



How Machine Learning on AWS can help you transform your Education business

Julien Simon, Principal Evangelist, AI & Machine Learning
[@julsimon](#)

ML on AWS for Education Webinar Series

- Building Your Education Applications with Machine Learning on AWS, *April 10th at 2pm EDT*
- Using Voice Technology to Improve Learning: Amazon Polly for Education, *April 24th at 2pm EDT*
- Machine Learning Models for Smarter Education Apps with Amazon SageMaker, *May 10th at 2pm EDT*

REGISTER

aws.amazon.com/education/machine-learning-on-aws-edu-webinars



Are you ready to get started today?

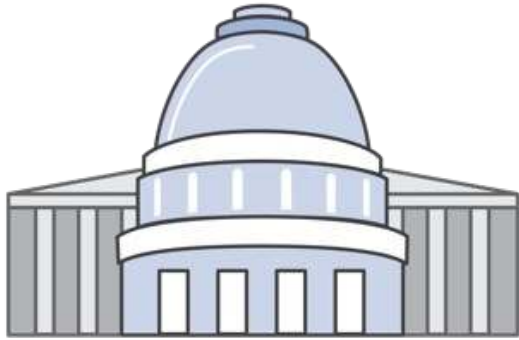
If you know how you want to integrate ML on AWS into your product roadmap or technology infrastructure, we want to help! Email us today.

- **EMAIL:** EdTechTeam@amazon.com
- **SUBJECT:** ML on AWS for EDU Pilot Idea
- **CONTENT:** Describe your proposed use of ML on AWS services in your EdTech or institution, and we'll connect you with the right team to kick start your project!

What to expect

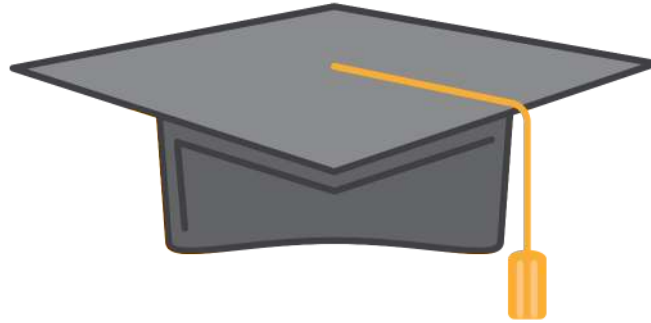
- Why AI matters
- Machine Learning @ Amazon
- Use cases
- Getting started

AWS in the public sector



2,300

government
agencies



7,000

educational
institutions



22,000

nonprofit
organizations

Education customers using AWS



If I asked you...

“How important is it for your organization to invest in Machine Learning and AI?”

Most of you would probably answer:

“We’re not a Machine Learning company.”

“They’re not central to our business.”

“We have more important topics to address.”

Now, if I asked you...

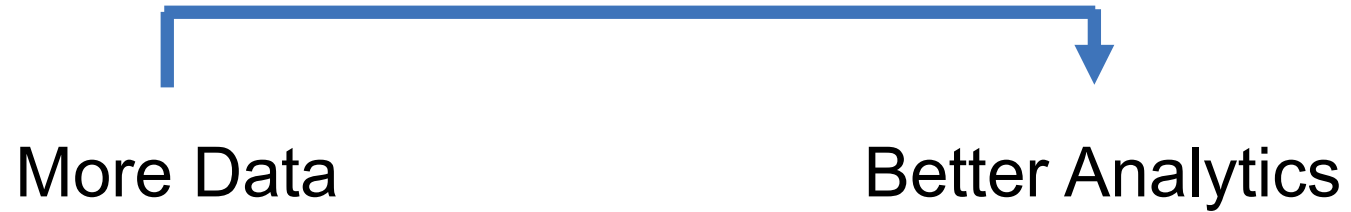
“How important is it for your organization to deliver a better learning outcome for students?”

Most of you would certainly answer:

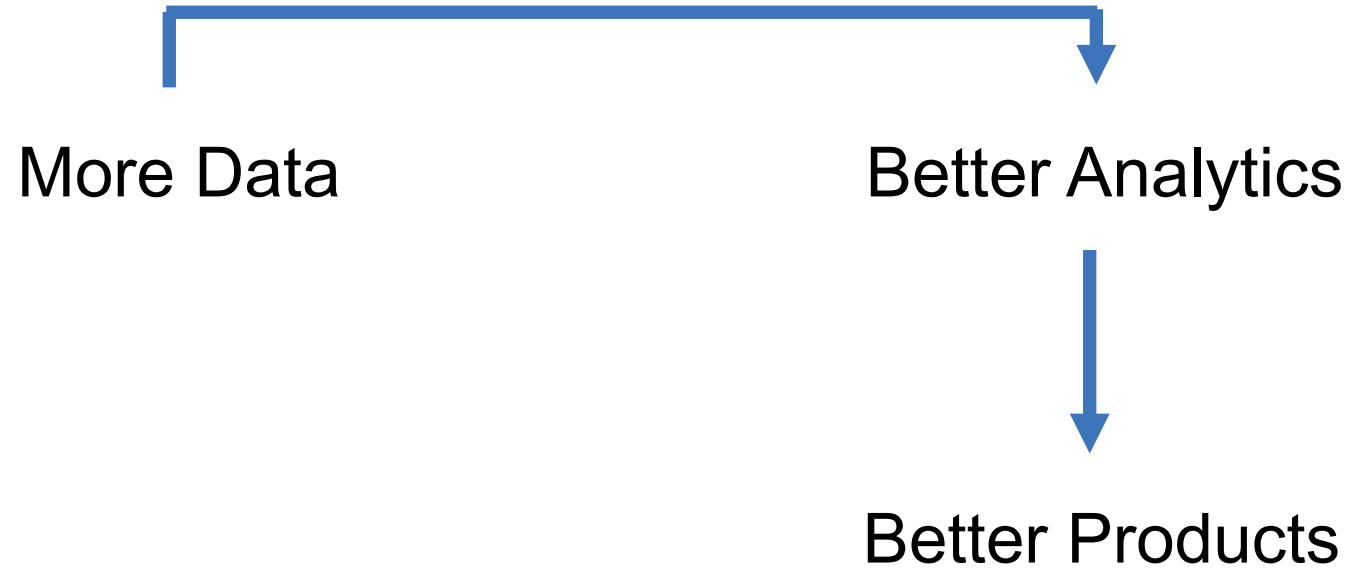
“This is our number one priority.”

But isn't this the same question, really?

