

//interknowlogy/

INTEL®
AI BUILDERS
MEMBER

Gold
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Gold Cloud
Gold App Dev

The Power of Machine Learning and Computer Vision at the Edge

Intel OpenVino – Visual Inferencing and Neural Network Optimization

agenda

- A quick background on IK and their customer VSBLTY
- OpenVino definition and value proposition
- R&D + ISV roadmap

- Demos
- Lets be interactive



Tim Huckaby

Founder / Chairman

TimHuck@InterKnowlogy.com

Blog: www.TimHuckaby.com

LinkedIn: www.linkedin.com/in/timhuckaby

Twitter: @TimHuckaby

“

With you today...

”

...a little about me



about IK



Gold Cloud
Gold App Dev

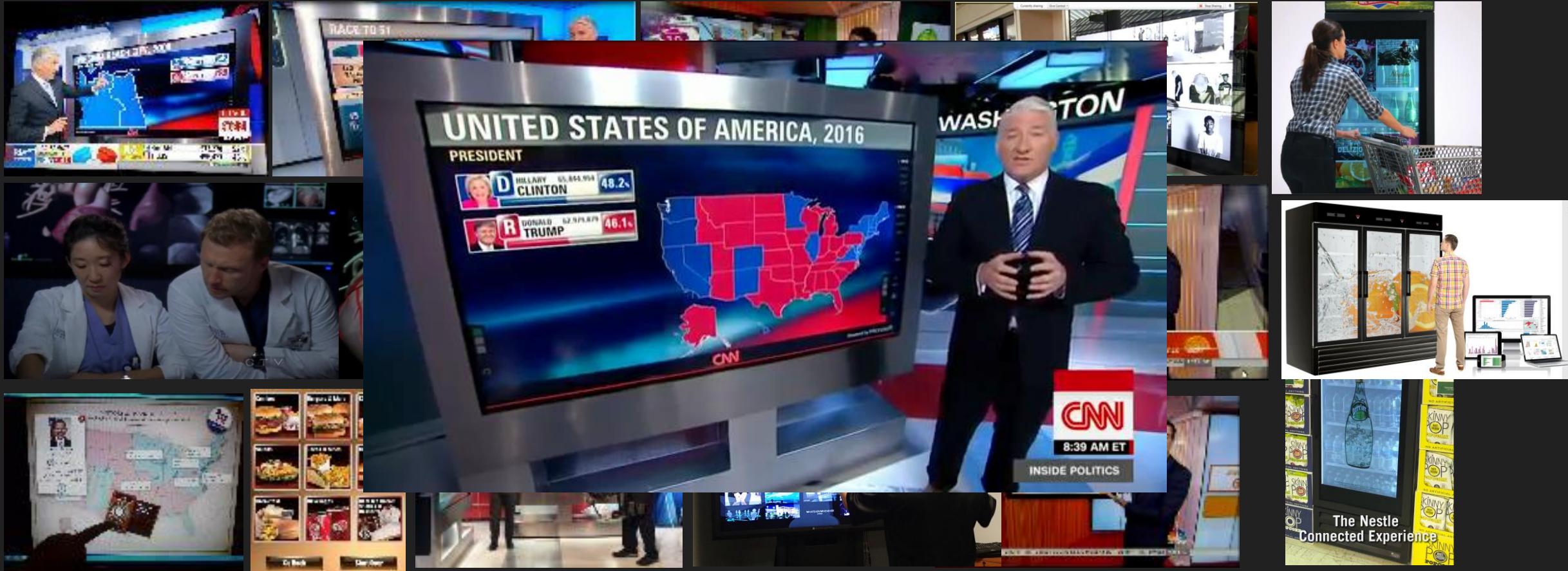
- est. 1999, our mission is to build v1 product with emerging technology
- we have delivered countless consumer quality web & mobile experiences with enterprise grade scalability earning our customers 100's of millions in revenue

Clients





//interknowlogy/

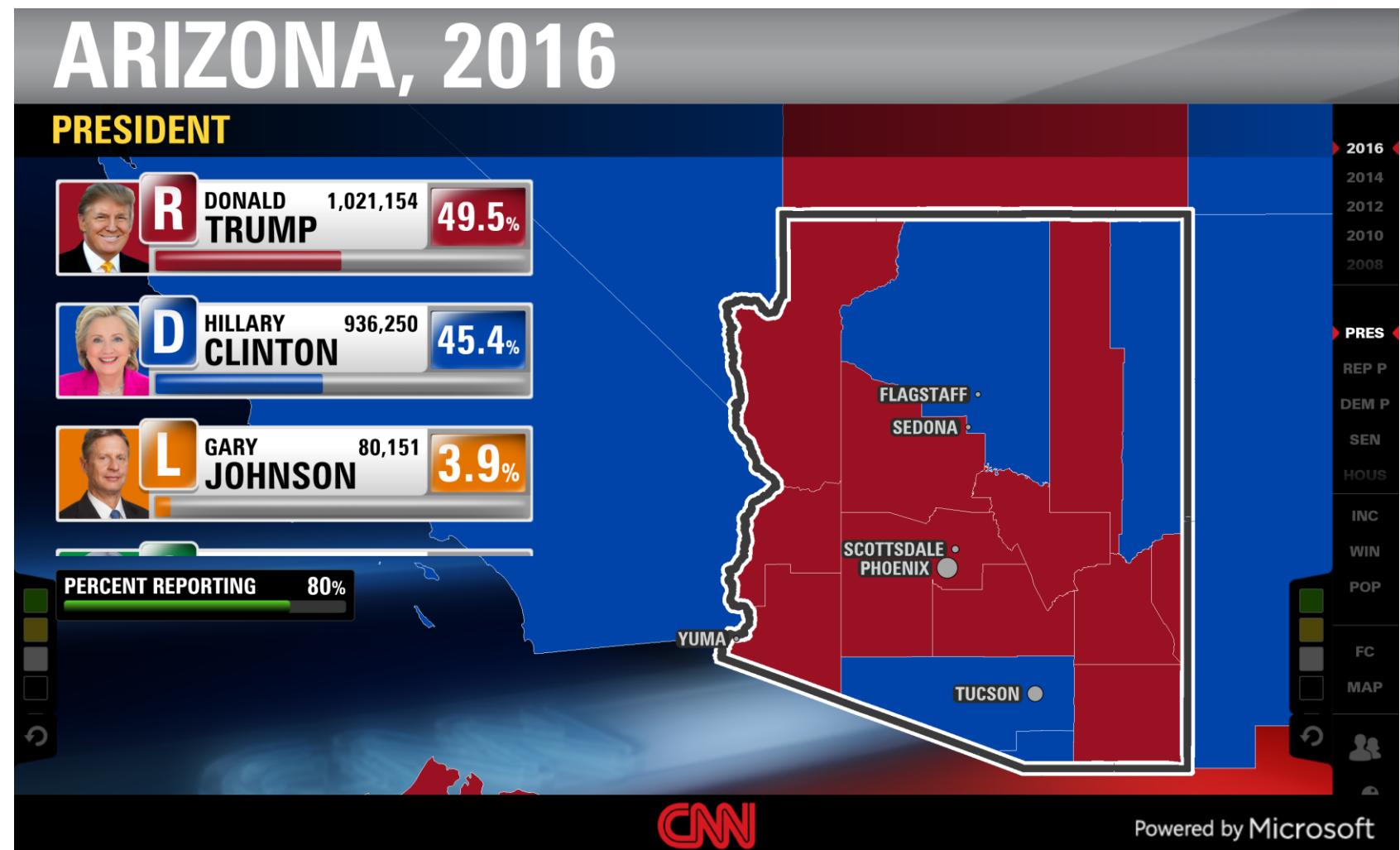


CNN: Magic Wall

Demo

Tim Huckaby

- InterKnowlogy, Chairman/Founder
- VSBLY, CTO
- Microsoft Worldwide RD
- Microsoft MVP, AI



our skills – real engineers, PMs, designers

- we build everything from high-tech proof of concepts to enterprise grade platforms, from product ideation to deployment
- “real” engineers
- deep expertise in web, mobile, MR/AR, computer vision, machine learning, blockchain, IoT & complex data visualization



