Detection with AWS DeepLens

Ramine Tinati
Senior AI/ML Advocate
Amazon Web Services

Agenda

Machine Learning on AWS

Amazon DeepLens

Building A Custom DeepLens Computer Vision CNN

Solution Demo

Wrap Up

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Machine Learning at AWS

Our mission at AWS

Put machine learning in the
hands of every developer

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Build your Machine Learning Skills

NO PhD REQUIRED

Build Now

Learn Hands-on

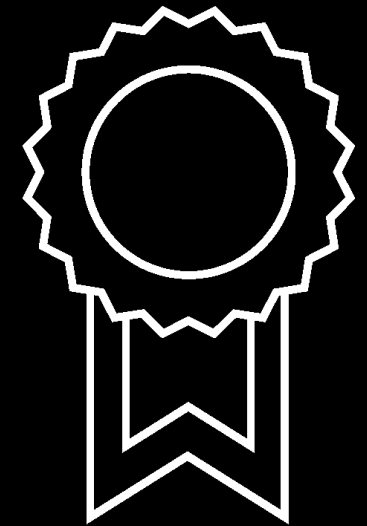## Get Certified

AWS DeepRacer
Reinforcement Learning

AWS DeepLens
Deep Learning

AWS DeepComposer
Generative Adversarial
Networks(GAN)

AWS AI Services
Multiple capabilities

Machine Learning
Certification

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The AWS ML Stack

Broadest and most complete set of Machine Learning capabilities

AI SERVICES

VISION	SPEECH		TEXT			NEW! SEARCH	CHATBOTS	PERSONALIZATION	FORECASTING	NEW! FRAUD	NEW! DEVELOPMENT	NEW! CONTACT CENTERS
Amazon Rekognition	Amazon Polly	Amazon Transcribe *+Medical* NEW	Amazon Comprehend *+Medical*	Amazon Translate	Amazon Textract	Amazon Kendra	Amazon Lex	Amazon Personalize	Amazon Forecast	Amazon Fraud Detector	Amazon CodeGuru	Contact Lens *For Amazon Connect*

ML SERVICES

Amazon SageMaker	Ground Truth	Augmented AI	ML Marketplace	SageMaker Studio IDE NEW!								Neo
				Built-in algorithms	NEW! Notebooks	NEW! Experiments	Model training & tuning	NEW! Debugger	NEW! Autopilot	Model hosting	NEW! Model Monitor	

ML FRAMEWORKS & INFRASTRUCTURE

TensorFlow   mxnet   GLUON   K Keras

PYTORCH   HOROVOD

Deep Learning AMIs & Containers	GPUs & CPUs	Elastic Inference	Inferentia	FPGA

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Amazon SageMaker helps you build, train, and deploy models

Prepare   **Build**   **Train & Tune**   **Deploy & Manage**

Web-based IDE for machine learning

Automatically build and train models

Fully managed data processing jobs and data labeling workflows	One-click collaborative notebooks and built-in, high performance algorithms and models	One-click training	Debugging and optimization	Visually track and compare experiments	One-click deployment and autoscaling	Automatically spot concept drift	Add human review of predictions	Fully managed with auto-scaling for 75% less
101011010 010101010 000011110								
Collect and prepare training data	Choose or build an ML algorithm	Set up and manage environments for training	Train, debug, and tune models	Manage training runs	Deploy model in production	Monitor models	Validate predictions	Scale manage the production environment

