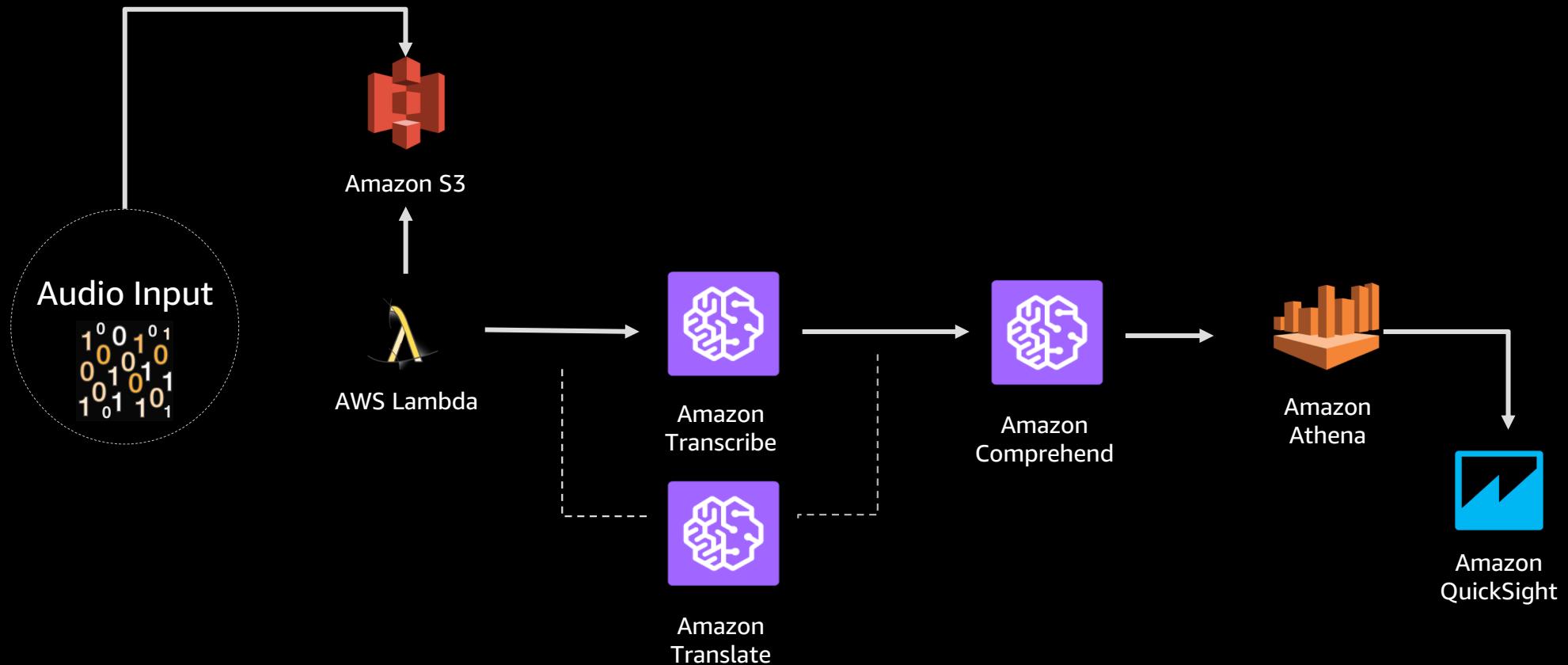
Andrea Walsh - CIO, Isentia



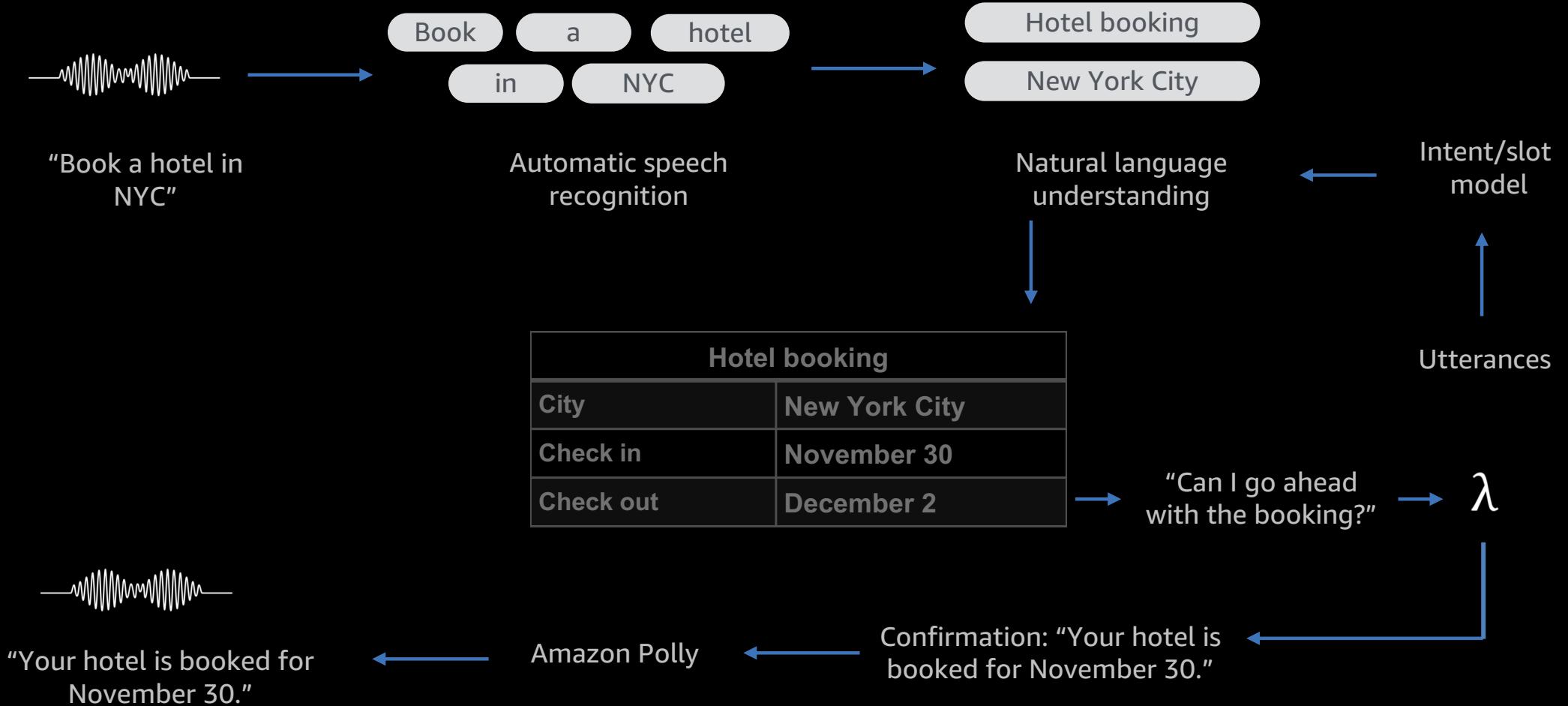
*"RingDNA is an end-to-end communications platform for sales teams. A critical component of RingDNA's Conversation AI requires best of breed speech-to-text to deliver transcriptions of every phone call. RingDNA is excited about **Amazon Transcribe** since it provides high-quality speech recognition at scale, helping us to better transcribe every call to text."*