Intel OpenVINO – Visual Inferencing and Neural Network Optimization

- A “toolkit” used for development and deployment of computer vision solutions
- Toolkit: a grouping of code sets which includes a C++ library
- Runs on intel platforms in the cloud or the edge; but the differentiator is the edge
- Runs deep learning models for detection, classification, image processing -> computer vision
- Windows or Linux – more in the roadmap
- Performance – intel CPUs, GPUs, VPUs (moovidius), intel FPGAs
- Deep Learning Inference; like a runtime for a trained model. Not about training ML models
- Contains a large set of pre-trained state of the art DL models
- Open source; no licensing fees

The Power and Potential of OpenVino

- There is no real competitor for OV
- Momentum - Intel goes fast; wait until you hear about the roadmap...
- OV is tied to the metal
- IK created a .NET wrapper (SDK) for OV to expose capabilities to a wider developer audience
- IK created model transformation processes to ingest models from various platforms to be processed on the edge
- for facial recognition, IK created an enterprise deployment model for in memory deployments of tokenized faces (managed from Azure)

Case Study - isv:VSBLTY

VisionCaptor™

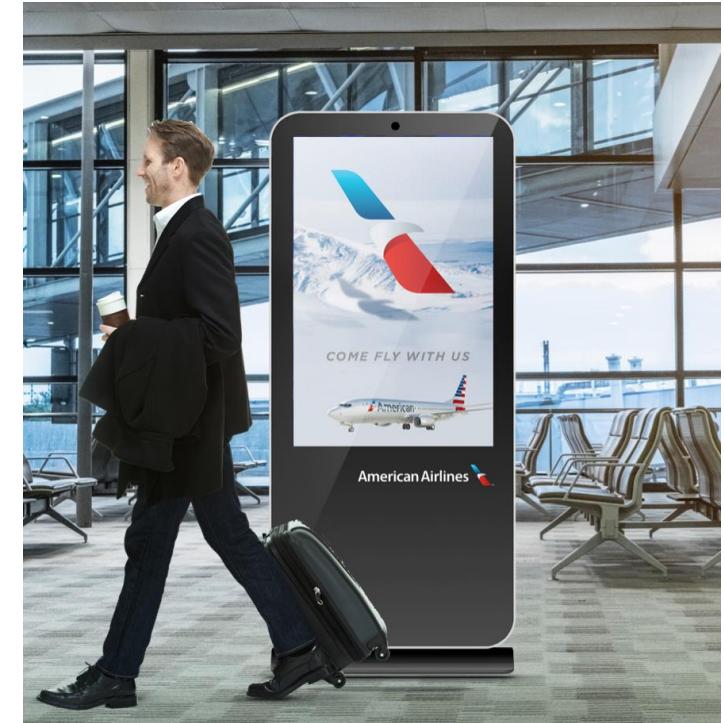


DataCaptor™



Vector™

Security by VSBLTY



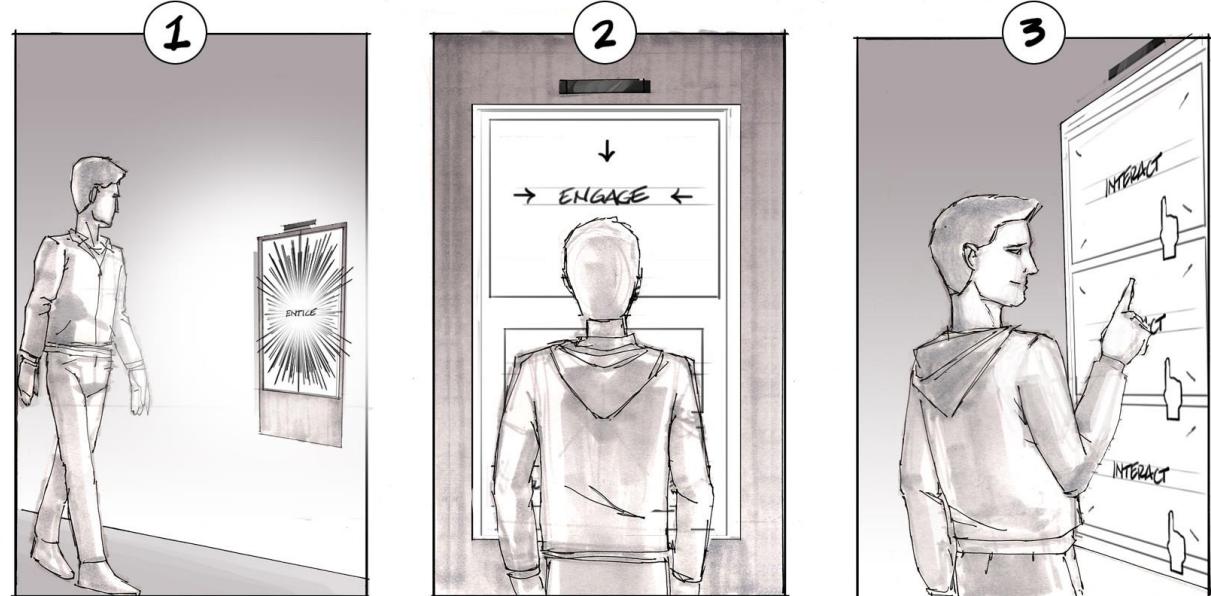
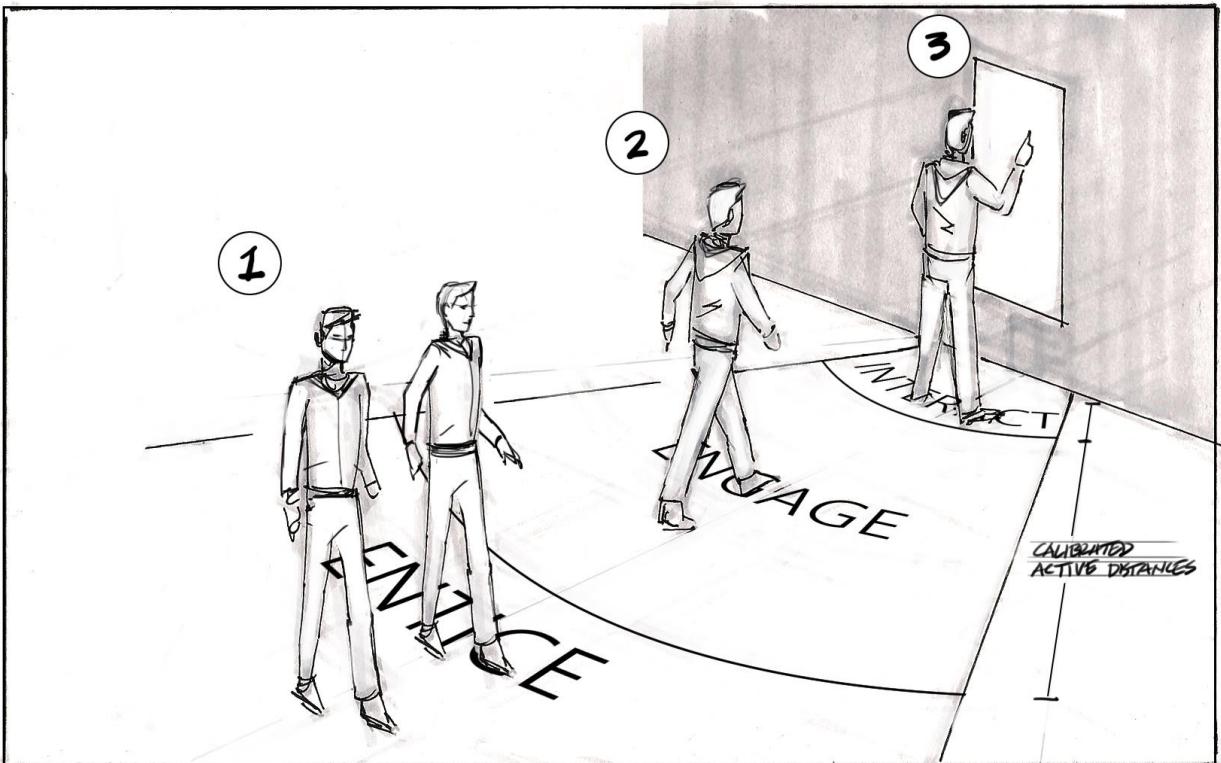
VisionCaptor™ marries brilliantly executed motion graphics or interactive brand messaging on display surfaces including glass panel doors at point-of-sale in retail environments such as supermarkets and c-stores, with "first of its kind" facial recognition and data capture technology that delivers real time behavioral analytics and sales metrics.

