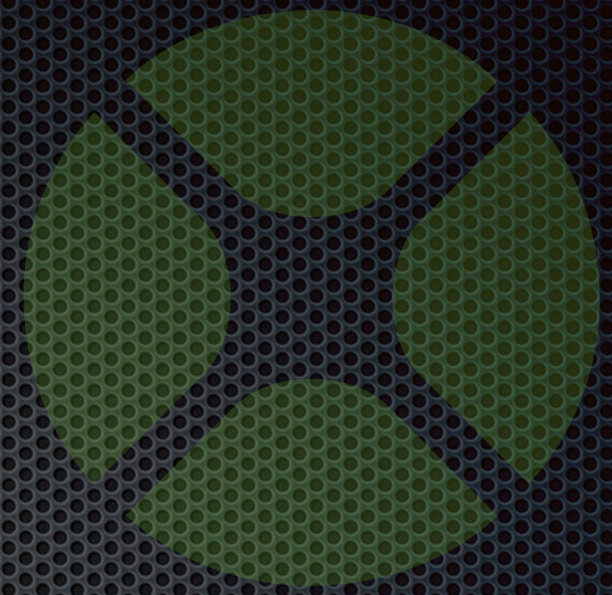


Integrating Your Xojo App With Artificial Intelligence Cloud Services



Jim Meyer
Varsity Systems

Demo



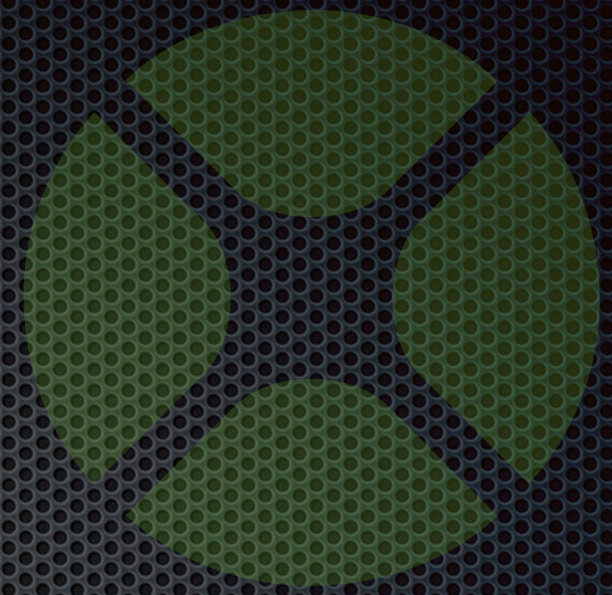
- AWS AI Services
 - Machine Vision: Video Facial Recognition
 - Audio to Text
 - Translate Text
 - Comprehend Text
 - Using 2018 XDC promotional video

Machine Learning

- ML is most common type of AI
- Systems coded to Learn rather than perform a specific task
- How it works:
 - <https://www.youtube.com/watch?v=nKW8Ndu7Mjw>
 - AWS hands-on tutorial “Deep Racer”
 - Training autonomous scale model racing cars
 - Purchase car (\$400) or run in simulator
 - International competition
 - <https://aws.amazon.com/deepracer/>
 - Uses “TensorFlow”

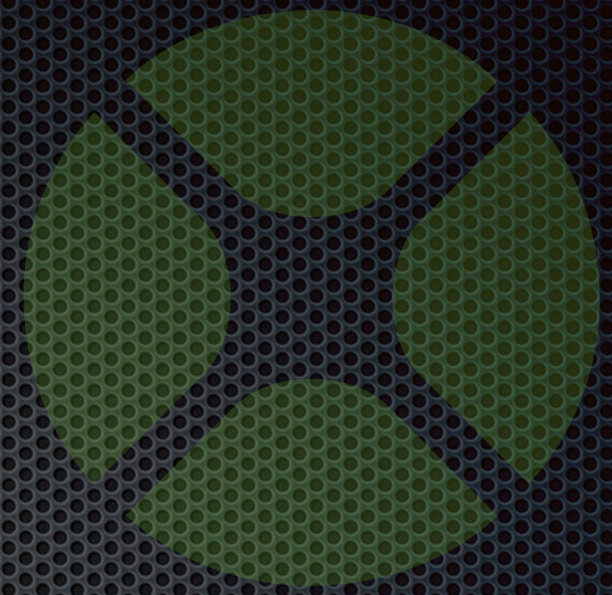


Machine Learning



- TensorFlow:
 - ML Library developed by Google
 - Open source November 2015
 - Very widely used
 - C++ usually implemented with Python
 - Mac, Ubuntu, Windows & Raspbain
 - ? MBS Plugin
 - <https://www.tensorflow.org>

