# AWS | Artificial Intelligence for Education

## Enhancing Student Outcomes and Accelerating Research

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# Our mission at AWS

Put machine learning in your hands

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# Why AWS for AI/ML?

## Broadest and deepest set of AI and ML services

200 new features & services launched this last year alone

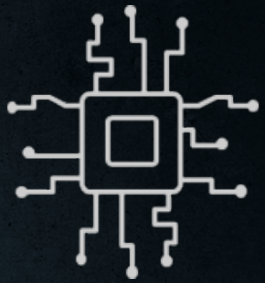
Unmatched flexibility

## Accelerate your adoption of ML with SageMaker

70% cost reduction in data-labeling

10x faster performance

75% lower inference cost



## Built on the most comprehensive cloud platform optimized for ML

AWS holds the top spots on Stanford's benchmark, for fastest training time, lowest cost, lowest inference latency

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# AI / ML to Improve Education & Research Outcomes

## Learning

- Student retention and success
- Personalized learning
- Lecture / Video transcription
- Curriculum localization
- Accessibility

## Research

- Accelerated ML for Research
- Research document classification
- Scientific image analysis

## Operations

- Campus experience & self service
- Marketing and Recruitment
- Enrollment forecasting
- Predictive maintenance
- Campus security

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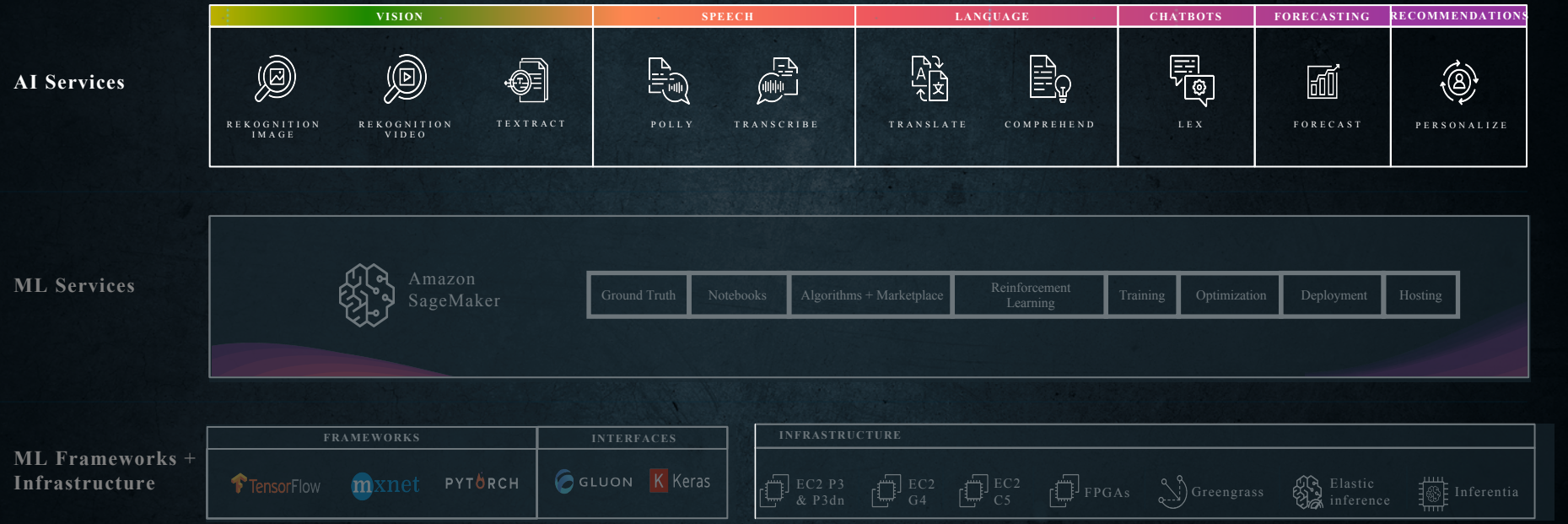
# The Amazon ML stack: Broadest & deepest set of capabilities

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"The Echo360 platform fosters active and engaging video-based learning that serves today's student. We're excited about Amazon Transcribe because it offers our university partners high-quality transcripts for each video, enabling more powerful search, lower cost captioning of educational video content, and enhanced note-taking, making learning assets more valuable and accessible to students."