DataCaptor™ is a stealthier application that tracks consumer data at the highest level at POS. VSBLTY is "Insights in Motion" and the future of retail engagement and analytics.

Vector™ does Facial Recognition with precision, scale and accuracy. Vector provides multiple Alerting functionality and Coolfire security dashboard integration.

VisionCaptor

How it Works



- 3 Modes of Operation:**
 - Entice, Engage, Interact
- Agnostic to Camera, Sensor and Screen**
 - Any camera including your existing surveillance.
 - Any Screen in including running “headless” along with your existing digital signage

Demo

Tim Huckaby

- InterKnowlogy, Chairman/Founder
- VSBLYT, CTO
- Microsoft Worldwide RD
- Microsoft MVP, AI

Golden Trout Demo

VSBLYT: Command Center

The interface features a central video feed of a man with glasses. A green bounding box highlights his face, and a small overlay displays "Tim Huckaby (64%, male, 56 Happy)". To the left, three semi-circular infographics represent "Interactions Data" (green), "Engagement Data" (red), and "Enticement Data" (yellow). Above the video are six control buttons for "CAMERA", "FACE", "EMOTION", "BODY COUNT", "ZONES", and "ANALYTICS", each with an "OFF" switch. To the right are icons for "RECORD" and "THEME". On the far right, a bar chart shows emotion percentages: Neutral (24.5%), Anger (0%), Sadness (0%), Contempt (0.3%), Happiness (75.2%), Surprise (0%), and Fear (0%). Below the video is a summary table:

TOTAL BRAND ENTICEMENT	TOTAL BRAND ENGAGEMENT	TOTAL BRAND INTERACTIONS	TOTAL BRAND IMPRESSIONS	INTERACTIONS TO ENGAGEMENT	AVERAGE DWELL TIME		
159,291	957,183	56,544	1,116,474	6%	:32		
Male	Female	-20	21-30	31-40	41-50	51-60	60+
48%	52%	0.04%	6.5%	43.7%	44.4%	4.7%	0.02%

VSBLTY: Security Email Alerting

Demo

Tim Huckaby

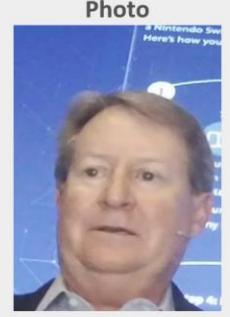
- InterKnowlogy, Chairman/Founder
- VSBLTY, CTO
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- Microsoft MVP, AI

Screenshot of an email alert from VSBLTY showing a found person.

The email header reads: [no-reply] [CLOUD] TIM HUCKABY found at location TIMHSURFACEBOO...
File Message Help Tell me what you want to do
Wed 5/22/2019 8:28 AM
VSBLTY-TIMHSURFACEBOOK <no-reply@vsblty.net>
[no-reply] [CLOUD] TIM HUCKABY found at location TIMHSURFACEBOOK with 80% confidence
To security@vsblty.net