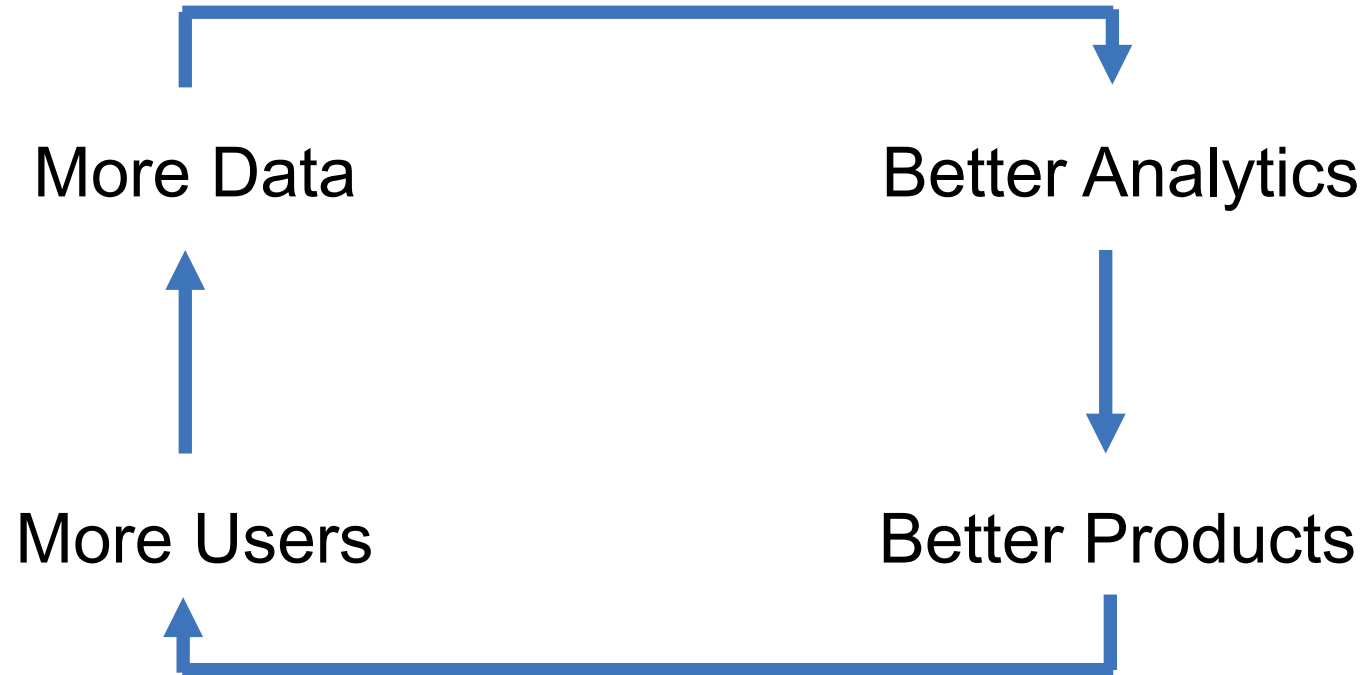
A Flywheel For Data



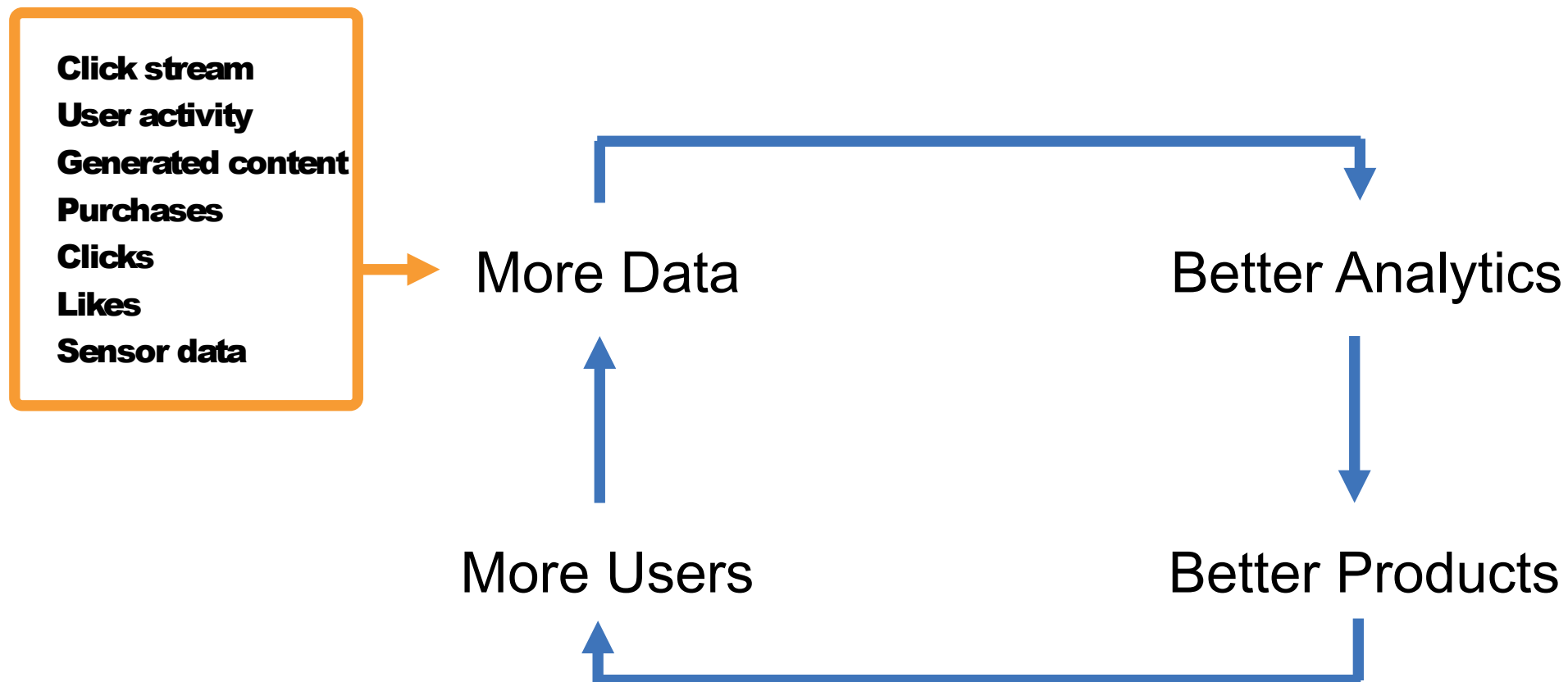
A Flywheel For Data



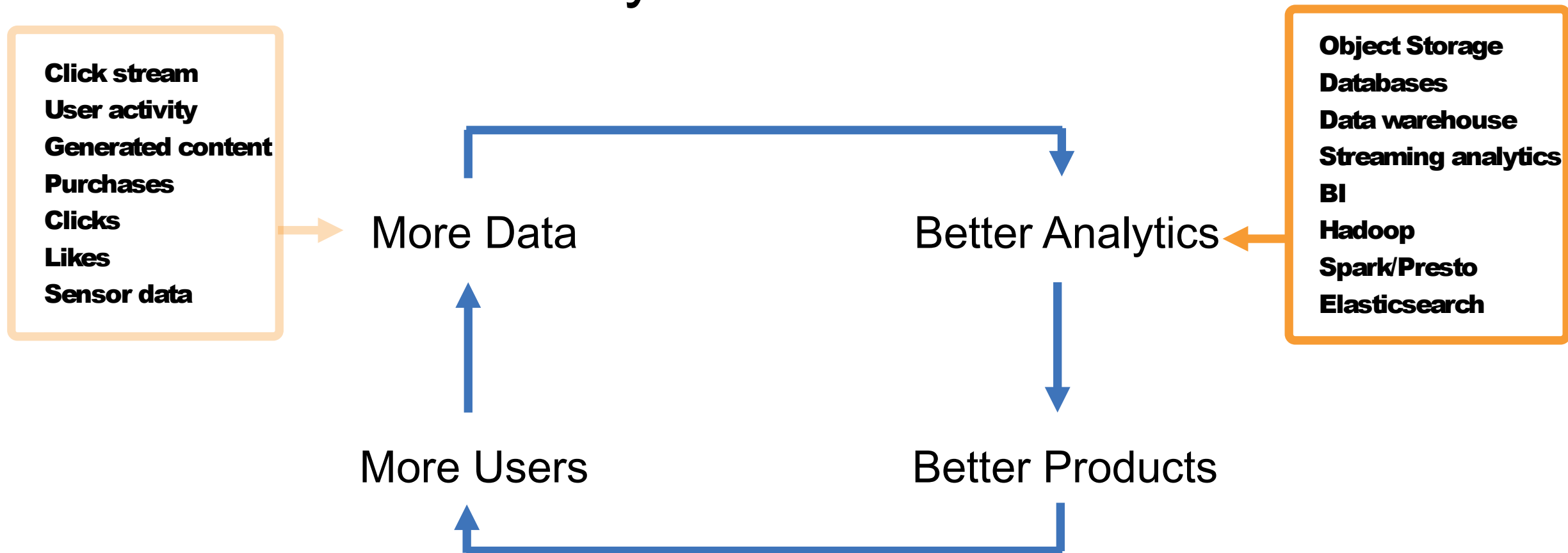
A Flywheel For Data



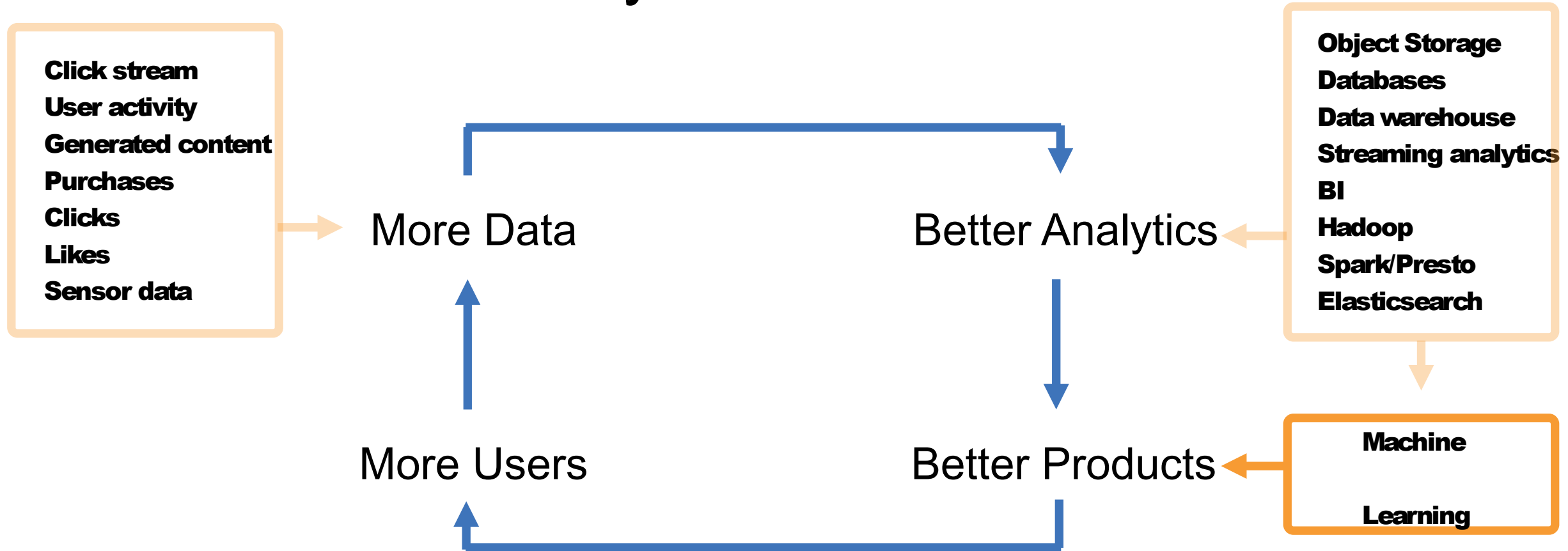
A Flywheel For Data



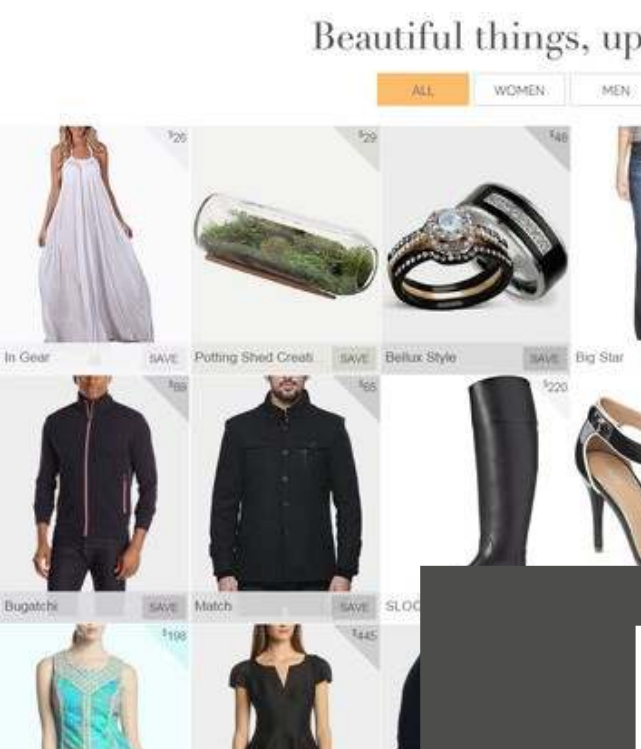
A Flywheel For Data



A Flywheel For Data



- **Artificial Intelligence**: design software applications which exhibit human-like behavior, e.g. speech, natural language processing, reasoning or intuition
- **Machine Learning**: teach machines to learn without being explicitly programmed
- **Deep Learning**: using neural networks, teach machines to learn from complex data where features cannot be explicitly expressed