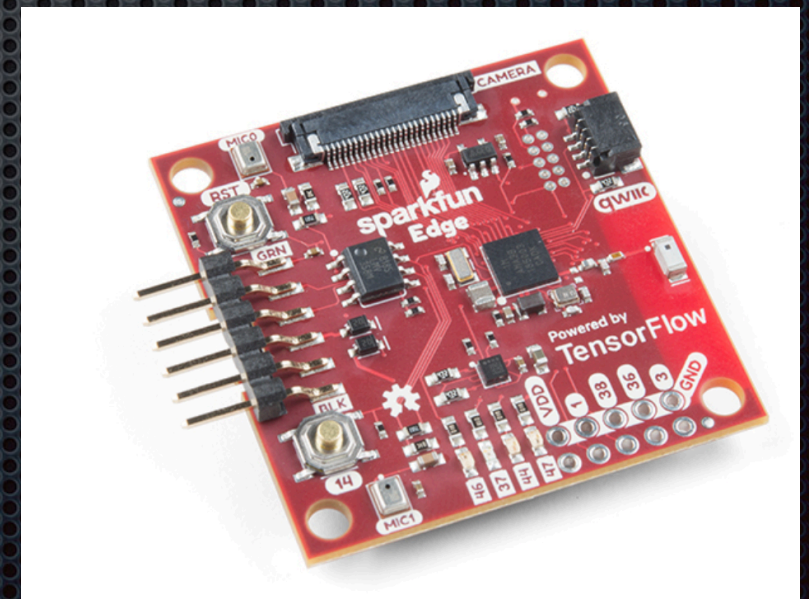
ML Requires



- 2 Steps: Learn then Deploy (Inference)
- Learning (Model Building) is processing intensive
 - Complex Models require petaFLOPS speeds
 - Dedicated custom hardware (TPU, MS, Intel)
 - Model building ideal for cloud computing
 - Scale as required
 - No infrastructure required
 - Pay as you go
- Deployment is lightweight

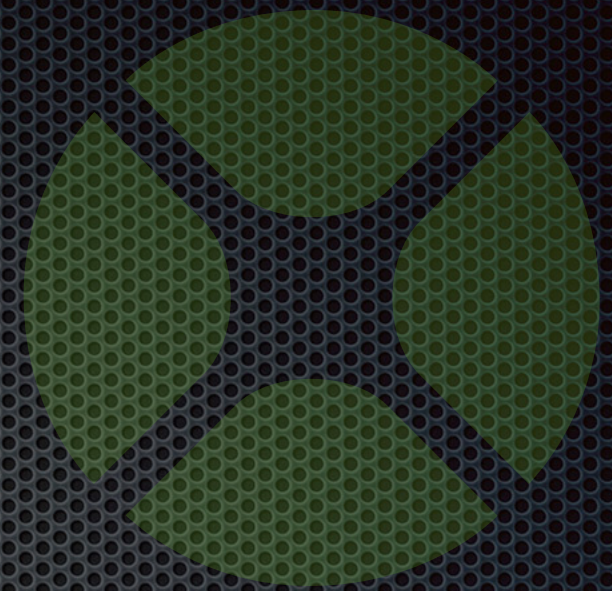
Deployment (Inference)

- Cloud Service or “Edge” depending on application
 - Edge: processing where the data is collected (Deep Racer)
- Use Edge if latency, connectivity, security, cost are a concern
- Build Model in Cloud, deploy on the Edge
 - Apple Core ML (MBS Plugin OSX)
 - Google Edge TPU (\$150)
 - Sparkfun Edge (\$15)



Big Players Cloud AI

- Amazon Web Services (AWS)
- Google Cloud Platform (GCP)
- IBM Watson
- Microsoft Azure
- Others...