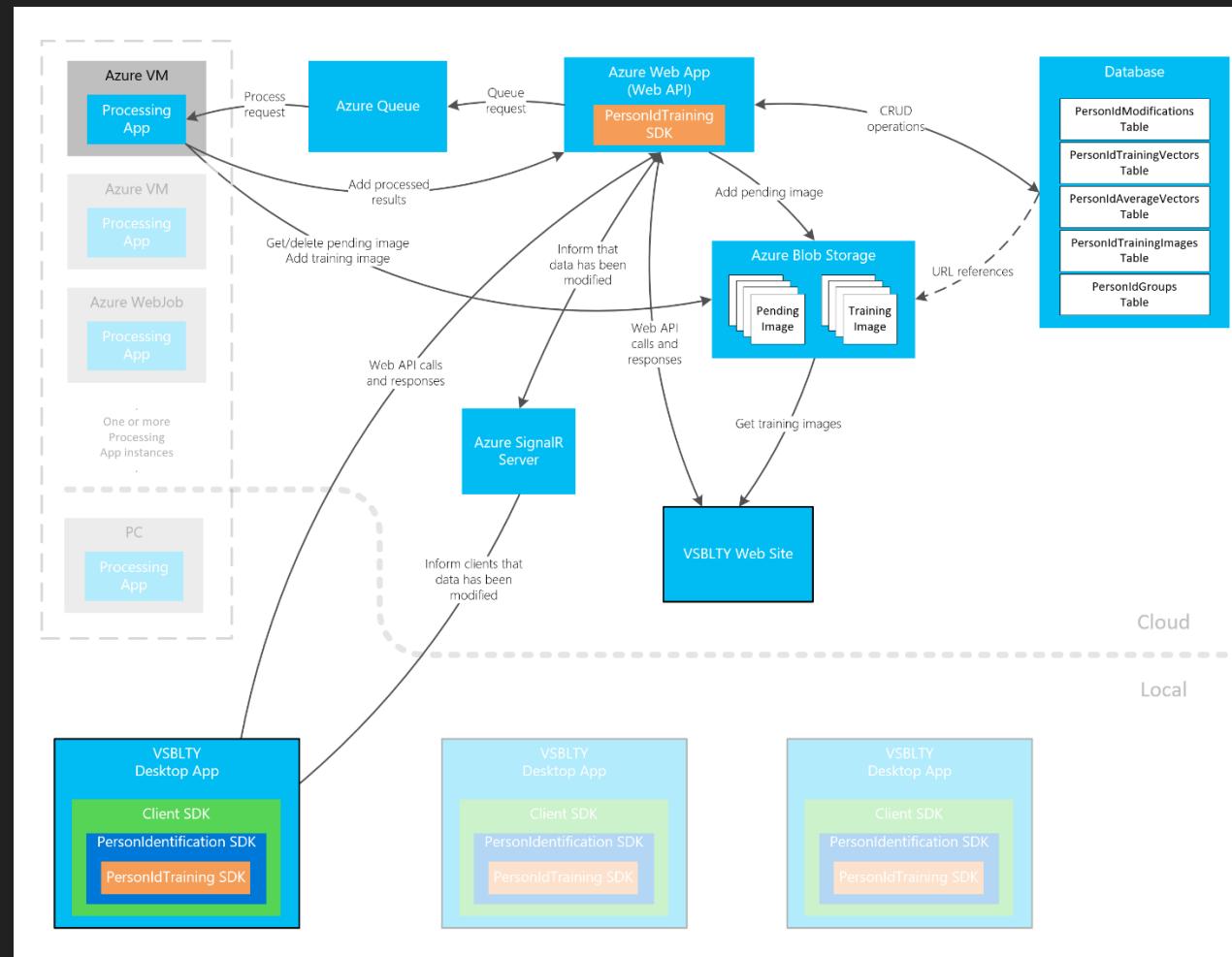
CLOUD DB: VSBLTY
DATE: 2019-05-22

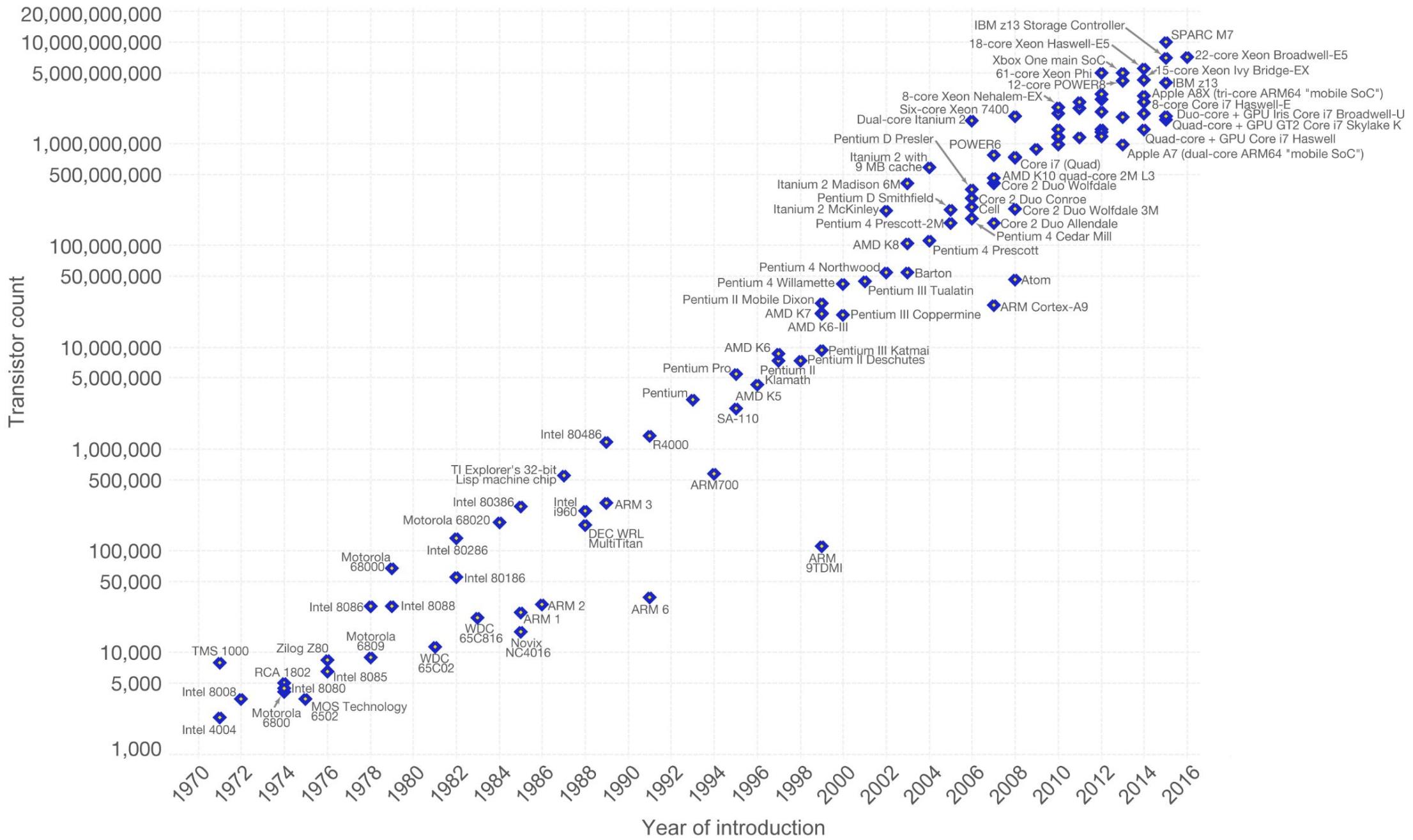
Tim Huckaby FOUND

FR Database image  Photo 

Name	Tim Huckaby
Confidence	80%
Date/Time	2019-05-22 08:27:17.966 UTC
Location	TIMHSURFACEBOOK
Endpoint	TIMHSURFACEBOOK

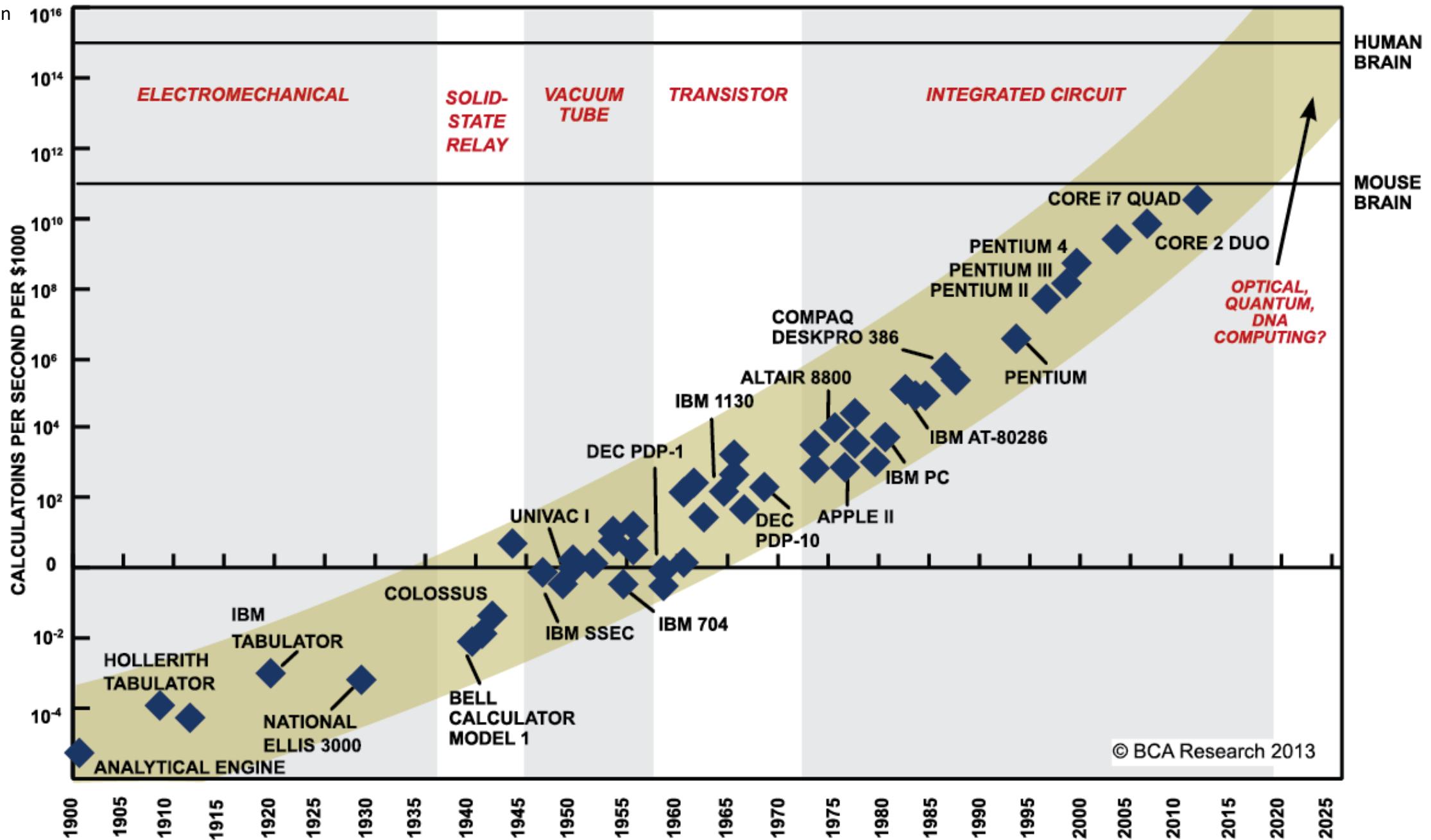
OpenVINO person identification on the edge; in memory database





Moore's Law Defined & Described

- The “law” is named after Intel co-founder Dr. Gordon E. Moore, who described the trend in a Electronics Magazine Article in April, 1965.
- The Prediction: in his Electronics Magazine article, Moore noted that ***the number of components in integrated circuits had doubled every year from the invention of the integrated circuit in 1958 until 1965 and predicted that the trend would continue "for at least ten years".***
- It was a description of a trend, and a prediction
- Intel didn't exist yet, when Moore wrote the article he worked as a director at Fairchild Camera and Instrument Corp.
- Although originally calculated as a doubling every year, Moore later refined the period to two years
- Moore's prediction has proved to be uncannily accurate
- **Why is all this important?** Because Software Ultimately Reflects Hardware Capability



© BCA Research 2013

SOURCE: RAY KURZWEIL, "THE SINGULARITY IS NEAR: WHEN HUMANS TRANSCEND BIOLOGY", P.67, THE VIKING PRESS, 2006. DATAPoints BETWEEN 2000 AND 2012 REPRESENT BCA ESTIMATES.