ML @ Amazon



More AI/ML is built on AWS than anywhere else



More AI/ML is built on AWS than anywhere else



AWS Machine Learning Stack

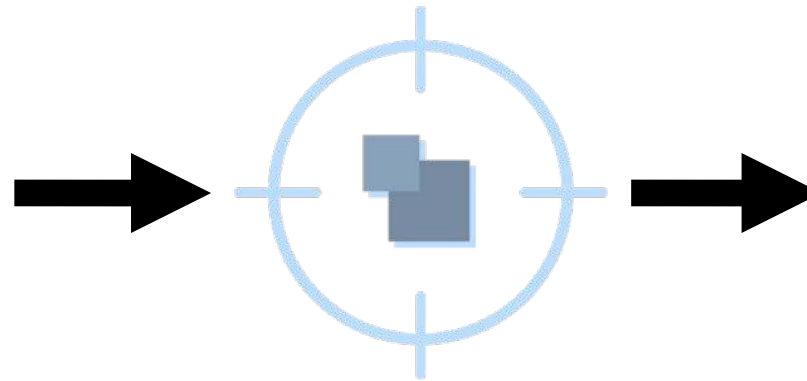
Application Services	API-driven services: Vision & Language Services, Conversational Chatbots
Platform Services	Deploy machine learning models with high-performance machine learning algorithms, broad framework support, and one-click training, tuning, and inference.
Frameworks & Infrastructure	Develop sophisticated models with any framework, create managed, auto-scaling clusters of GPUs for large scale training, or run inference on trained models.