Howard Brown – CEO & Founder, RingDNA

Integrating Speech, Translation, and NLP + AWS



Lex Use Case: Digital Assistant to Book a Hotel



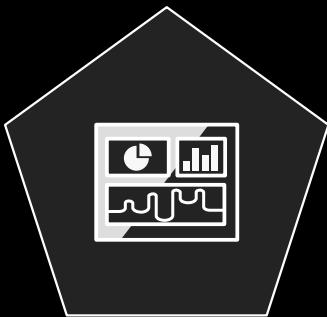


Amazon Rekognition

Amazon Rekognition

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

aws SUMMIT



Fully
managed
service

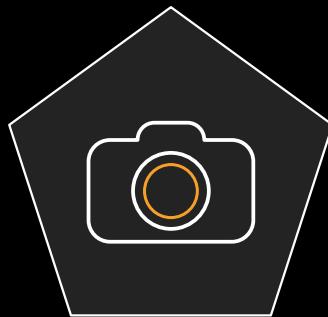


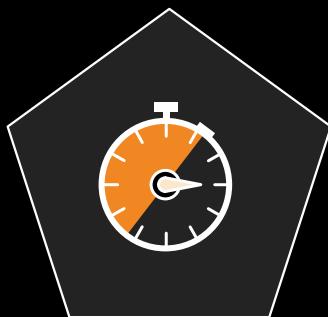
Image
analysis



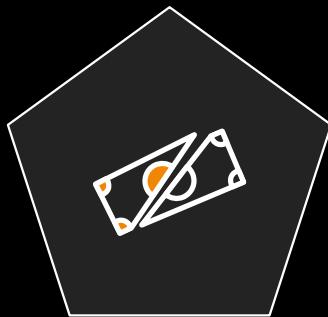
Video
analysis



Easy-to-use
API



Real-time and
batch analysis



Low cost

Amazon Rekognition Image

aws SUMMIT

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



Object and Scene
Detection



Facial
Analysis



Face
Recognition



Unsafe Image
Detection



Celebrity
Recognition



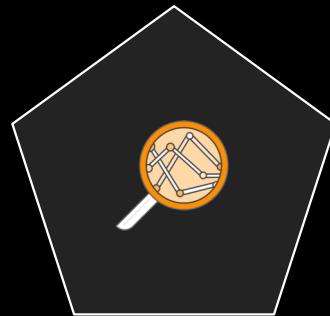
Text in Image



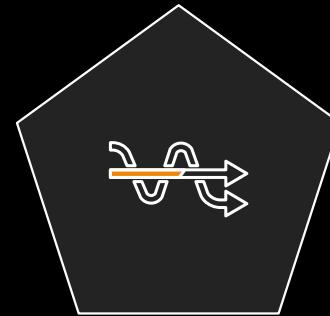
Face
Comparison

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