Rendering 3D in movies: Avatar

To tackle the task of helping create Avatar, it took the Weta Digital super computers processing up to 1.4 million tasks per day to render the movie, which consisted of processing 8 gigabytes of data per second running 24/7 for over a month. Often each of Avatar's frames took several hours to render.

...seems to be around 1 hour and 45 minutes long. $105 \text{ minutes} = 6,300 \text{ seconds}$. They're probably recording at a standard 24FPS so $6,300 * 24 = 151,200$ total frames.

...server farm consisting of 34 racks, each with four chassis of 32 machines a piece. The combination of those machines comprises a total of 40,000 processors along with 104 terabytes of memory using 10 GB networking adapters.

...The entire rendering of Avatar reportedly requires over 1 Petabyte of storage space, which is the equivalent of 500 harddrives of 2TB each. That's equal to a 32 year long MP3 file.

Source: <https://www.geek.com/chips/the-computing-power-that-created-avatar-1031232/>
<http://news.bbc.co.uk/1/hi/technology/8421091.stm>



Avatar 2 has been delayed to 2021 (then alternated with Star Wars sequels)

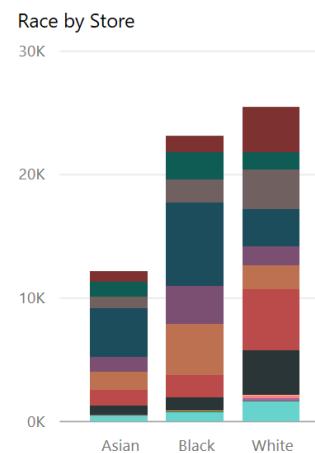
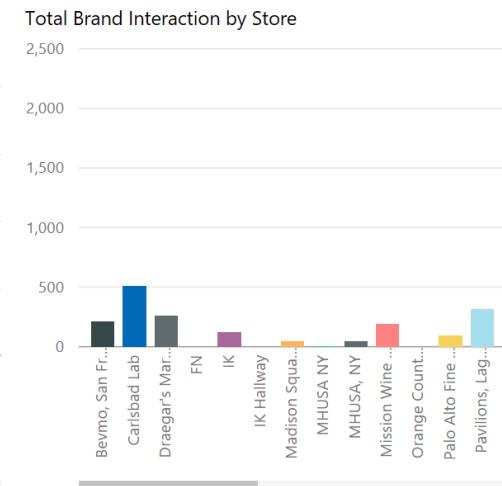
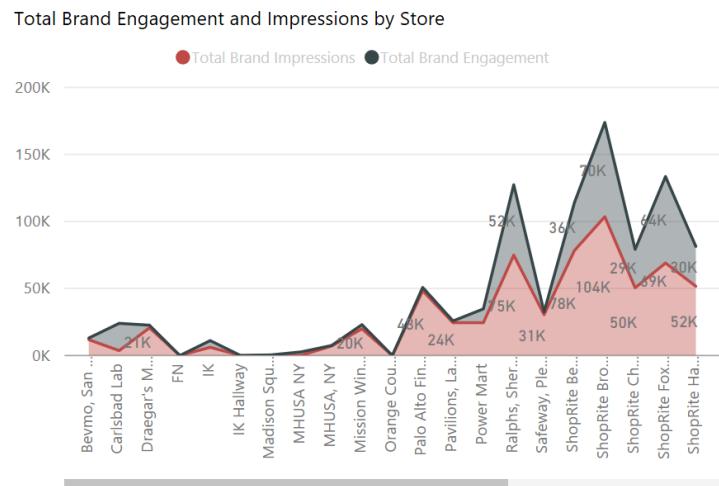
VSBLY Analytics

Demo

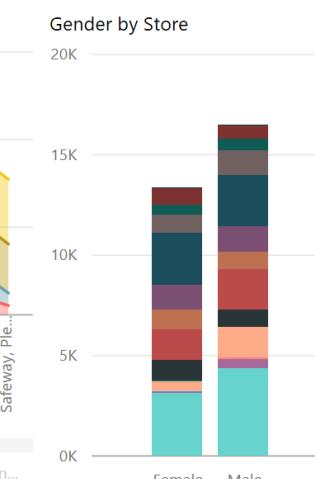
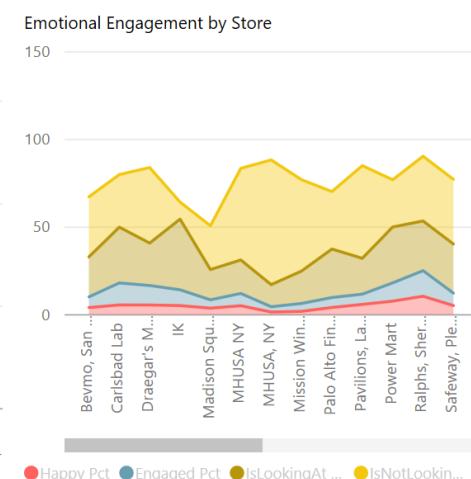
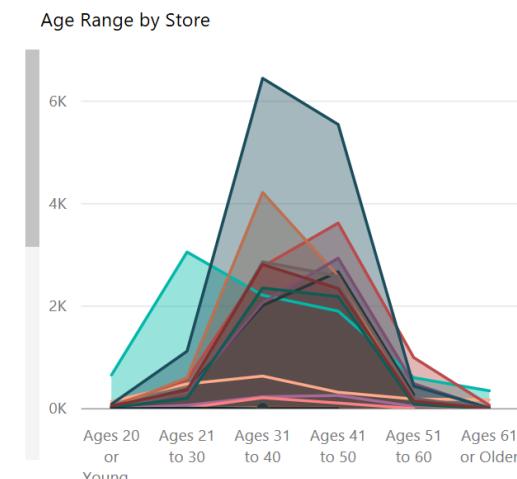
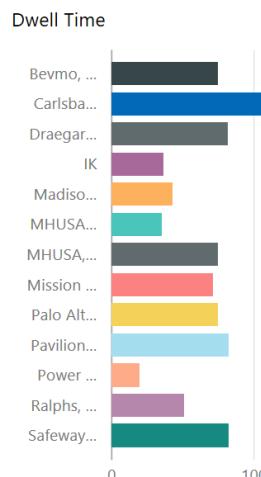


Customer
(Blank)
FN
Madden
MHUSA
Nestle

Date
1/1/2017 2/28/2017



Engagement Type Name
Select All
Engage
Entice
Interact



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- Microsoft Worldwide RD
- Microsoft MVP, AI

VSLTY: Security integration and notification

Demo

Tim Huckabee

- InterKnowlogy, Chairman/Founder
- VSLTY, CTO
- Microsoft Worldwide RD
- Microsoft MVP, AI

File Message Tell me what you want to do...