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AWS DeepLens 2019 Edition

AWS DeepLens

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

- Purpose-built for ML-skills development

- Fully programmable and customizable

- Build custom Amazon SageMaker models

- 10-minutes to your first deep learning project

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AWS DeepLens Specifications

- Intel Atom Processor
- Gen9 graphics
- Ubuntu OS- 16.04 LTS
- 100 GFLOPS performance
- Dual band Wi-Fi
- 8 GB RAM
- 16 GB Storage (eMMC)
- 32 GB SD card
- 4 MP camera with MJPEG
- H.264 encoding at 1080p resolution
- 2 USB ports
- Micro HDMI
- Audio out
- AWS Greengrass preconfigured
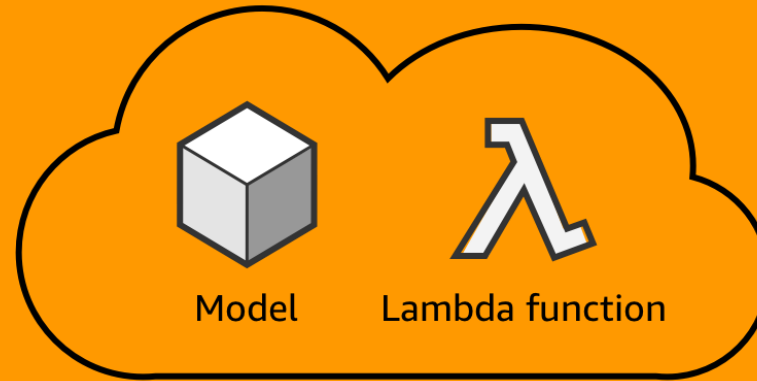- clDNN Optimized for MXNet

AWS DeepLens: How Does It Work?

Console
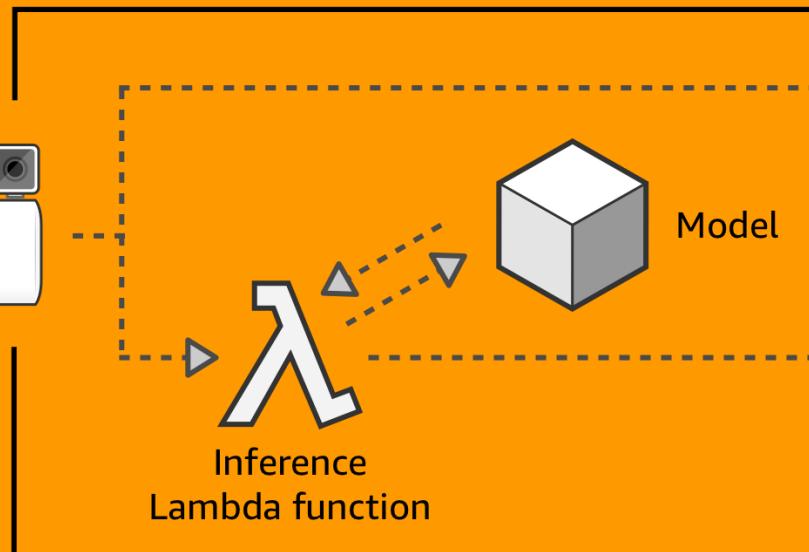
AWS DeepLens   Create project / Deploy project   Device

Model   Lambda function

Deploy

Device

Input   Device   Output

Scene

Model

Inference
Lambda function

Device stream

Project stream

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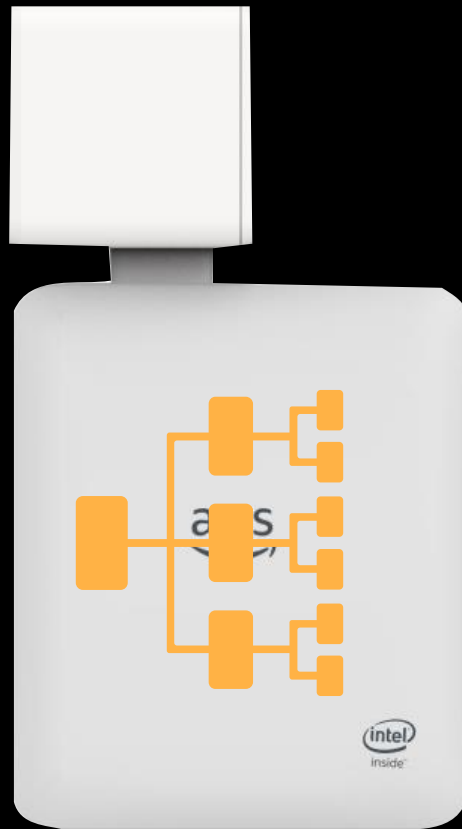
AWS DeepLens: How Does It Work?