Two Levels of Services



- “Grow Your Own”
 - Develop ML Models from your own data
 - Many “GYO” Cloud Services available
 - Choice dependent on type of data & your knowledge level
 - GCP “AutoML” easy place to start

Two Levels of Services

- “Pre-Trained Services” (Machine Communications)
 - Text
 - Comprehension
 - To Speech
 - Language Translation
 - Audio
 - Transcribe (to text)
 - ChatBots (Audio or Text)
 - AWS Lex (Alexa engine)
 - GCP DialogFlow



Two Levels of Services



- “Pre-Trained Services” (cont.)
 - Image & Video Recognition (Machine Vision)
 - Facial Identification
 - Finding/Tracking People
 - Keyword Identification
 - Logo Identification
 - Detect Adult Content
 - Find Text & OCR
 - Landmark Location
 - Find Related Web Content

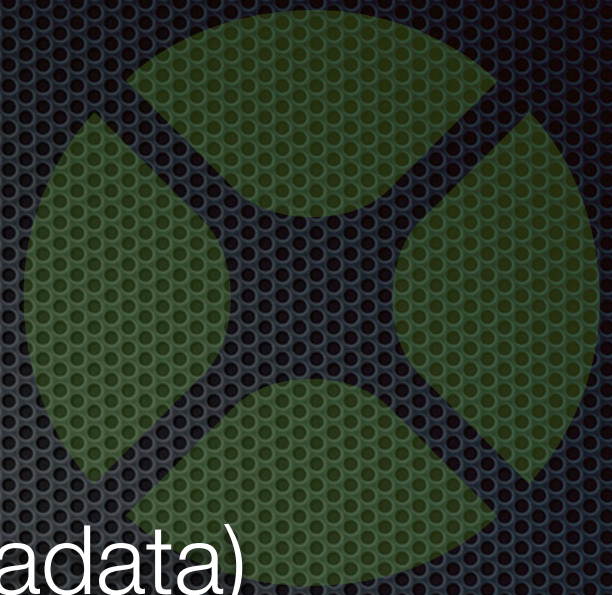
ML Services with Xojo

The Xojo logo is a green circle with a white 'X' inside, positioned in the top right corner of the slide.

- REST API (“Grow Your Own” & “Pre-Trained”)
 - Create JSON request
 - Post or Get via HTTPS
 - Parse JSON response
 - Big & deeply nested JSON arrays
 - Advise using a JSON visualizer/editor

JSON Response

- Requested Data (translated text, audio, metadata)
- X, Y, height, width, time stamp
- Confidence Level
- Batch/Job Number

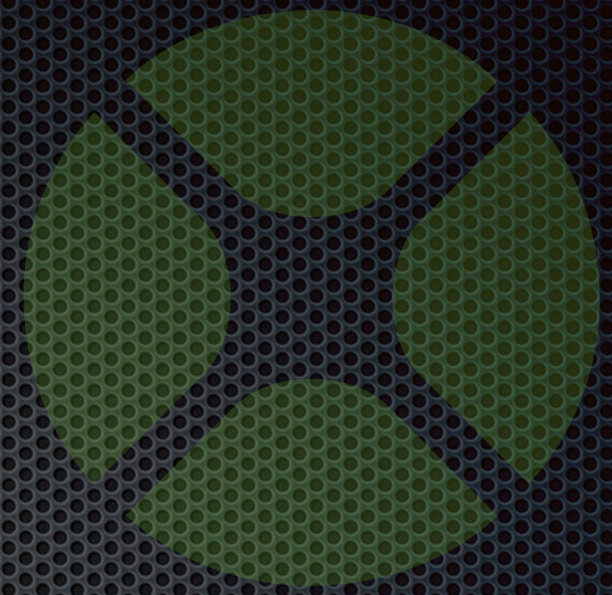


Synchronous or Batch

- Sync if data under 5 megs
- Batch for larger files including Video & Audio
 - XDC Video Demo was Batch
 - Upload files to S3 or GC storage
 - Submit job request with URL to file(s)
 - Wait and download results
- Some Services can be either Sync or Batch