Image & video

Education use cases

- Virtual proctor to compare images to validate test takers.
- Sentiment analysis to measure effectiveness of lectures and calls.
- School and campus safety.

Amazon Rekognition (image & video)



Amazon
Rekognition

Object and scene detection
Facial analysis
Face comparison
Celebrity recognition
Image moderation
Text in image

FREE TIER

Facial analysis



City of Orlando



Real-time video analysis

"The City of Orlando is excited to work with Amazon to pilot the latest in public safety software through a unique, first-of-it's-kind public-private partnership. Through the pilot, Orlando will utilize **Amazon Rekognition Video** and **Amazon Kinesis Video Streams** technology in a way that will use existing City resources to provide real-time detection and notification of persons-of-interests, further increasing public safety, and operational efficiency opportunities for the City of Orlando and other cities across the nation".

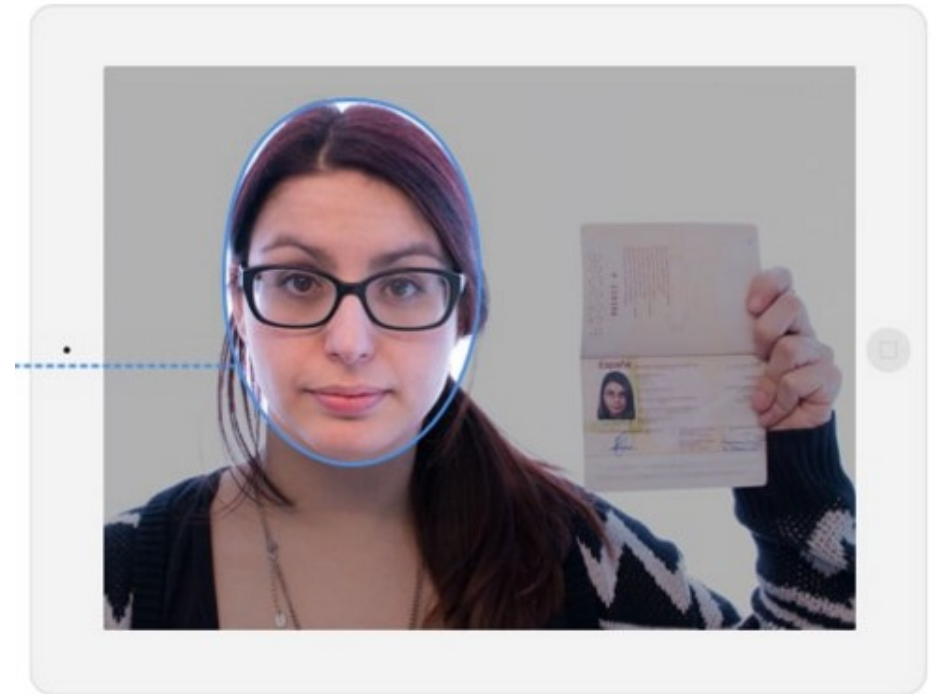


John Mina, Police Chief, City of Orlando



Onfido

- Onfido uses **Deep Learning** to help companies verify identities and carry out adverse-history searches at scale.
- They use **TensorFlow** for supervised and unsupervised learning of data corpus in Amazon S3 to optimize Deep Learning models.
- Onfido rely on **GPU instances** for training computer vision models that allow fast and accurate analysis of images such as passports and driver licenses.



<https://www.periscope.tv/AWSstartups/1LyGBBADmDWGN>

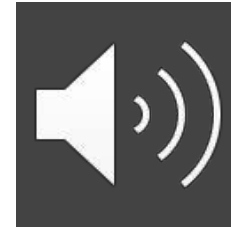
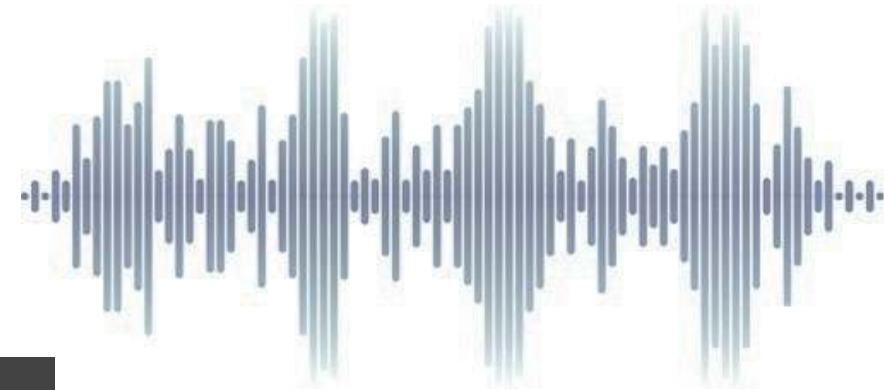
Voice

Amazon Polly: Text In, Life-like Speech Out

“Hejsan! Jag heter Astrid och läser upp det som skrivs här.”