**Fred Singer**

**CEO at Echo360**

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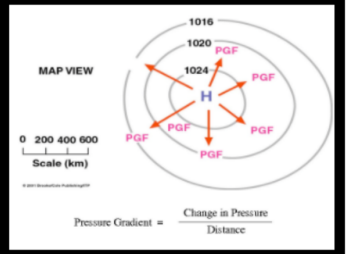
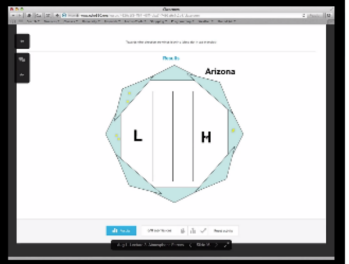
echo Class 3: Atmospheric Forces (after) Fri May 12

ATMS-101 - Extreme Weather




13:22 / 26:42 Slide 5 Sources CC

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In the atmosphere.

And understand that, we have enumerate the fact that there are three forces that

actually cause wind directions and wind speed and

we're gonna be able to determine what the wind speed is anywhere and

what the wind direction is anywhere by knowing those three forces.

The three forces we are interested in first of all,

our the first force is pressure gradient force.

The pressure gradient force is a force that always acts towards low pressure.

Always acts towards lower pressure no matter where you are on Earth.

There's high pressure in one spot and low pressure in another spot.

The pressure gradient force is always gonna be working towards low pressure.

Now when we say that, we're always talking about in the horizontal.

Pressure changes quite rapidly, vertically.
But in terms of determining wind speed,

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# Getting global medical terminology right

Biodigital uses **Amazon Translate** to provide a scalable way to augment their 3D virtual body visualization with health and medicine descriptions in multiple languages. Biodigital customers can collaborate across six languages at an expected 80% cost savings compared to manual translation.

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# Increasing access to computer-based exams with text-to-speech

automated speech recognition

Blind candidates get “auditory” signal of timing using Amazon Polly

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# AWS DeepRacer

A fully autonomous 1/18th-scale race car designed to help you learn about reinforcement learning through autonomous driving

- Build machine learning models in Amazon SageMaker
- Train, test, and iterate on the track using the AWS DeepRacer 3D racing simulator
- Compete in the world's first global autonomous racing league, to race for prizes and a chance to advance to win the coveted AWS DeepRacer Cup

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# AWS DeepLens

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

- Purpose-built for ML-skills development
- Fully programmable & customizable
- Build custom Amazon SageMaker models
- 10-minutes to your first deep learning project

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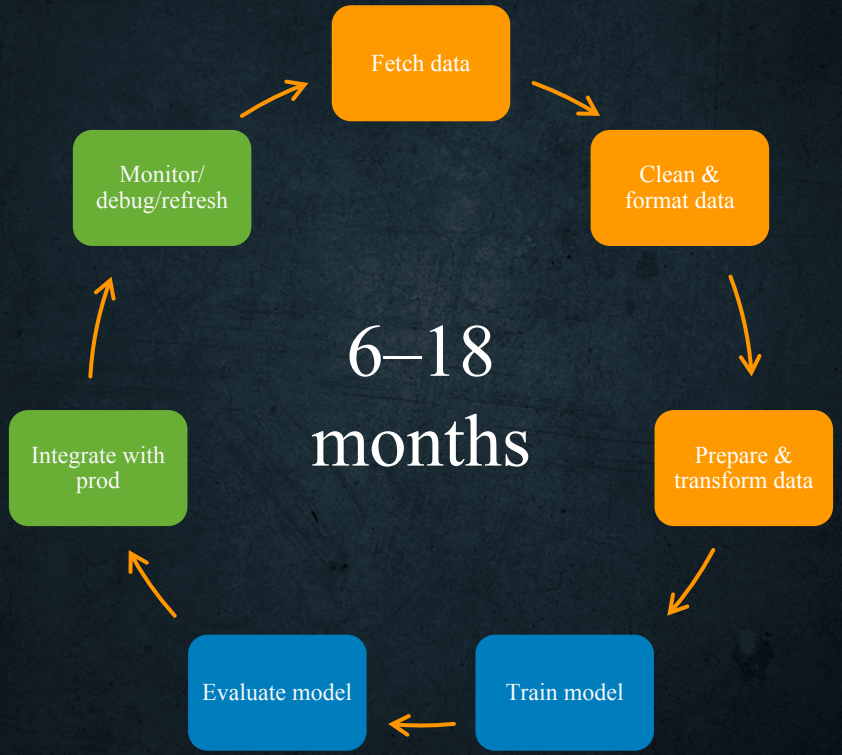
# Machine Learning Process is Hard & Time Consuming