AWS versus GCP



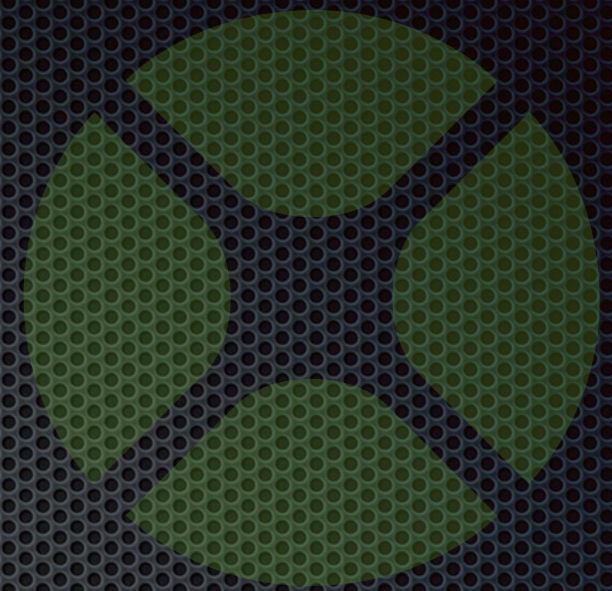
- Similar but also different
- Each has strengths & weaknesses
 - Free tier lets you experiment
 - Features constantly changing
- Both provide free SDK (PHP, Python, .NET, C#, C++)
- Good docs & examples for SDK
- Authorization is most difficult part for non-SDK

AWS versus GCP

- Both integrate with their other cloud services
- No monthly minimums
- Both have intro offers & free tier
- Example cost: Text Translate
 - 1st meg/month free
 - AWS \$15/meg (most pairs supported)
 - GCP \$20/meg (charge for 'auto' detection)