Delete Reply Quick Steps Move Tags Editing Zoom Reply with Meeting Poll

Delete Respond Quick Steps Move Tags Editing Zoom FindTime

VSLTY-TIMHSURFACEBOOK <vsltykiosk@gmail.com> security@vslty.net 5/15/2018

[no-reply] TIM HUCKABY found at location PERSONAL with 86% confidence

Name	Tim Huckabee
Photo	
Confidence	86%
Date/Time	5/15/2018 11:25:42 AM
Location	Personal
Endpoint	TIMHSURFACEBOOK

1 - FedEx Way 38.906948, -76.865868 Tue, Dec 5, 3:27 PM ismconnect ismconnect

Events Info

Back to Sensor

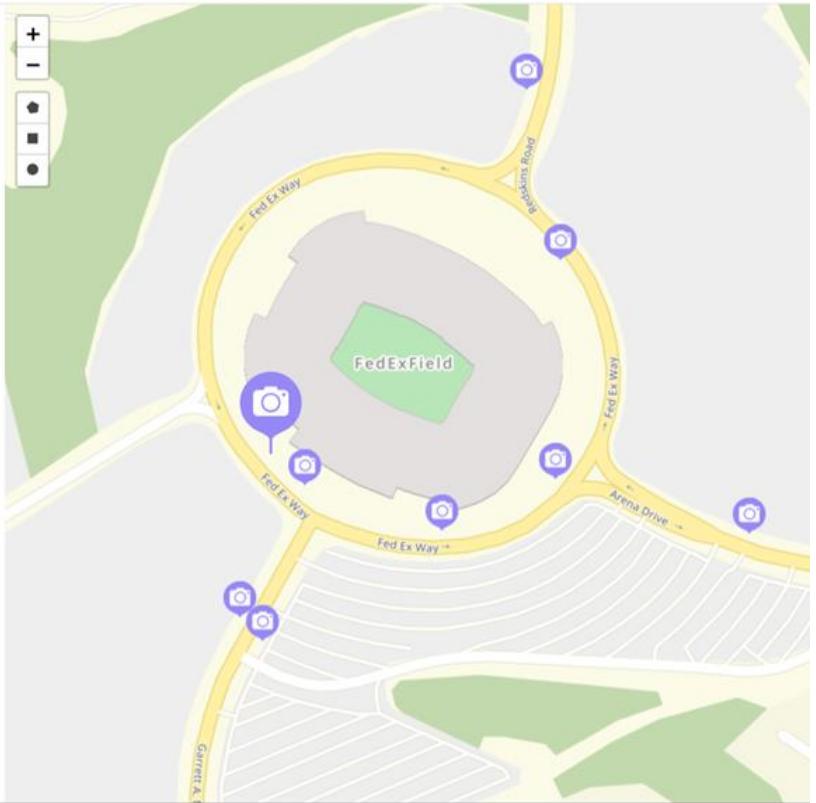
GUILLERMO VACA found at location QUITO with 65% confidence

Today 10:18 AM

Attachments:



Property	Description
IdentityName	Guillermo Vaca
PercentageProbability	65
DateTime	2017-12-15 10:18:33
Location	quito
MachineName	TROJANSKIOSK-EC
BioRecordId	9d44f546-9bff-47f2-8d89-b7ab14e5ca03



VSBLY Vizsafe integration

Demo

Tim Huckaby

Vizsafe

Map Feed Report Cameras Info Account Log out

All Channels

Match Name: Tim Huckaby FR Group: VSBLY Testing Confidence: 72.54 Delete Edit Download

7.10.19 6:43 AM

reported

VSBLTYAPI clear

VSBLTY Sensor

Match Name: Tim Huckaby FR Group: VSBLY Testing Confidence: 73.7 Delete Edit Download

7.10.19 6:43 AM

reported

VSBLTYAPI clear

VSBLTY Sensor

FEED CONTENT

FEED VIEW

Search Reports...

+ Collapse/Expand

My Geofences

Open

Pending

Clear

High

CHANNELS

Search for channel to add...

LOVES MAINTENANCE

LOVES OPERATIONS

LOVES SECURITY

VSBLY SENSOR



THE DAILY Herald
SATURDAY, 10.25.2014 • EVERETT, WASHINGTON • WWW.HERALDNET.COM • 75¢ (HIGHER IN OUTLETS)

DREADED DAY IN MARYSVILLE

■ 2 die, 4 wounded in school shooting
■ Students, parents
■ Gun
■ Common theme

Voice of the Rocky Mountain Empire
THE DENVER POST
SATURDAY, JULY 21, 2012 HOT 100° ▼ 68° 30A • © THE DENVER POST • \$1 PRICE MAY VARY OUTSIDE METRO DENVER
Latest updates: Photos, videos and a timeline of the theater attack and the police response. [denverpost.com](#)

MIDNIGHT MASSACRE | AURORA THEATER SHOOTING

OUR HEARTS ARE BROKEN"

Tampa Bay Times

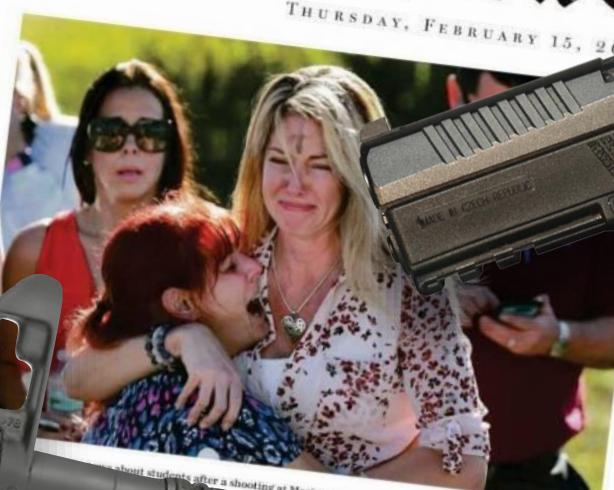
FLORIDA'S BEST NEWSPAPER
tampabay.com
TEARS, ANGER FLOW

» Officials say the 19-year-old suspect admitted fatally shooting 17 at the Marjory Stoneman Douglas High School.

R ***** FRIDAY, FEBRUARY 16, 2018 | 9
THE SUSPECT

The Boston Globe

THURSDAY, FEBRUARY 15, 2018



FRESHMAN ta
classmates, th
BY ERIC STEVICK, RUSSELL KING
and KAREN BRAY
Herald Writers

WILMINGTON — A burst of
shots rang out at the school
on Friday morning, sending stu-
dents running for cover. A stu-
dent who was shot in the leg
was taken to a nearby hospital.
The shooting occurred at about
10:30 a.m. at Marjory Stoneman
Douglas High School in Parkland,
Fla., where 17 people were killed
in a shooting last month.

Expelled teen opens fire on fleeing students in Florida, killing 17, officials say

By Andrea D.S. Borch
and Patricia Mazzei
Staff Writers

PARKLAND, Fla.

The Post and Courier
FOUNDED 1803 • WINNER OF THE 2015 PULITZER PRIZE FOR PUBLIC SERVICE
Friday, June 19, 2015
POSTANDCOURIER.COM
Charleston, S.C. \$1.00



**'The unspeakable
happened in our city'**



Decries Trump's attacks in
speech to Native Americans

By Matt Viser and Liz Goodwin

WASHINGTON — Senator Elizabeth Warren made a surprise appearance at the National Congress of American Indians Wednesday, forcefully denouncing President Trump's use of the name "Pocahontas" to deride her and defending her claims of Native American heritage more expansively than she has before.

The Massachusetts Democrat also made an impassioned pledge to advocate for issues of importance to Native Americans.

The speech was a clear attempt to put to rest a sensitive issue that has been used by her enemies to attack her character.