aws SUMMIT



Object and activity detection



Person tracking



Real-time live stream



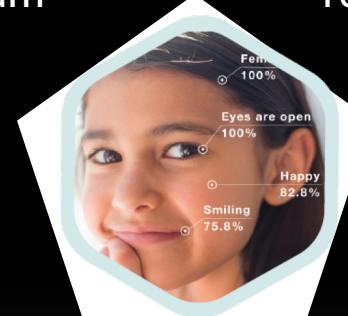
Celebrity recognition



Unsafe video detection



Face recognition



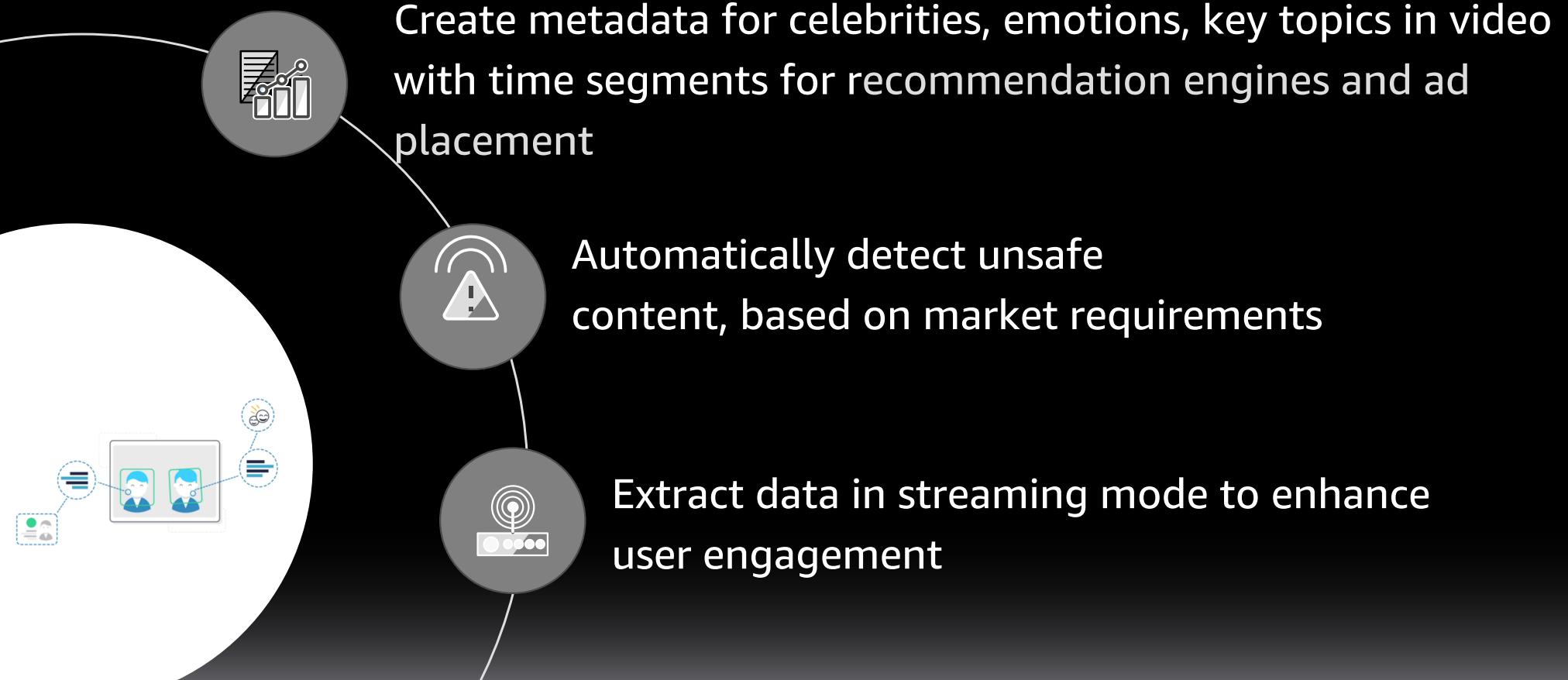
Facial Analysis

Deep Dive/Components

Amazon Rekognition Video

Media and entertainment

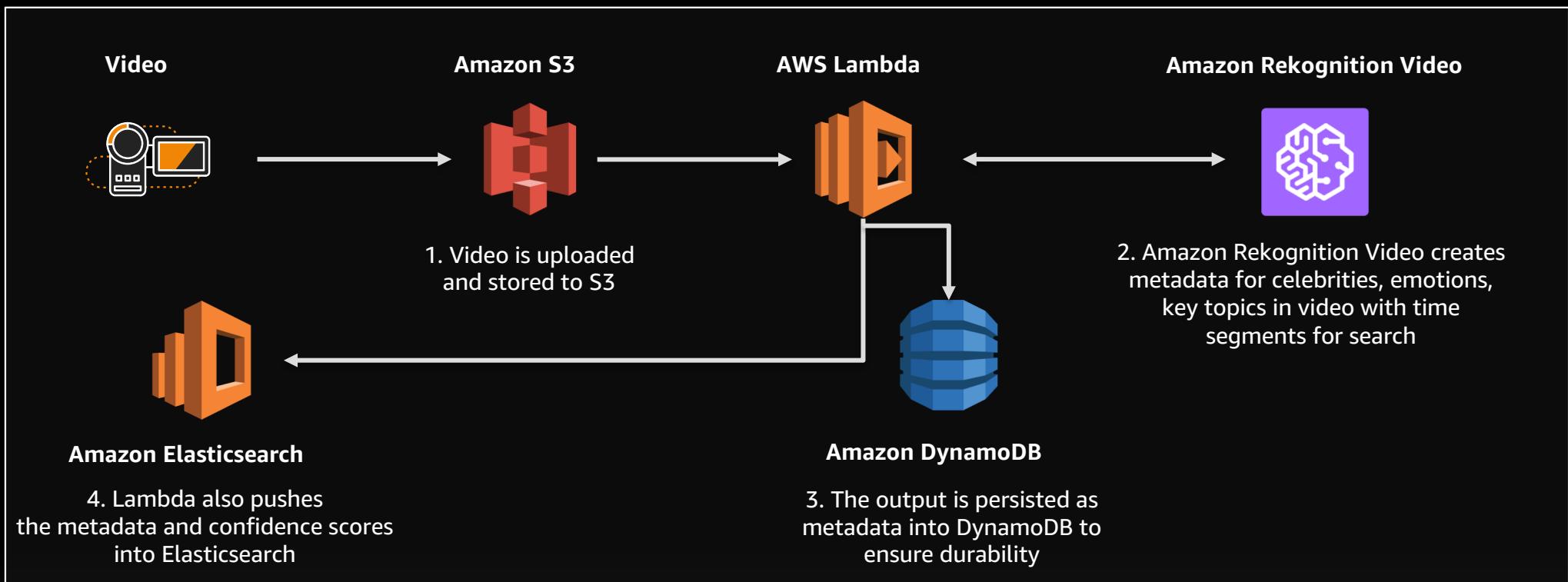
aws SUMMIT



Amazon Rekognition Video

Use case: Video search index

aws SUMMIT



LIVE STREAMING •
Front Door Camera 1



Smartphone Video

00:05:00 •



Face Search—Media and Entertainment

aws SUMMIT



Automating Footage
Tagging with Amazon
Rekognition

Indexed 99,000 people

Saves ~9,000 hours a year in labor

APRIL 4, 2017

Senate Republican Agenda Following their weekly caucus lunch, Senate Republican leaders spoke to reporters. They criticized Democrats' plans to filibuster Judge Neil... [read more](#)