Amazon Polly



25 languages, 52 voices

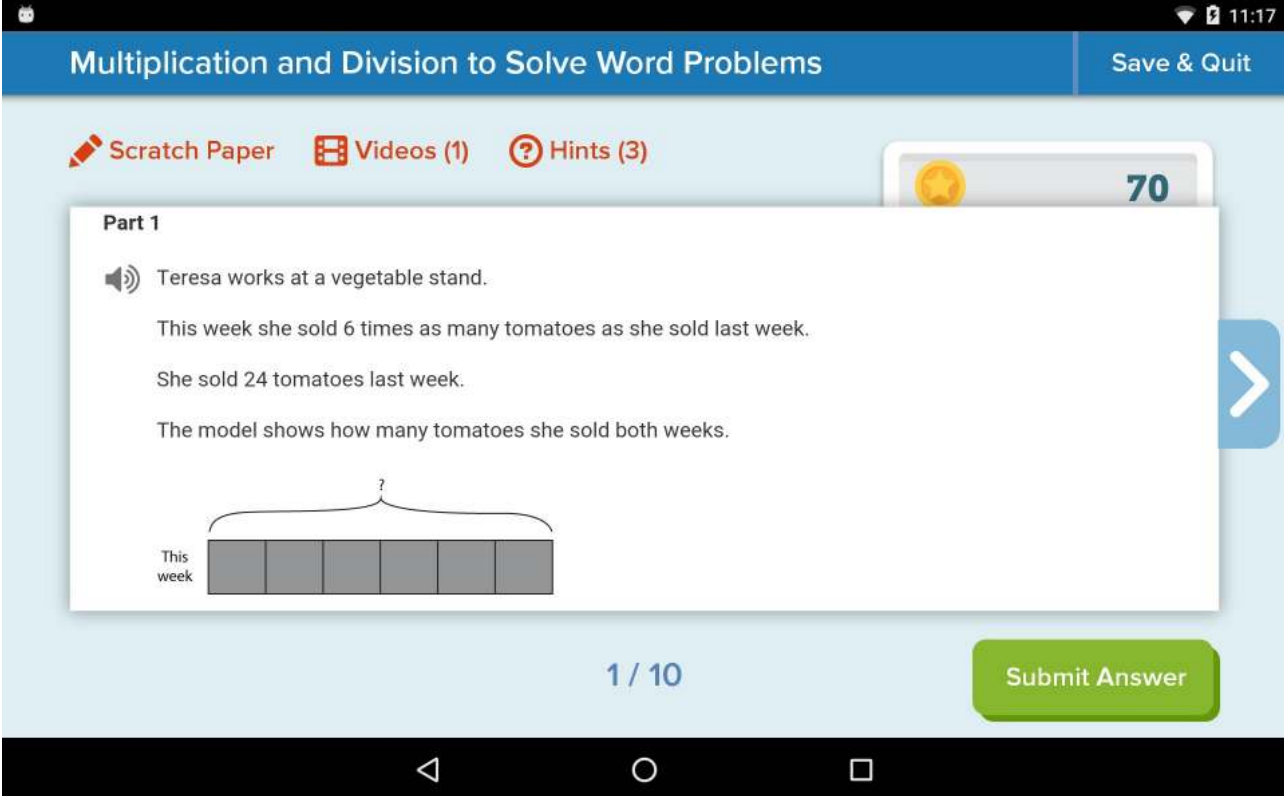
FREE TIER

Education use cases

- Add voice to your content, either in archive mode or in real-time.
- Help learners with visual impairments or visual learning disabilities access digital content.

TenMarks

- Students in more than 85% of U.S. school districts have TenMarks Math accounts.
- TenMarks use Amazon Polly to **voice instructions for their math practice and enrichment programs.**



The screenshot shows the TenMarks app interface on a mobile device. At the top, there's a blue header with the title "Multiplication and Division to Solve Word Problems" and a "Save & Quit" button. Below the header, there are icons for "Scratch Paper", "Videos (1)", and "Hints (3)". A score of 70 is displayed in a yellow box. The main content area is titled "Part 1" and contains a word problem: "Teresa works at a vegetable stand. This week she sold 6 times as many tomatoes as she sold last week. She sold 24 tomatoes last week. The model shows how many tomatoes she sold both weeks." Below the text is a diagram with a horizontal bar divided into 6 equal segments. The first segment is labeled "This week" and has a bracket above it with a question mark, indicating the total number of tomatoes sold both weeks. At the bottom, there's a "1 / 10" indicator and a green "Submit Answer" button.

Pollexy: Building a Special Needs Voice Assistant



<https://aws.amazon.com/blogs/aws/pollexy-building-a-special-needs-voice-assistant-with-amazon-polly-and-raspberry-pi/>

<https://www.youtube.com/watch?v=BUewiOZTNzM>



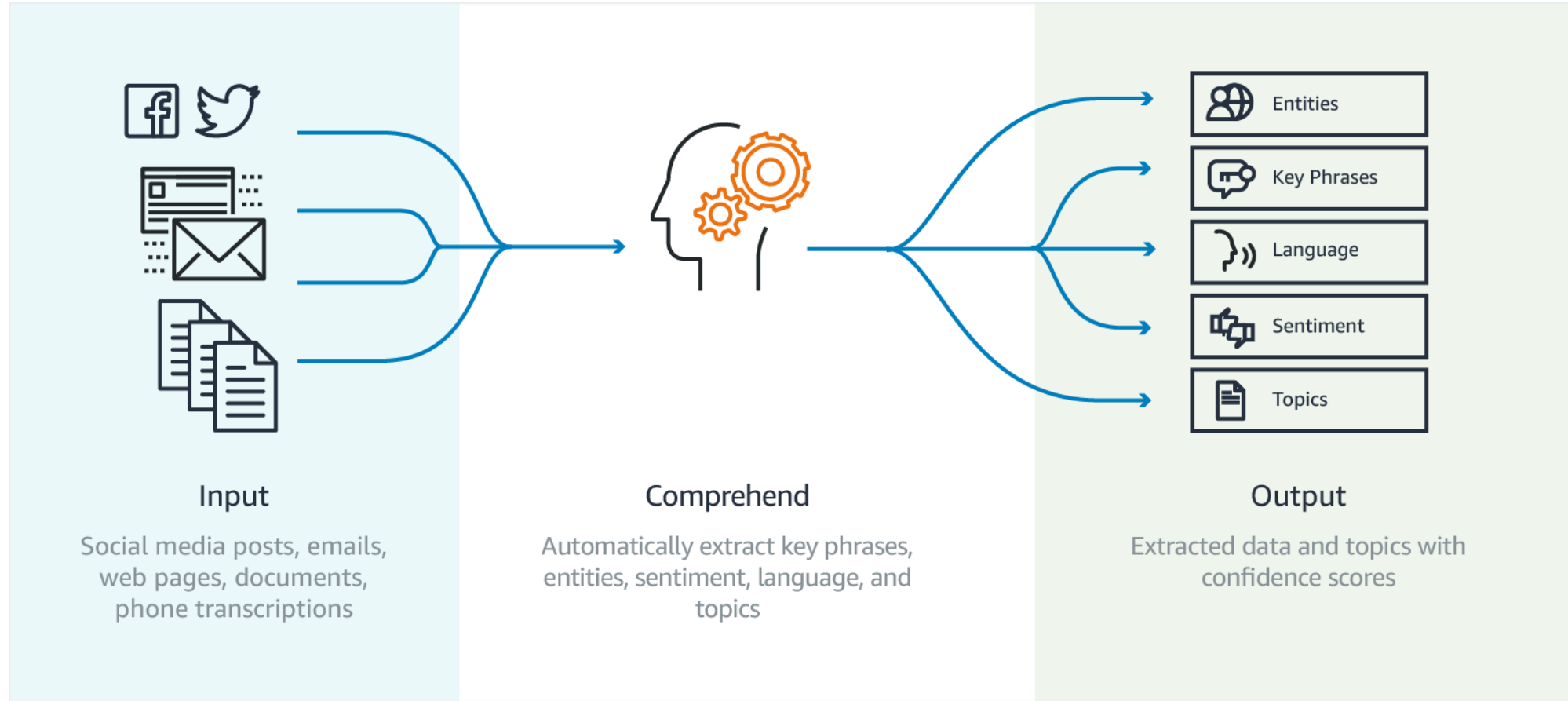
Natural Language Processing

Education use cases

- Analyze digital content to improve search and recommendation of relevant course work.
- Organize and categorize documents by topic for easier discovery.
- Detect plagiarism when term paper topics are re-used from prior semesters or other essays.
- Analyze sentiment for your online content, including comments, chat rooms and surveys.

Amazon Comprehend

Discover valuable insights from text



FREE TIER

The Washington Post



Natural Language Processing

« *The Post strives to give its nearly 100 million readers the best experience possible and relevant content recommendations are a key part of that mission. With **Amazon Comprehend**, we can leverage the continuously-trained NLP capabilities like Key phrase and Topic APIs to potentially allow us to provide even better content personalization, SEO, and ad targeting capabilities.* »

Dr. Sam Han, Director of Data Science, The Washington Post



Translation & transcription

Use cases

- Accommodate international learners by delivering fast, high-quality, and affordable language translation.
- Build multi-language captions for video courses and MOOCs.
- Provide just-in-time translation of user-generated content.
- Transcribe automatically all video and audio content.