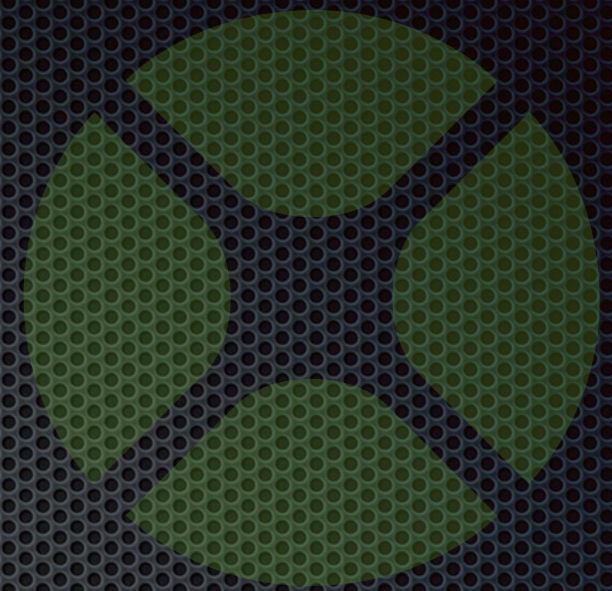


GCP Setup



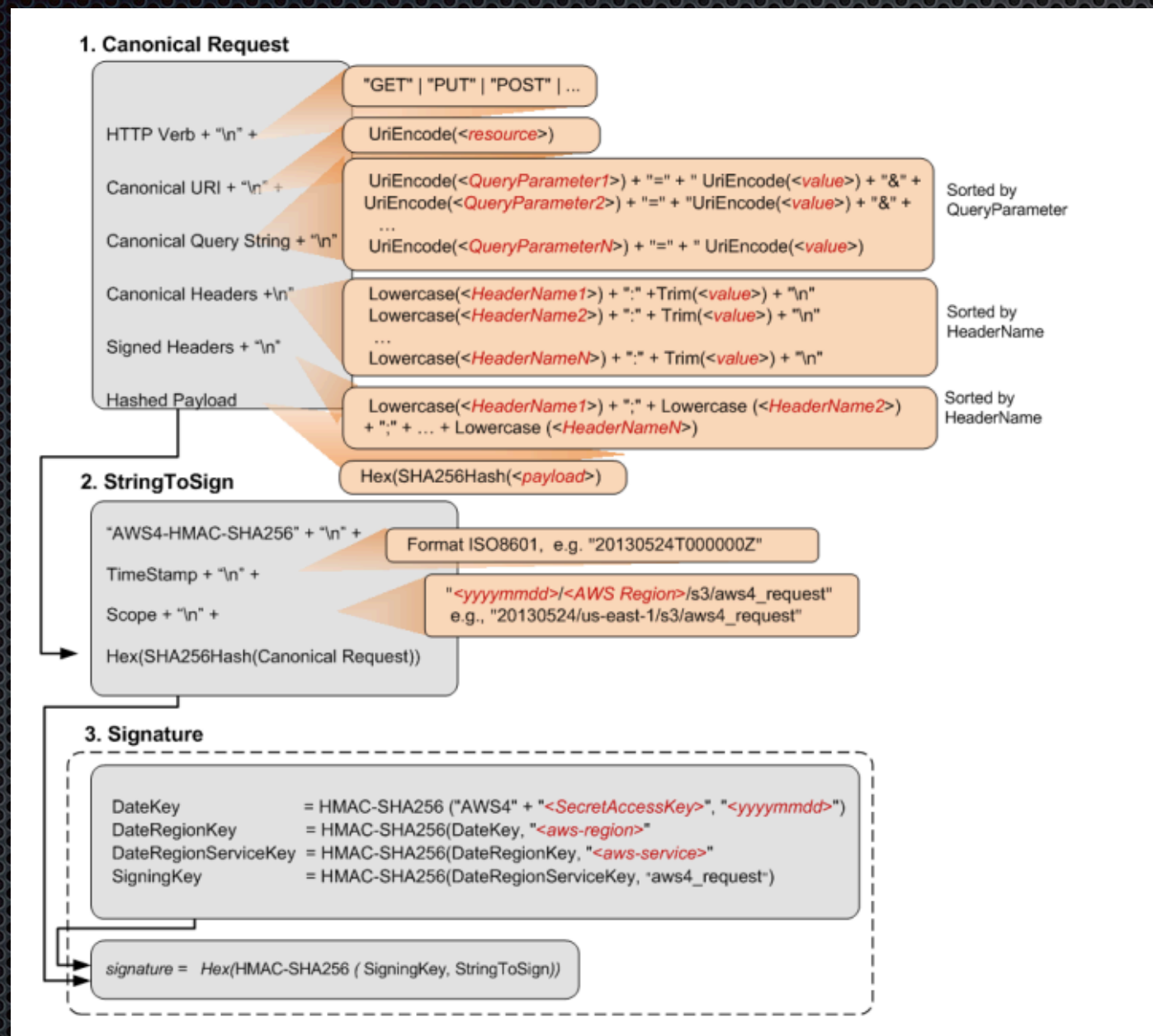
- Create/Login cloud.google.com (free)
- Create a Project
- Get “API Key” or oAuth “Access Token” for Project
 - Enable API for that Project’s required services
- API Authorization
 - Some Services allow “API key” as URL Parameter in request
 - Others require oAuth “Access Token”
 - Requires User to login and get “Access Token”
 - Pass “Access Token” in request header
 - “Access Tokens” expire in 1 hour
 - Renewal does not require User authorization

AWS Setup



- Create/login aws.amazon.com (free)
- Create Group & IAM User
- Get “Access Key” & “Secret Key” for User
- Optionally disable Services for User
- API Authorization
 - Sign request with “AWS Signature 4” string
 - Signature string in URL param or request header
 - Signature hash of Keys, headers, date-time, request
 - Expires in 5 minutes

AWS Signature 4



Xojo AWS & GCP Classes

The Xojo logo is a green circle with a white 'X' inside, positioned in the top right corner of the slide.

- Classic Framework & URLConnection (no Plugins)
 - Requires 2019 R1
- Not as complete as the SDKs
 - Easy to modify
 - Includes link to Service documentation
- Includes Authorization
 - AWS Signature 4
 - GCP both OAuth & API Key
 - OAuth Automatic renewal

Demos & Code Review



- xLocalizer
 - Developer Tool to Translate Xojo App UI
- AWS Test
- GCP Test
 - GCP AutoML
- OSX Edge Core ML (requires MBS plugin)
- AWS Lex Test

Q & A

Jim Meyer

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Give us feedback on this session in the XDC app!