00:09

LIVE
2:08 pm ET

C-SPAN3
c-span.org
@cspan

07:44 HD CC

Clip Bookmark To MyC-SPAN Embed Share This Video

Transcript type: Text Filter by Speaker: All Speakers Search this transcript

00:00:05 Mitch McConnell Jr. >> GOOD AFTERNOON, EVERYONE. AS YOU KNOW WE'RE MOVING FORWARD WITH THE GORSUCH NOMINATION FOR THE SUPREME COURT THAT SHOULD BE WRAPPED UP SOME TIME...

00:00:59 John Cornyn >> I GOT TO THE SENATE IN 2002 AND IMMEDIATELY SENATOR SCHUMER AND DEMOCRATIC COLLEAGUES INSTITUTED THE IDEA OF FILIBUSTERING JUDGES. INTERESTINGLY...

More People

PEOPLE IN THIS VIDEO

John A. Barrasso M.D.
U.S. Senator (Class 1)
[R] Wyoming

John Cornyn
U.S. Senator (Class 2)
[R] Texas

More People

HOSTING ORGANIZATION

U.S. Senate | Ohio Clock

Amazon Rekognition Customers



influicity

THE TAKE

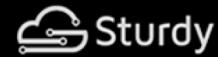
C-SPAN

Artfinder



Openinfluence

The Washington Post



SmugMug The SmugMug logo, which is a green, stylized "M" shape.