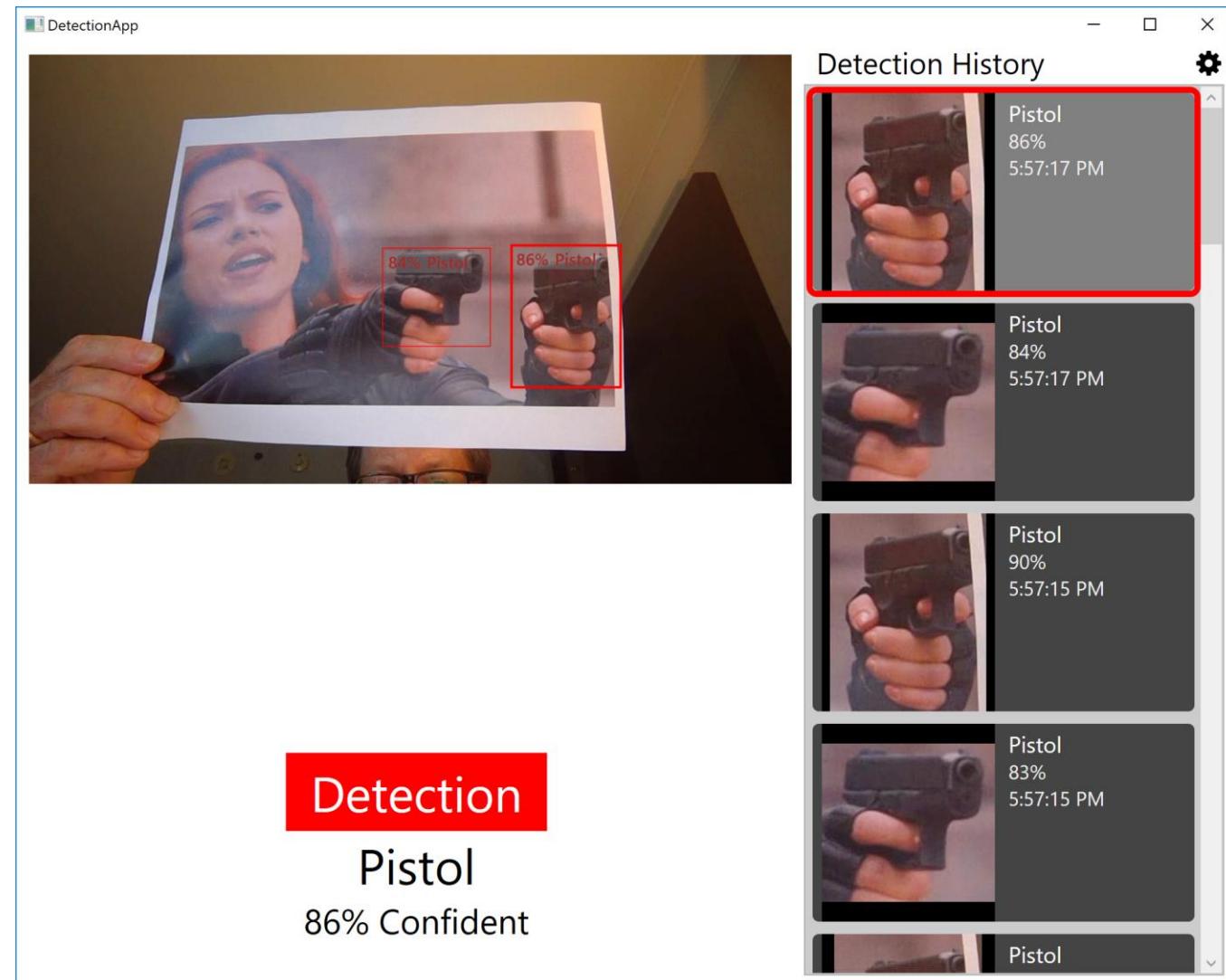
Object Detection & Recognition: - Weapons

Weapon DetectionApp.exe

Demo

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- VSBLY, CTO
- Microsoft Worldwide RD
- Microsoft MVP, AI



Demo

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Golden Trout Demo

VSBLYT: Command Center

The screenshot shows the VSBLYT Command Center interface. At the top, there's a navigation bar with icons for camera, face detection, emotion recognition, body count, zones, analytics, record, and theme. Below the bar, the main area is divided into several sections:

- Interactions Data:** A green semi-circular gauge with a white human icon in the center.
- Engagement Data:** A red semi-circular gauge with multiple white human icons in the center.
- Enticement Data:** A yellow semi-circular gauge with many small white human icons in the center.
- Video Preview:** A live video feed of a man wearing glasses. A green bounding box highlights his face, and a small overlay displays the text "Tim Huckaby (64%, male, 56 Happy)" along with a sun emoji.
- Emotion Recognition:** A small thumbnail of the same man with glasses, followed by a list of emotions and their percentages: Neutral (24.5%), Anger (0%), Sadness (0%), Contempt (0.3%), Happiness (75.2%), Surprise (0%), and Fear (0%).
- Summary Metrics:** A table at the bottom provides overall statistics:

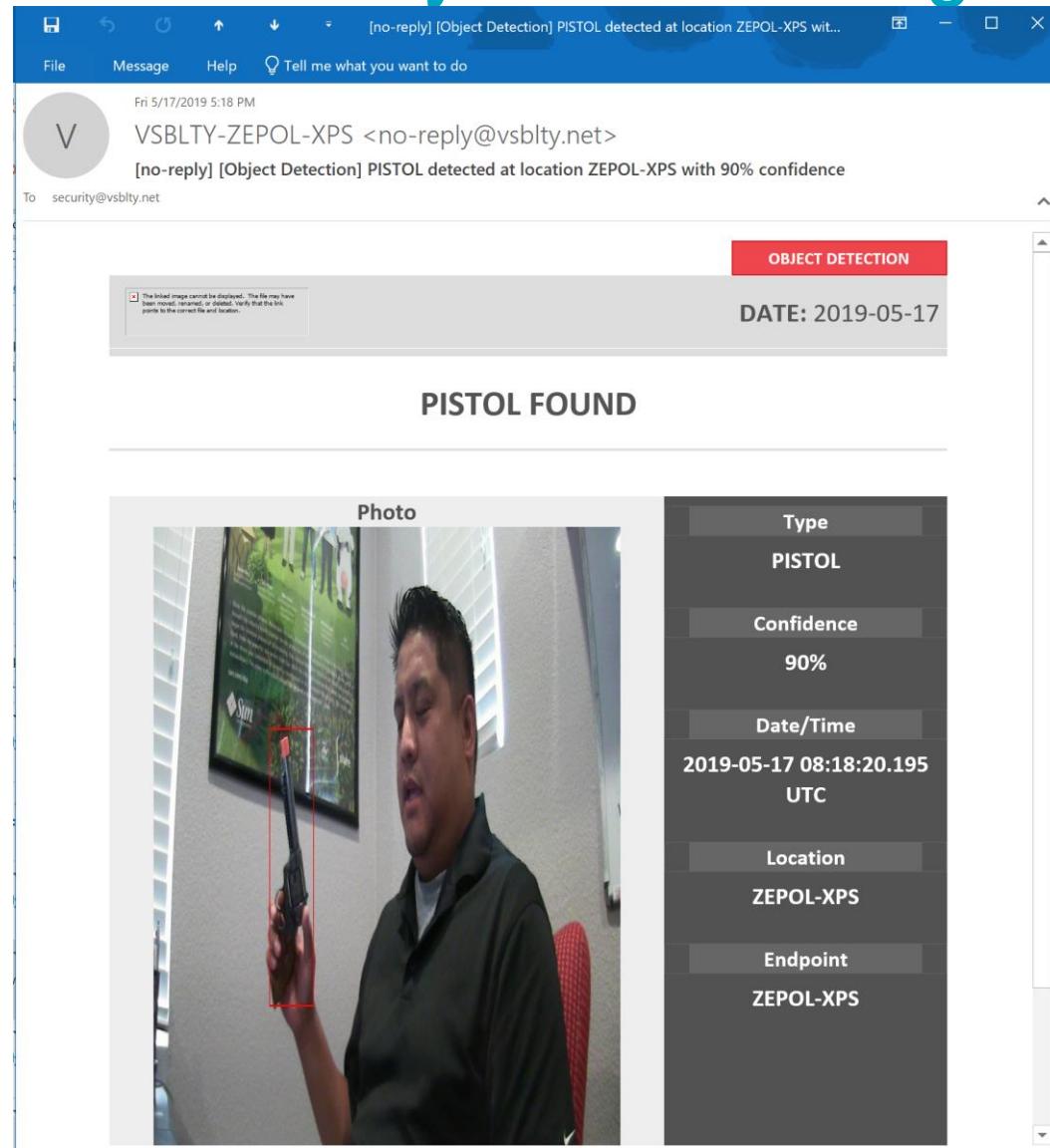
TOTAL BRAND ENTICEMENT	TOTAL BRAND ENGAGEMENT	TOTAL BRAND INTERACTIONS	TOTAL BRAND IMPRESSIONS	INTERACTIONS TO ENGAGEMENT	AVERAGE DWELL TIME		
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Male	Female	-20	21-30	31-40	41-50	51-60	60+
48%	52%	0.04%	6.5%	43.7%	44.4%	4.7%	0.02%