## Deployment

- Setup and manage inference clusters
- Manage and auto scale inference APIs
- Testing, versioning, and monitoring




## Data wrangling

- Setup and manage Notebook environments
- Get data to notebooks securely

## Experimentation

- Setup and manage clusters
- Scale/distribute ML algorithms

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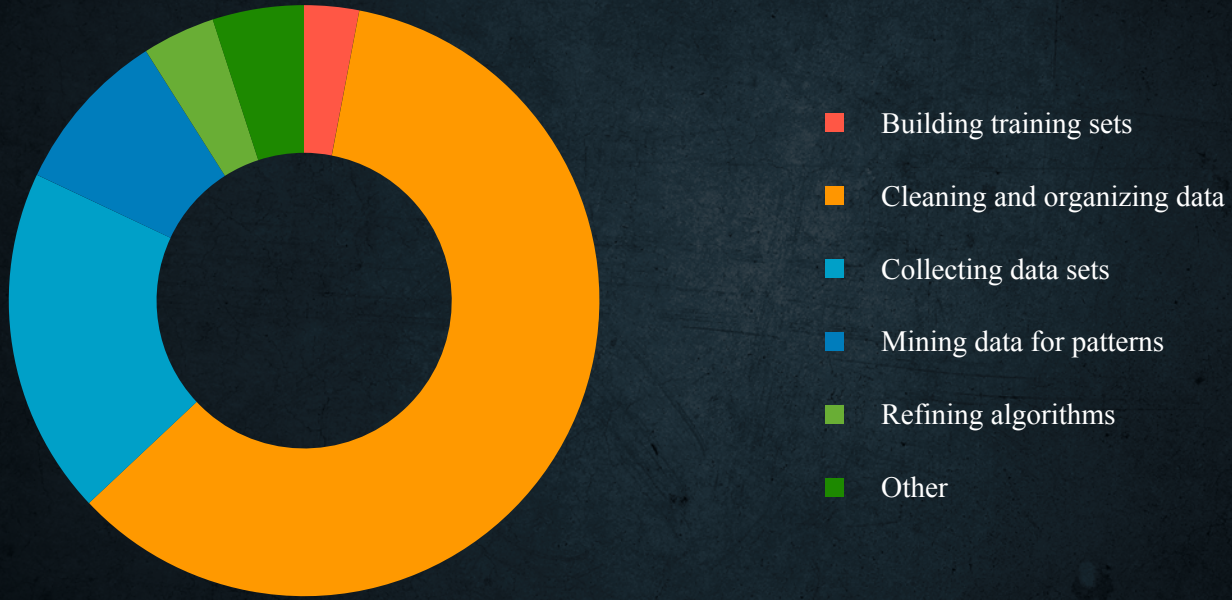
# Data Preparation Account for ~80% of Work

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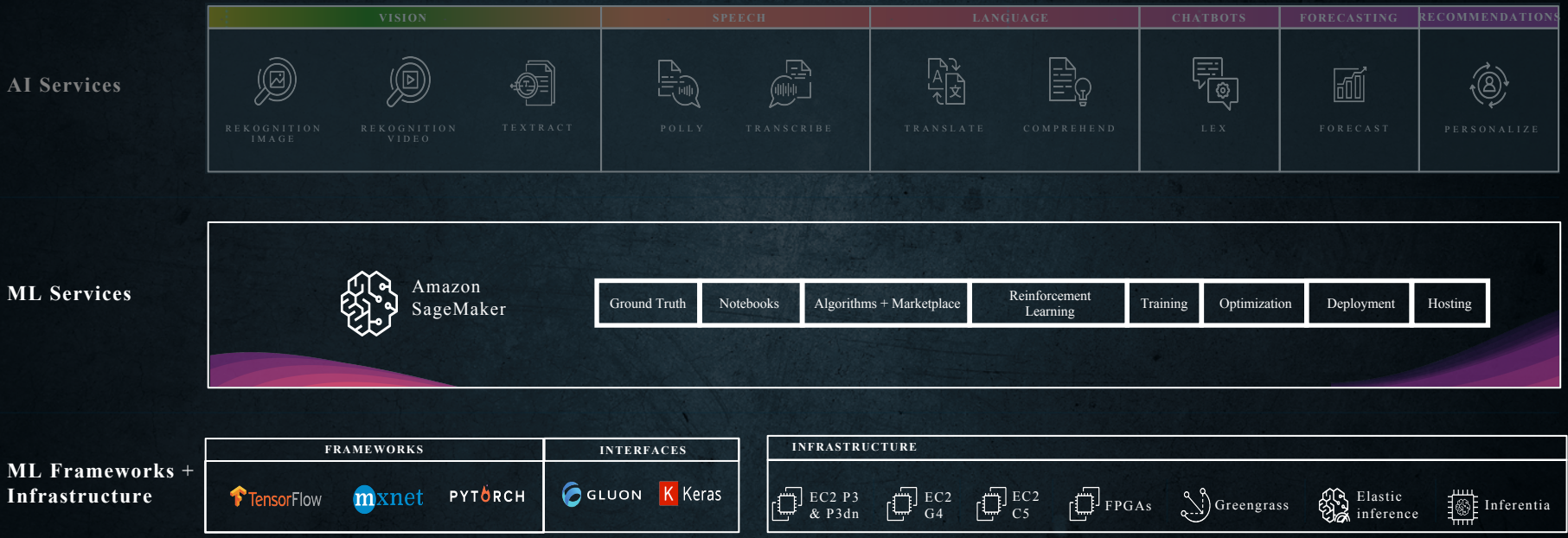