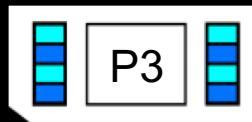


zmags



Amazon SageMaker

Bottom Layer: Frameworks & Interfaces



Tesla V100 GPUs

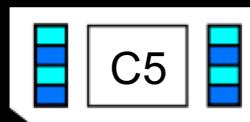
5,120 tensor cores

128 GB of memory

1 petaflop of compute

NVLink 2.0

~14X faster than P2



72 vCPUs

3.0 GHz Intel Xeon
(Skylake) processors

Advanced Vector
Extension (AVX) 512

144 GB of memory

Nitro Hypervisor

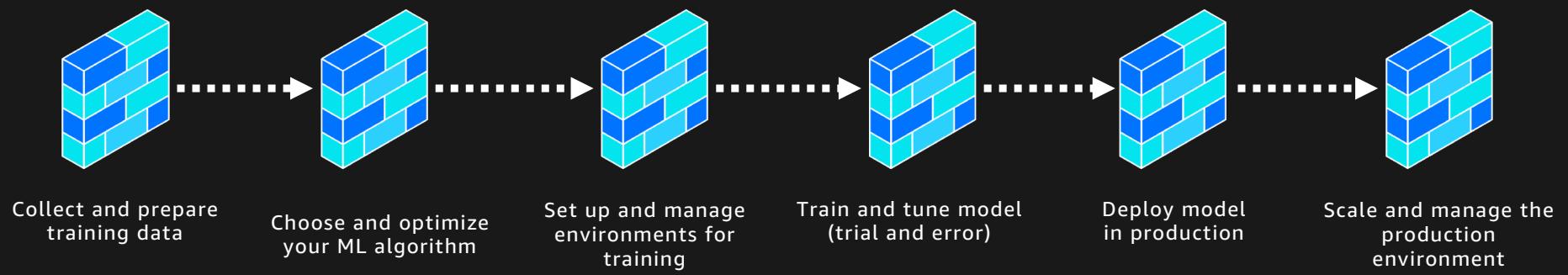