Deploy pre-trained educational models

Deploy custom models from Amazon SageMaker

**Deep learning models
run in real time on the device**

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AWS DeepLens: How Does It Work?

Stream live video back to AWS

Integrate with Lambda, SNS, SES, etc.

Video analytics with Amazon Rekognition Video

Sophisticated inference with
Amazon IM hosted models

**Deep learning models
run in real time on the device**

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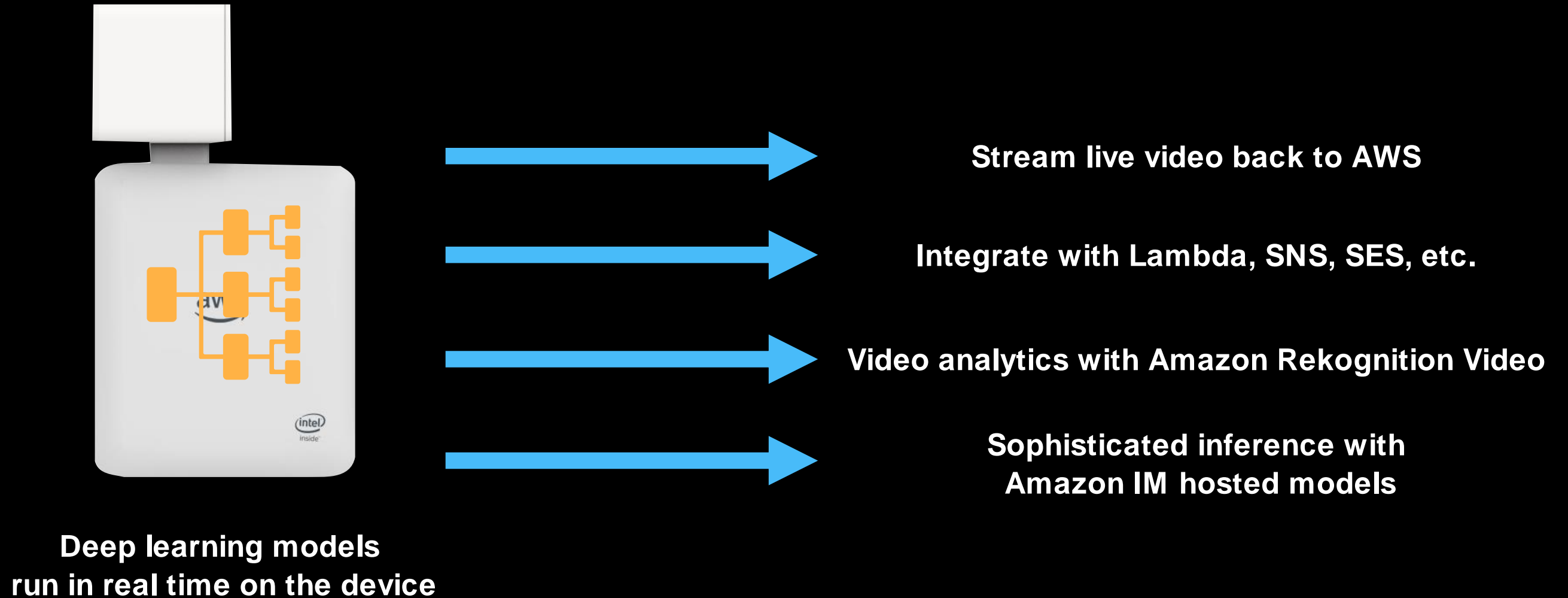
Learning ML with AWS DeepLens