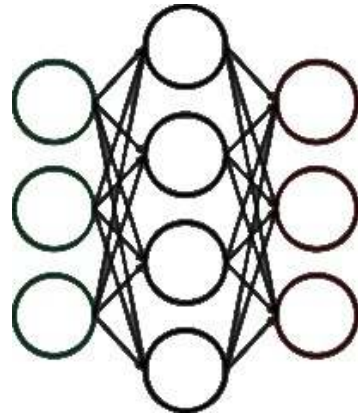
Amazon Translate

Natural and fluent language translation

PREVIEW



Real-time translation



Powered by Deep Learning



12 Language pairs
(more to come)



Language detection

FREE TIER

Amazon Transcribe

PREVIEW



Multiple
languages



Intelligent
punctuation
and formatting



Timestamp
generation



Support for
telephony
audio



Recognize
multiple
speakers



Custom
vocabulary

FREE TIER

Transcribing lectures at scale

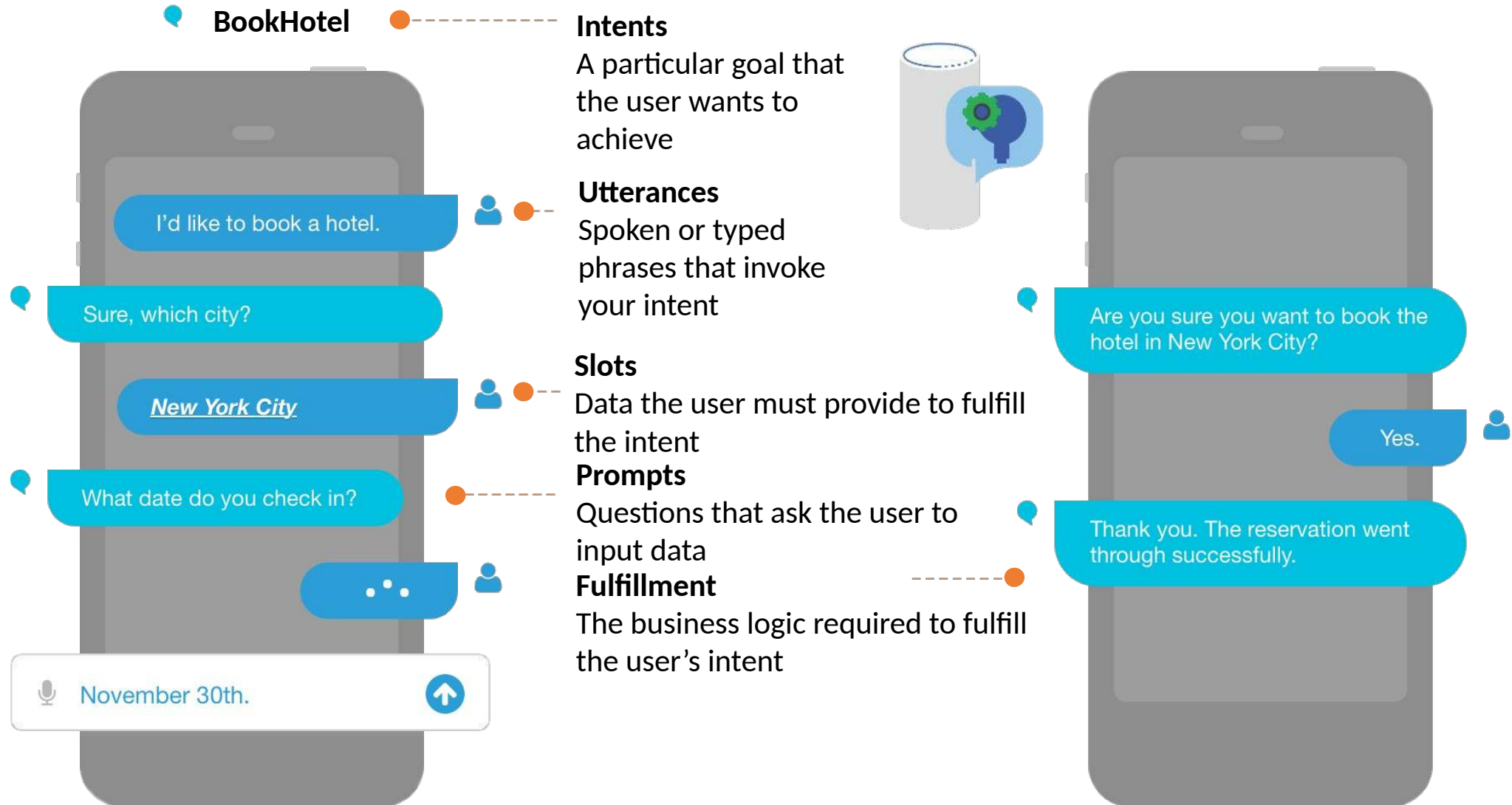
- One of our customers (soon to be announced) is capturing video lectures at 650 institutions in 30 countries for over 3 millions students.
- Their goal is to transcribe these video lectures and offer speech to text as an additional value to their customers.
- This will also allow subject matter searches, in depth analytics, etc.

Chatbots

Education use cases

- Answer common questions from prospective students and parents.
- Simplify administrative tasks and every day life on campus.
- Create an intuitive communication channel between professors and students: booking appointments, asking questions, etc.

Amazon Lex



FREE TIER

FreshDesk



« Adding [Amazon Lex](#) to our cloud-based platform will help our customers provide a more personalized experience, a critical feature in customer support. Our 100,000 customers will be able to use natural language to handle [administrative tasks](#), [review metrics](#) and [provide support](#), ultimately simplifying ticket management. Using Amazon Lex for intent identification, our customers will quickly be able to answer their clients' questions, resulting in the ability for agents to address the more complex inquiries in a timely manner.»

Francesco Rovetta, Vice President Alliances, Freshdesk



Liberty Mutual



« With the growing importance of cognitive technologies in every area of business, we were delighted to see [Amazon Lex](#), with its Speech Recognition and Natural Language Understanding technologies, added to the broad portfolio of services AWS provides. Amazon Lex integrates easily into our existing applications, as well as our new cloud-native serverless architectures. »

Gillian Armstrong, Technologist, Liberty Mutual



https://www.youtube.com/watch?v=TeLvFqLW_0A



Machine Learning

Education use cases

- Help the right student join your university or receive financial aid.
- Help students with personalized content to drive custom learning paths.
- Predict student outcomes and gain insights from course withdrawals.

Ivy Tech



Predicting Student Success

- Identify behaviors of **successful/unsuccessful students**
- Can predict with over 80% accuracy, **which students are likely to fail a course within the first two weeks** of a 16-week term