Demo

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VSBLYT: Security Email Alerting



VSBLTY Roadmap

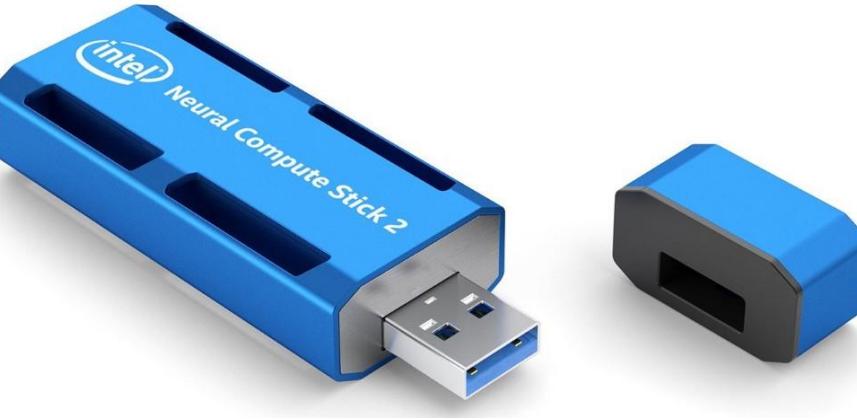
Open Vino w/ VPU



Nvidia Jetson Nano



Dragonboard 410c



Raspberry Pi



Google Coral dev board and stick

Boot time

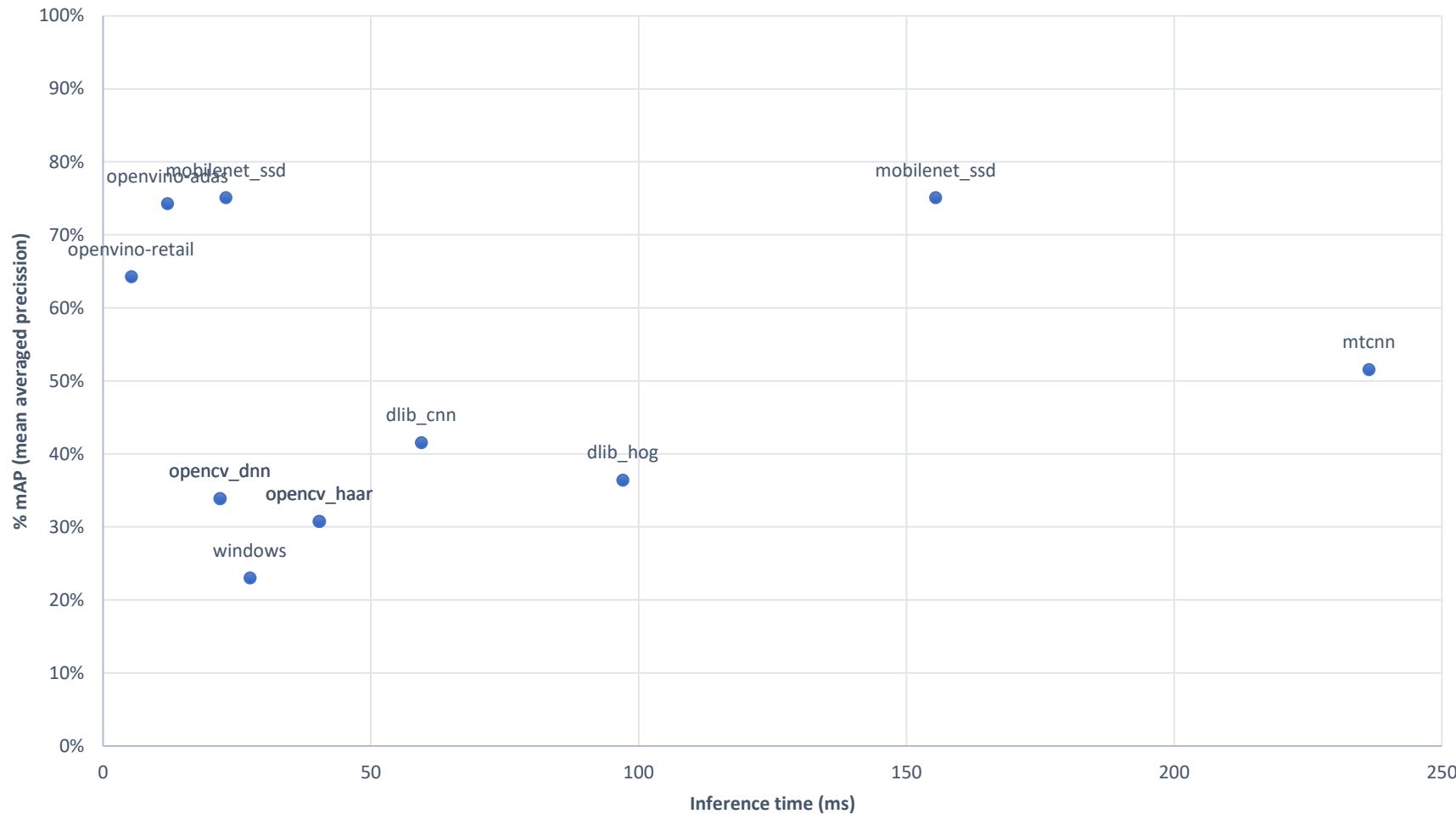
Windows 10 IoT Core

00:02:42,28

Raspbian Linux

00:00:18,63

Performance Comparison – Face Detection



In this benchmark OpenVINO outperforms Windows Face Detection in both speed and accuracy

Summary

InterKnowlogy: 20 year old High end custom app dev company. Service Company / Project work

Experts in intel Open Vino. Real Engineers; experts at building enterprise grade software on the cutting edge. AI->ML->computer vision. AR/MR

VSLTY: publicly traded ISV with a suite of computer vision products built on OpenVino. SAAS licensed. Interactive Digital Signage with audience measurement and analytics.

Intel OpenVino: powerful, the computer edge, free, no significant competition

Intel OpenVino: tied to the metal. They go fast. The future of computer vision on open vino will be shocking....truly “make a blind man see” type of stuff.



Tim Huckaby



More info on InterKnowlogy:

- www.InterKnowlogy.com
- <http://ikeurope.com/>
- www.vimeo.com/InterKnowlogy

More info on VSBLY:

- www.VSBLY.net

About Tim Huckaby...

- Founder/Chairman, InterKnowlogy,
- Founder/CTO, VSBLY
- Microsoft® Global Regional Director
- Microsoft® MVP – Artificial Intelligence
- Author & Speaker

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LinkedIn:

<http://www.linkedin.com/in/timhuckaby>

Twitter: @TimHuckaby

thank you

for more information please contact info@interknowlogy.com