GET STARTED WITH SAMPLE PROJECTS

ARTISTIC STYLE TRANSFER

OBJECT DETECTION

FACE DETECTION / RECOGNITION

ACTIVITY DETECTION

HOT DOG / NOT HOT DOG

CAT VS. DOG

HEAD POSE DETECTION

BIRD CLASSIFICATION

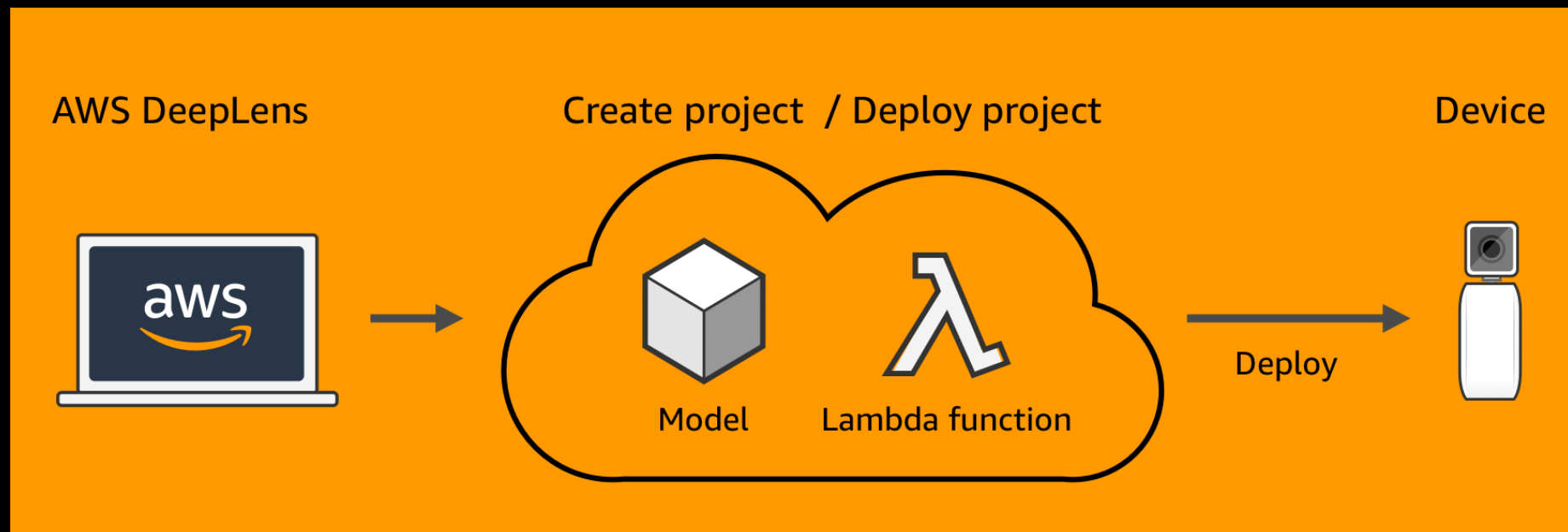OR CREATE YOUR OWN CUSTOM PROJECT IN AMAZON SAGEMAKER

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Demo: Building A Simple Custom DeepLens Object Detection Model

https://github.com/aws-samples/aws-deeplens-reinvent-2019-workshops/tree/master/AIM229-Beginner

aws SUMMIT ONLINE

Deploying the Model to AWS DeepLens

This is where the magic happens!

AWS DeepLens   Create project / Deploy project   Device

Model   Lambda function   Deploy

Demo: Using AWS DeepLens Camera For Real-Time Inferencing

Amazon Rekognition Image:
Deep learning-based image analysis service

Object and Scene Detection

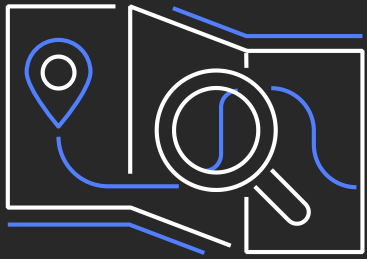Facial Analysis

Face Comparison

Facial Recognition

Celebrity Recognition

Image Moderation

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AWS Training and Certification

Training for the Whole Team

Explore tailored learning paths for customers and partners

Flexibility to Learn Your Way

Build cloud skills with 550+ free digital training courses, or dive deep with classroom training

Validate Skills with AWS Certification

Demonstrate expertise with an industry-recognized credential

Education Programs

Find entry-level cloud talent with AWS Academy and AWS re/Start

aws.amazon.com/training

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