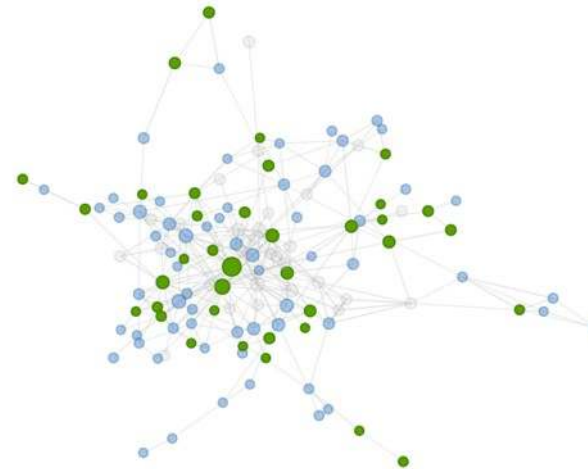
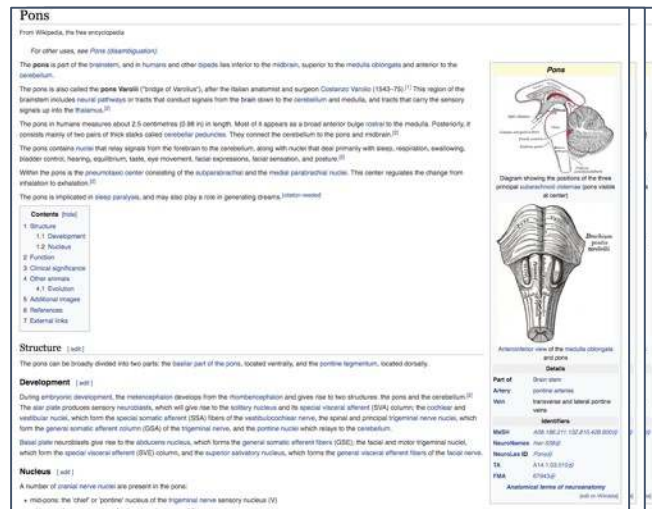
Improvements across the University

- Struggling faculty can be identified and addressed before they impact students
- Flagging fraudulent activity far earlier using Natural Language Understanding tools to analyze course evaluations

« We have an analysis kit we run every day, looking at data, comparing patterns over previous years' information, and in a matter of seconds, we can tell if a student is likely to succeed or fail. The results have been phenomenal. »

Lige Hensley, CTO, Ivy Tech

Cerego



Cerego trained a NLP model on 5.5 million articles

They then created a knowledge graph to extract key concepts and run ML models to update and improve creation based upon instructor and learner inputs

250+ institutions use Cerego to improve learning outcomes across topics from astronomy to medicine



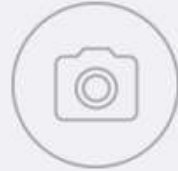
EdCast is the *Netflix of Learning*

No matter where your learning content or knowledge might be, EdCast helps your learners discover it and use it.
Make every individual a contributor to create a high-performance organization.



Aggregate

EdCast aggregates all your learning content including from your LMS, intranet, external providers, your subject matter experts, and your team's preferred resources on the web.



Create

The most valuable content you have is the 'tacit' knowledge in the minds of your experts. EdCast can help you release this and build your own libraries of expert content with just the push of a button.



Curate

Our Machine Learning curation engine ensures that only the highest quality, most relevant, and contextual content is presented to your team.



Target

EdCast's AI based targeting engine learns about your team and makes continuous learning recommendations directly to where they are working – including Slack and Salesforce.



Analyze

EdCast gives you a real time view of flow of expertise and knowledge across your teams. Helping you identify your most acknowledged, best connected, and influential team members.

Promoting STEM

Blue Spurs



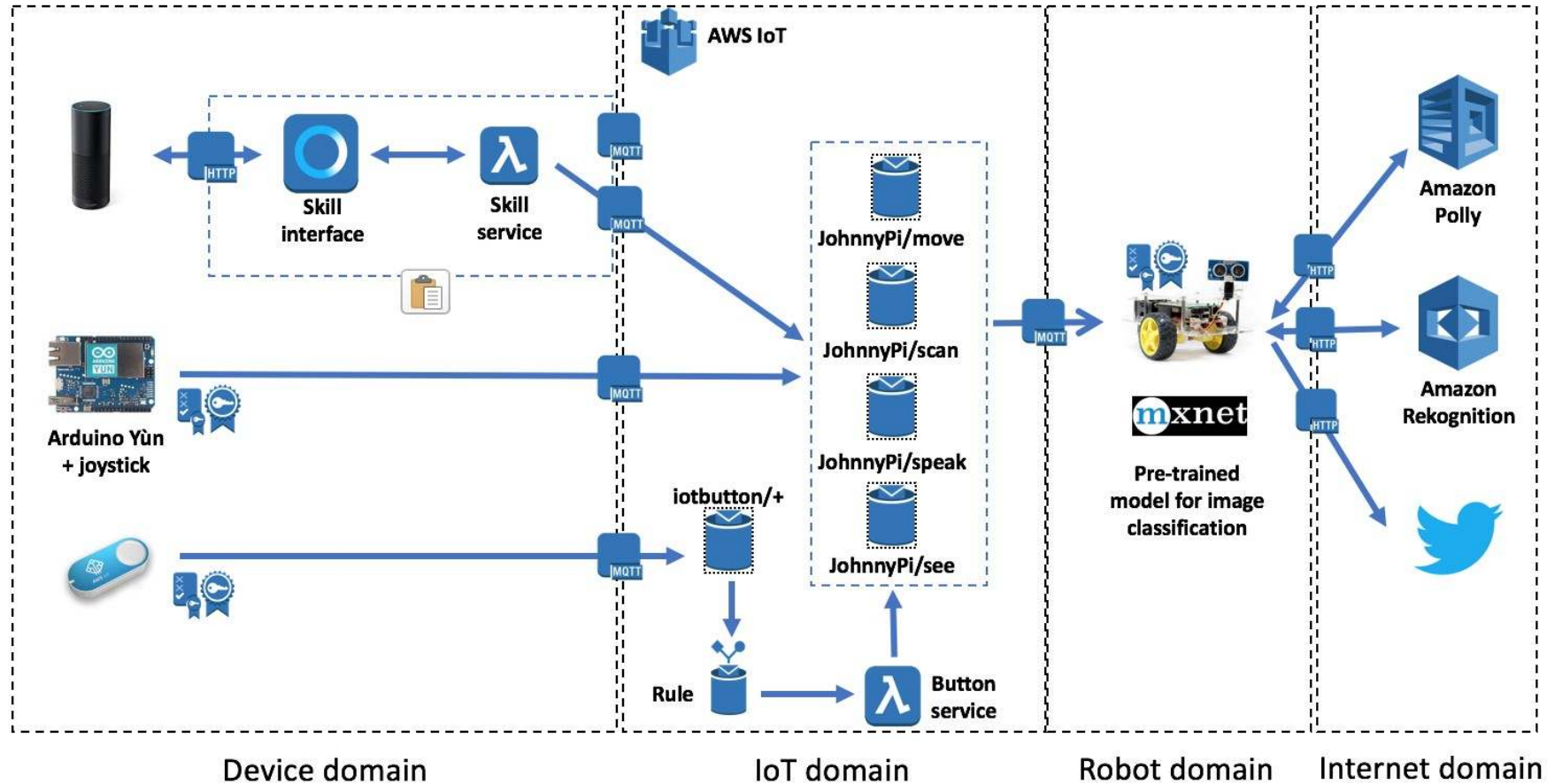
- The Blue Kit is a creative, low-code IoT educational starter kit that allows middle and high school students to understand the fundamentals of IoT.
- It can easily be combined with Amazon AI services such as [Amazon Polly](#) or [Amazon Lex](#) to build fun and engaging prototypes.



