From Research to "Reality"

Real-time Video Analytics and Alerting Using Deep Learning

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AIMS Data Science Workshop - April 2018

Overview

- Why start a data science company in Africa?
- Image recognition - timing
- Getting started - prototyping
- Encountering the "real world"
- DeepAlert today
- Live demos
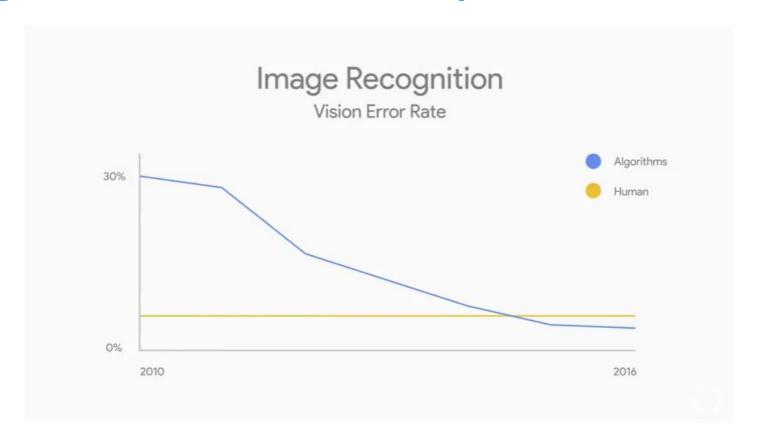- Complex decision making - the next level of AI?
- Questions

Deep Data

www.deepdata.works

Powerful technology. Positive impact.

Algorithms exceed human performance

Image Recognition
Vision Error Rate

- Algorithms
- Human

30%

0%

2010   2016

If a camera could tell you what it was seeing in real-time…

What could be done with that… in the real world?

Getting started

DeepAlert

Always Looking Out For You

Deep Data (Pty) Ltd

Towards global scale real-time alerting

Alerting that is useful, timely, relevant, responsible

Strong machine learning focus

(also IoT, cloud, HPC, etc.)

Alert on Trolley Pushers
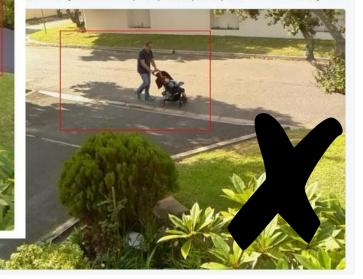# Not Dog Walkers or Prams

DeepAlert

Deep Alert @deepalertsystem · 47m
KCW-002 thinks this could be a trolley pusher (75.1%) at 08h05:53 on 19 May 2016

Deep Alert @deepalertsystem · 34m
KCW-002 is fairly sure this is a dogwalker (95.0%) at 16h26:28 on 9 May 2016

Alert @deepalertsystem · 2h
002 is fairly sure this is a pram pusher (94.9%) at 12h13:52 on 9 May 2016

Applications

DeepAlert

Security

Wildlife protect

Occup. health & safety
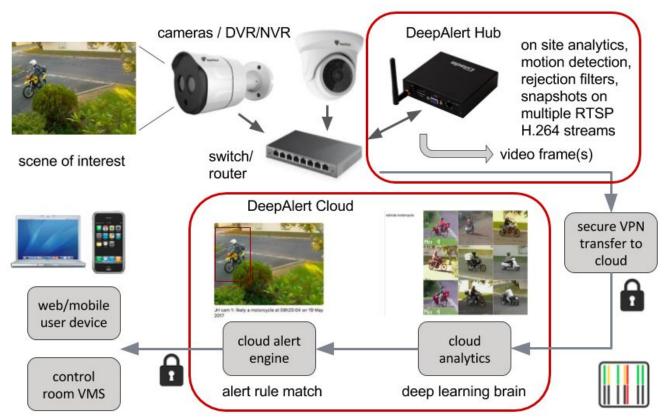
Production monitoring