25% improvement in
price/perf. than C4



AWS Deep Learning AMI

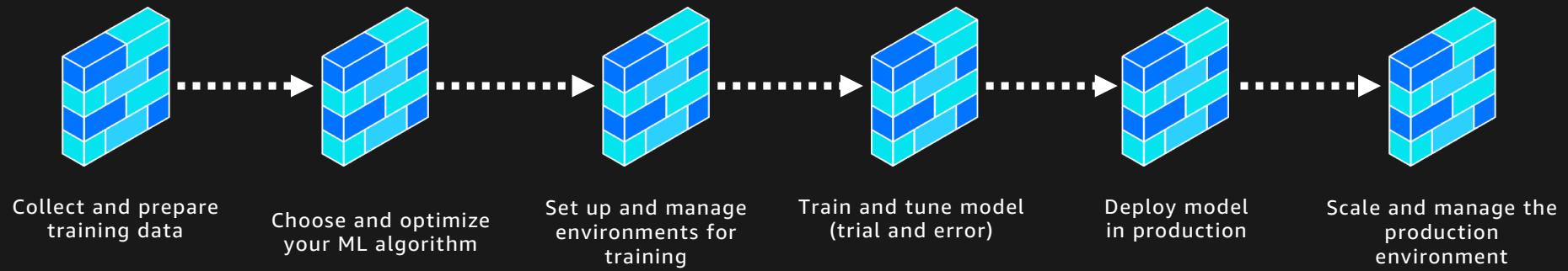


ML is still too complicated for everyday developers

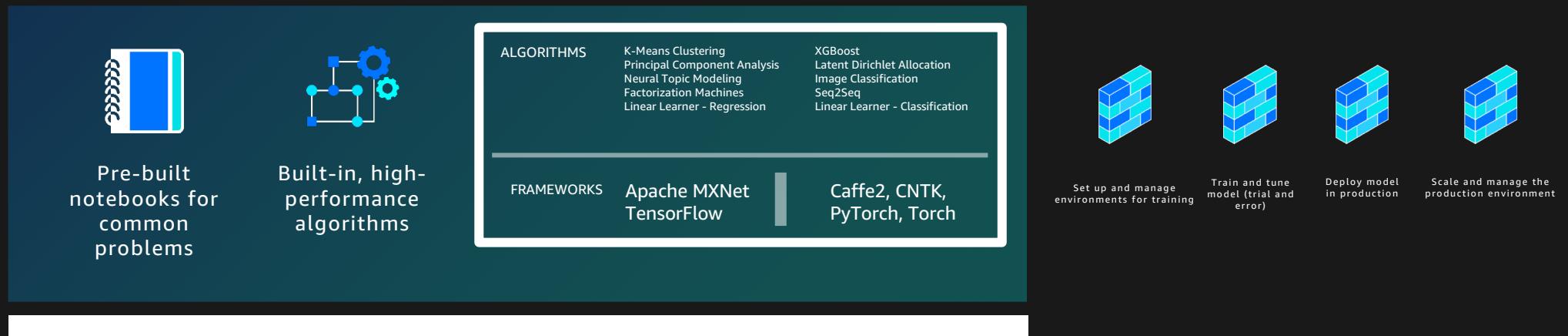


Amazon SageMaker

Easily build, train, and deploy machine learning models

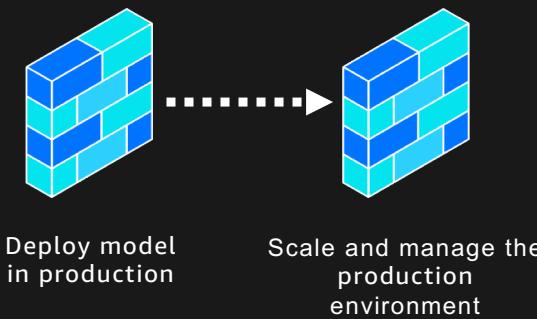
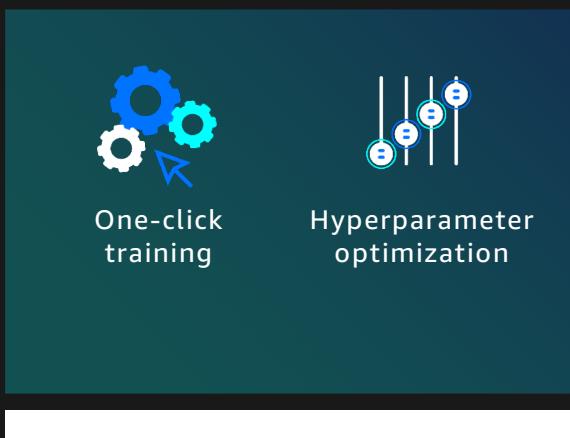
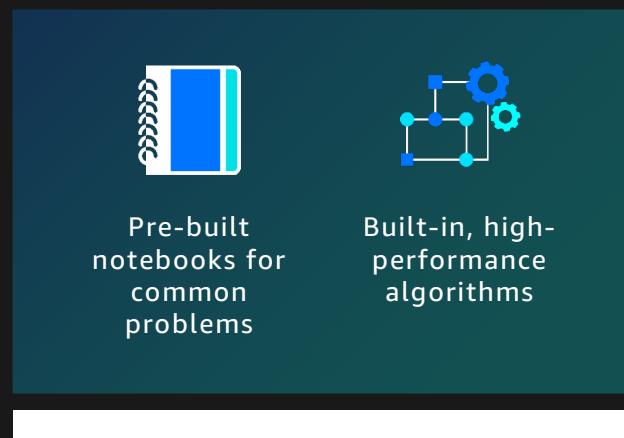