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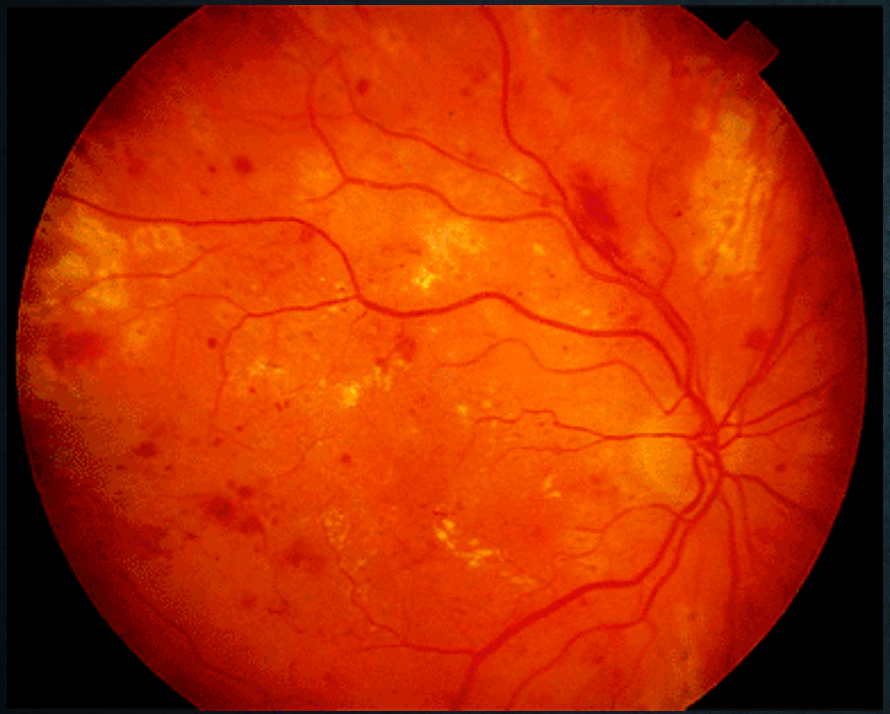
# Early Detection of Diabetic Retinopathy



Analyzed more than 80,000 fundus photos captured during retinopathy screenings.

Student Researchers used AWS EC2, S3, and EBS to manage, analyze, and review the many gigabytes of data.

Stanford University

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CLEMSON UNIVERSITY

# Topic modeling helps in discovering the underlying themes across a collection of documents

The researchers conducted nearly half a million topic modeling experiments to study how human language is processed by computers.

The 1.1 Million vCPU count usage is comparable to the core count on the largest supercomputers in the world.

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- Trained caching algorithm using Amazon SageMaker
- Impacts 100 PB of data and helps users find relevant images
- Improved cache hit by 2x and reduced storage costs by 50%

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# Complete research in hours which previously took weeks while reducing cost

accelerate research

predict functional sites in three-dimensional (3D) molecular structures

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# Recommend New Test Date

Amazon SageMaker to generate and analyze many millions of calendars and created an August date and it proved so popular that there weren't enough seats the first year.

In our nearly 100 years of doing the SAT, we had never considered August.

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ASU
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The UNIVERSITY of OKLAHOMA

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