Smart cities

Forest fires alerts

etc, etc.
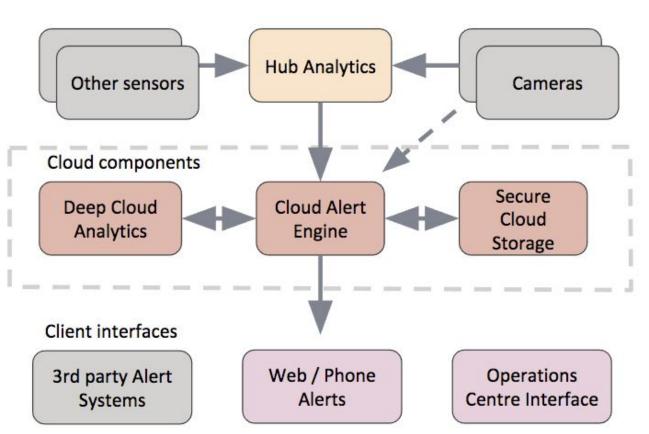

(if a human can look at a scene and want to know something useful about it, we can pretty much train up the system to alert on that)

DeepAlert

cameras / DVR/NVR

scene of interest

switch/ router

DeepAlert Hub

on site analytics, motion detection, rejection filters, snapshots on multiple RTSP H.264 streams

video frame(s)

secure VPN transfer to cloud

web/mobile user device

control room VMS

DeepAlert Cloud

JH cam 1: likely a motorcycle at 08h25:04 on 19 May 2017

vehicle motorcycle

cloud alert engine

cloud analytics

alert rule match

deep learning brain

Scene Understanding

DeepAlert

Targeted Alerting

DeepAlert

Deep Alert @deepalertsystem · 2h
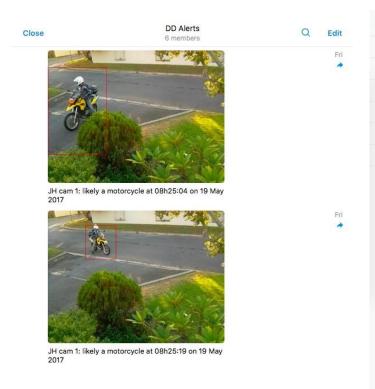KCW-001 is fairly sure this is a load and offload activity (94.1%) at 12h16:51 on 9 May 2016

JH cam 1: likely people activity (person carrying something big?) at 08h06:51 on 25 May 2017
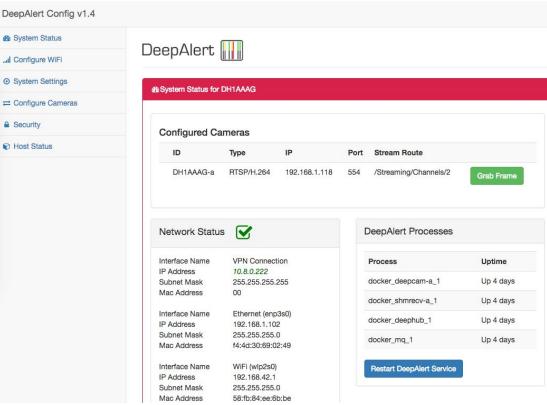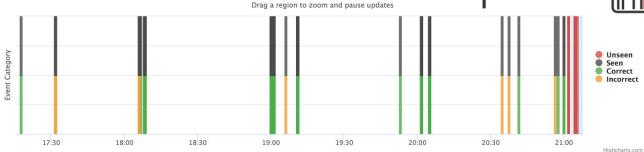
Web and Mobile Interfaces

DeepAlert

DD Alerts
6 members

Close | Edit

Fri

JH cam 1: likely a motorcycle at 08h25:04 on 19 May 2017

Fri

JH cam 1: likely a motorcycle at 08h25:19 on 19 May 2017

DeepAlert Config v1.4

DeepAlert

- System Status
- Configure WiFi
- System Settings
- Configure Cameras
- Security
- Host Status

System Status for DH1AAAG

Configured Cameras

ID	Type	IP	Port	Stream Route	
DH1AAAG-a	RTSP/H.264	192.168.1.118	554	/Streaming/Channels/2	Grab Frame

Network Status ✔

Interface Name	VPN Connection
IP Address	10.8.0.222
Subnet Mask	255.255.255.255
Mac Address	00
Interface Name	Ethernet (enp3s0)
IP Address	192.168.1.102
Subnet Mask	255.255.255.0
Mac Address	f4:4d:30:69:02:49
Interface Name	WiFi (wlp2s0)
IP Address	192.168.42.1
Subnet Mask	255.255.255.0
Mac Address	58:fb:84:ee:6b:be