Amazon SageMaker



Build

Amazon SageMaker



Build

Train

Amazon SageMaker



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

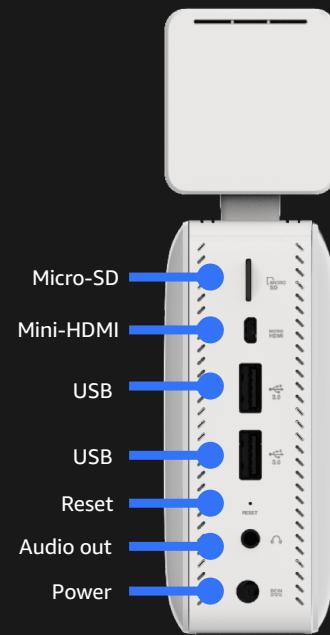
Build

Train

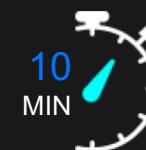
Deploy

AWS DeepLens

The world's first deep learning-enabled video camera for developers



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



From unboxing
to first inference
in <10 minutes

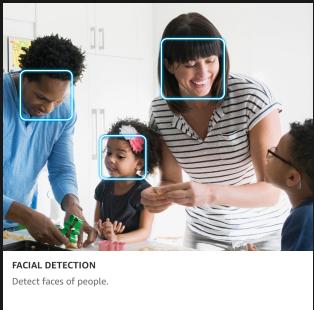
Integrates with
Amazon SageMaker
and AWS Lambda



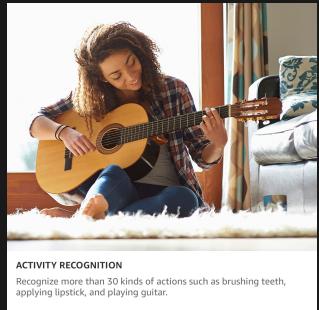
Tutorials, examples,
demos, and pre-
built models

Get Started with Deep Learning

It takes less than 10 minutes with AWS DeepLens



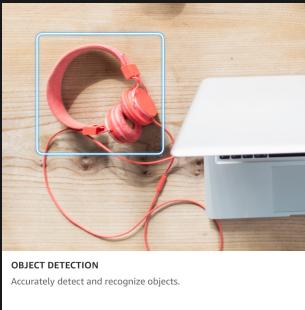
FACIAL DETECTION
Detect faces of people.



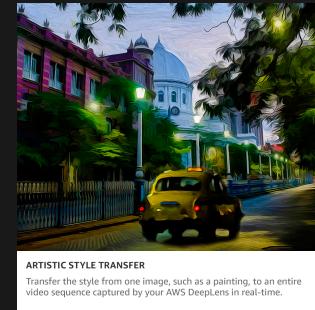
ACTIVITY RECOGNITION
Recognize more than 30 kinds of actions such as brushing teeth, applying lipstick, and playing guitar.



HOT DOG NOT HOT DOG
A hot dog or not a hot dog, that is the question.



OBJECT DETECTION
Accurately detect and recognize objects.



ARTISTIC STYLE TRANSFER
Transfer the style from one image, such as a painting, to an entire video sequence captured by your AWS DeepLens in real-time.



CAT AND DOG RECOGNITION
Detect whether it's a cat or dog.

Build custom deep-learning models in the cloud using Amazon SageMaker, or use the collection of pre-trained models included with AWS DeepLens





Thank You

Christian Petters  cubetoon

cpetters@amazon.com