<https://aws.amazon.com/blogs/publicsector/las-vegas-are-a-students-build-with-iot-at-reinvent/>



Johnny Pi



<https://medium.com/@julsimon/johnny-pi-i-am-your-father-part-0-1eb537e5a36>

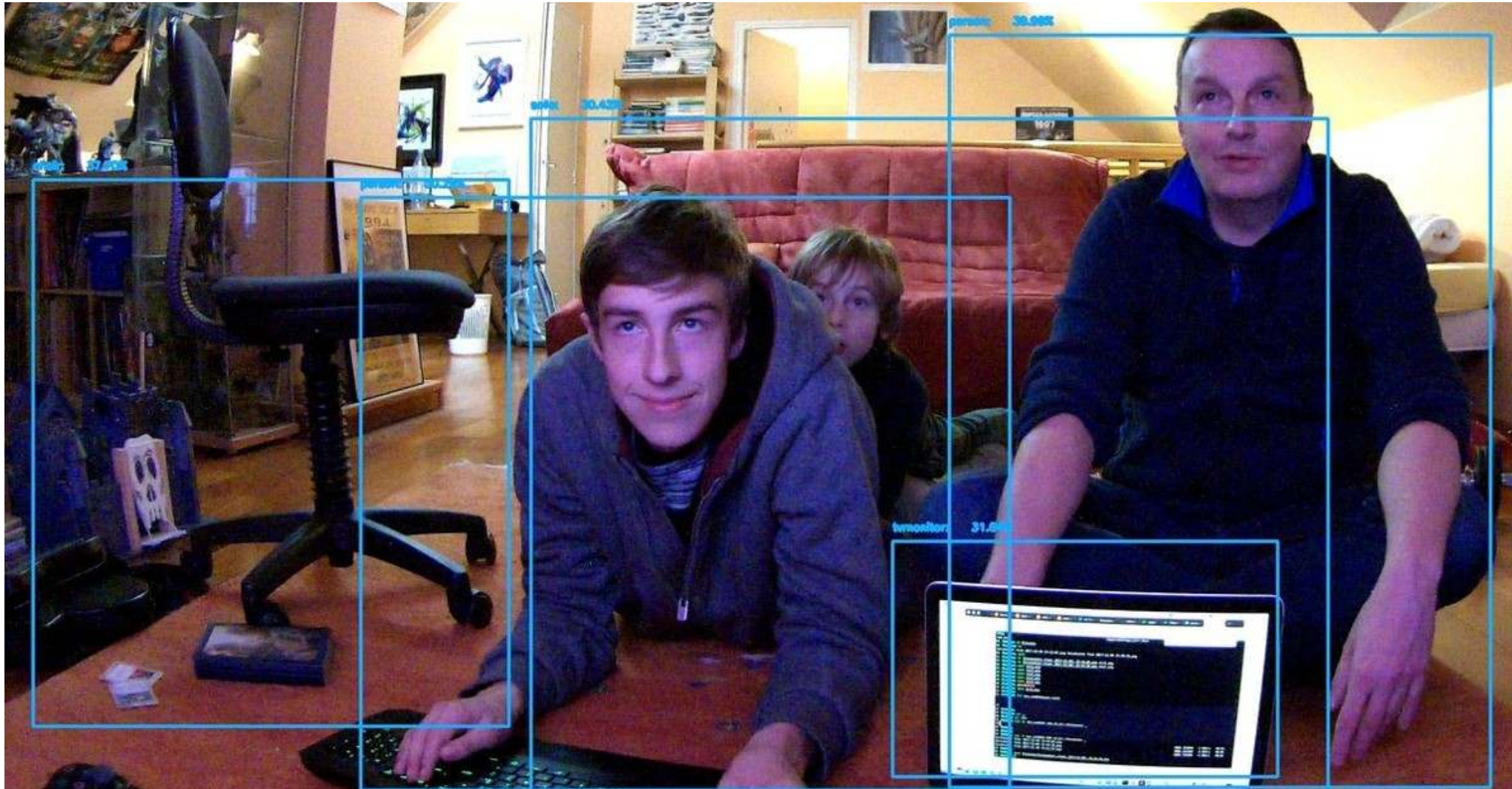
AWS DeepLens

World's first Deep Learning enabled video camera for developers



- A new way to learn
- Custom built for Deep Learning
- Broad Framework Support
- Deploy models from Amazon SageMaker
- Integrated with AWS
- Fully programmable with AWS Lambda

Object detection with AWS DeepLens



Getting started

Data security is (y)our #1 priority

AWS Compliance

Certifications & Attestations

Cloud Computing Compliance Controls Catalogue (C5)
 Cyber Essentials Plus
 DoD SRG
 FedRAMP
 FIPS
 IRAP
 ISO 9001
 ISO 27001
 ISO 27017
 ISO 27018
 MLPS Level 3
 MTCS
 PCI DSS Level 1
 SEC Rule 17-a-4(f)
 SOC 1, SOC 2, SOC 3

DE

UK

US

US

US

AU



CN

SG



US



Laws, Regulations and Privacy

CISPE

EU Model Clauses

FERPA

GLBA

HIPAA

HITECH

IRS 1075

ITAR

My Number Act

Data Protection Act – 1988

VPAT / Section 508

Data Protection Directive

Privacy Act [Australia]

Privacy Act [New Zealand]

PDPA - 2010 [Malaysia]

PDPA - 2012 [Singapore]

PIPEDA [Canada]

Agencia Española de Protección de Datos

Alignments & Frameworks

EU

EU

US

US

US



US

US

JP

UK

US

EU

AU

NZ

MY

SG

CA

ES

CIS (Center for Internet Security)

CJIS (US FBI)

CSA (Cloud Security Alliance)

Esquema Nacional de Seguridad

EU-US Privacy Shield

FISC

FISMA

G-Cloud

GxP (US FDA CFR 21 Part 11)

ICREA

IT Grundschutz

MITA 3.0 (US Medicaid)

MPAA

NIST

Uptime Institute Tiers

Cloud Security Principles

= industry or global standard

FERPA and COPPA compliance

- Whitepaper: **FERPA** compliance on AWS
<https://aws.amazon.com/blogs/security/ferpa-compliance-in-the-aws-cloud/>
- Amazon AI services can be used for applications subjected to **COPPA**
 - Amazon Rekognition
 - Amazon Polly
 - Amazon Lex
 - Amazon Comprehend
 - Amazon Translate
 - Amazon Transcribe

AWS Machine Learning Stack

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<https://aws.amazon.com/machine-learning>

<https://aws.amazon.com/blogs/ai>



Digital Training

<https://aws.training>

 training and certification

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× Artificial Intelligence (AI)

Filter for:

Role

+

Skill Level

+

Domain

+

Language

+

Digital

+

All

Digital

Classroom

AWS Machine Learning Services Overview

This course introduces Amazon Machine Learning and Artificial Intelligence tools that enable capabilities across frameworks and infrastructure, machine learning platforms, and API-driven services. To do machine learning well, you need competencies across these key layers, the right data store, security, and resources for analytics.

Video	5 minutes	Fundamental
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Introduction to Amazon Comprehend

This course introduces you to Amazon Comprehend, a new AWS service that helps with natural language processing. In this course, we discuss how Amazon Comprehend solves challenges like the exponential growth of unstructured text, explore the service's five main capabilities, and review some popular use cases. We also demonstrate the service so you can see it in action.

Video	10 minutes	Fundamental
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Introduction to Amazon Lex

Amazon Lex is a service for building conversational interfaces into any application using voice and text. This course introduces you to the service, including how to create a bot and deploy it to different chat services. We also review use cases for the service.

Video	10 minutes	Fundamental
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Introduction to Amazon Polly

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Thank you!

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<https://medium.com/@julsimon>