DeepAlert Processes

Process	Uptime
docker_deepcam-a_1	Up 4 days
docker_shmrecv-a_1	Up 4 days
docker_deephub_1	Up 4 days
docker_mq_1	Up 4 days

Restart DeepAlert Service

DeepAlert

Event Timeline
Drag a region to zoom and pause updates

Event Category

- Unseen
- Seen
- Correct
- Incorrect

17:30 18:00 18:30 19:00 19:30 20:00 20:30 21:00

Highcharts.com

Showing events from 1/17/2017, 7:15:27 PM to 1/17/2017, 11:07:39 PM. (Updated: Tue Jan 17 19:06:49 2017)

Event Review (7 unreviewed events in this session)

Mon Site 6: likely people activity (person?) at 19h03:00 on 22 Jan 2017

📷 Mon Site 6

17-01-2017 Tue 21:04:59

👍 Mark as Correct 👎 Mark as Incorrect 🚫 Ignore Always

🔔 Event List

👤 **likely people activity (person?)**
a minute ago (demo - reviewing)

👤 **perhaps people activity**
a minute ago (Reviewer unknown)

👤 **perhaps people activity**
a minute ago (Reviewer unknown)

👤 **perhaps people activity (person?)**
2 minutes ago (Reviewer unknown)

👤 **likely people activity (person?)**
4 minutes ago (Reviewer unknown)

👤 **perhaps people activity (person?)**
4 minutes ago (Reviewer unknown)

👤 **likely people activity (trolley pusher?)**
4 minutes ago (Reviewer unknown)

👤 **perhaps people activity**
6 minutes ago (ws7)

👤 **perhaps people activity**
6 minutes ago (ws7)

people.person

DeepAlert

people.carrying-big

DeepAlert

people.group

DeepAlert

people.pram

DeepAlert

people.trolley

DeepAlert

vehicle.commercial

DeepAlert

vehicle.patrol

DeepAlert

vehicle.trailer
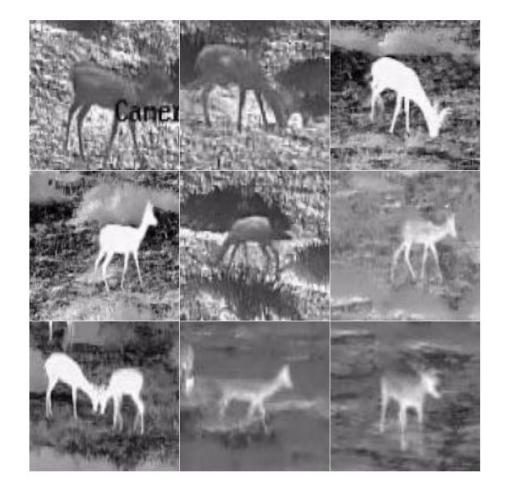
DeepAlert

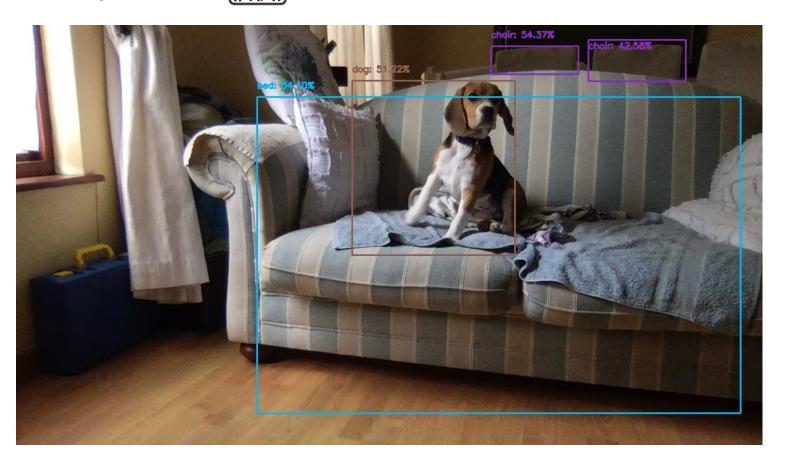animal.horse

DeepAlert

animal.buck

DeepAlert

What about busy scenes?

Full Scene Analysis (object detection)

Live Demos

Questions?

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