24/7 Intelligent Video Surveillance
Securing Your Business Data & Privacy!

Dr David E. Probert
VAZA International

Dedicated to Ethan, Alice, Hugh, Matthew, Abigail, Micah, Roscoe & Tatiana!

39th International East-West Security Conference

" 24/7 Intelligent Video Surveillance "
- *Securing Your Business Data & Privacy!* -
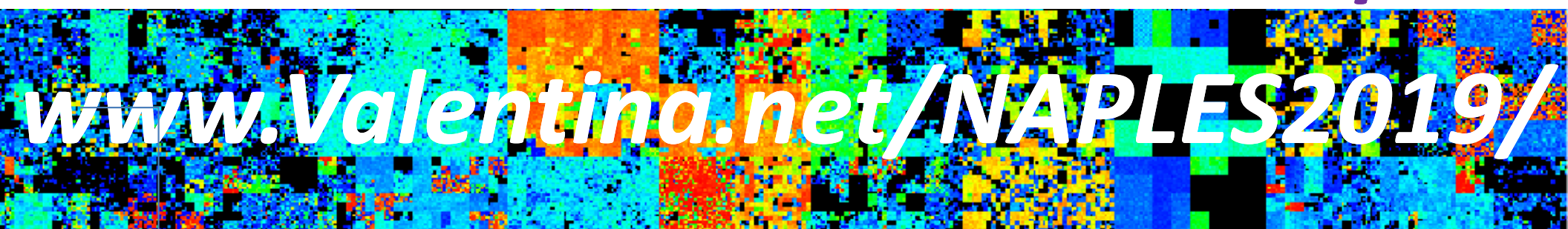Naples, Italy – 3rd/4th June 2019
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24/7 **Интеллектуальное**

видеонаблюдение...

AI Видеоаналитика и биометрия!

www.Valentina.net/NAPLES2019/

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Cyber Trilogy: FinTech, Surveillance & 2020s!

Theme (1) - 21stC Trends in FinTech Security: AI. Deep Learning & Blockchain!...

21stC Trends in FinTech Security
- AI, Deep Learning & Blockchain! -
Dr David E. Probert
VAZA International

- Review of Fintech Sector – Technology & Market Innovation
- Mitigation of Cyber Attacks with AI, Machine & Deep Learning
- Using Blockchains & Big Data to Secure FinTech Transactions

"Cyber Strategies for FinTech Business"   4th June: 9:45 – 10:30

Theme (2) – Intelligent Video Surveillance: Securing Your Business Data & Privacy!...

24/7 Intelligent Video Surveillance
Securing Your Business Data & Privacy!
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- 21stC Cyber Landscape for Business & Government Video Surveillance
- New Surveillance Tools using Intelligent Video Analytics & Biometrics
- Case Studies of Sector Surveillance: Transport, Retail, Culture, Defence...

"Cyber Surveillance for OUR Society "   4th June: 12:15 – 13:00

Theme (3) – Effective CyberSecurity for 2020s: Real-Time Analytics & Modelling!...

Effective CyberSecurity for 2020s
- Intelligent Analytics & Modelling -
Dr David E. Probert
VAZA International

- Understanding and Mapping Worldwide Cyber Threats
- Exploring Intelligent Cyber Tools & Real-Time Analytics
- Discussion of CyberSecurity Scenarios for **2020 s** & Beyond !...

"CyberVisions for Intelligent Security"   4th June: 14:30 – 15:15

Download: www.valentina.net/NAPLES2019/

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CyberSecurity
www.VAZA.com
VAZA

Intelligent **Video** Surveillance!...

|		
1 – 21stC Background Perspectives **"Video Intelligence"**	**2 – Smart Cities & Event Surveillance** **"Crowded Places"**	**3 – Case Studies: Recent Events** **"Urban Terrorism"**
4 – Integrated Video & Cyber Tools **"Cyber Convergence"**	**5 – Advanced Cyber Analysis Tools** **"AI Video Analytics"**	**6 – Biometric & Behaviour Profiles** **"Cyber Biometrics"**
7 – Cyber Surveillance Economics! **"Surveillance Capitalism"**	**8 – 21stC Business Data & Privacy** **"Adaptive Data Mining"**	**9 – YOUR Security & Surveillance!** **"YOUR Business Plan"**
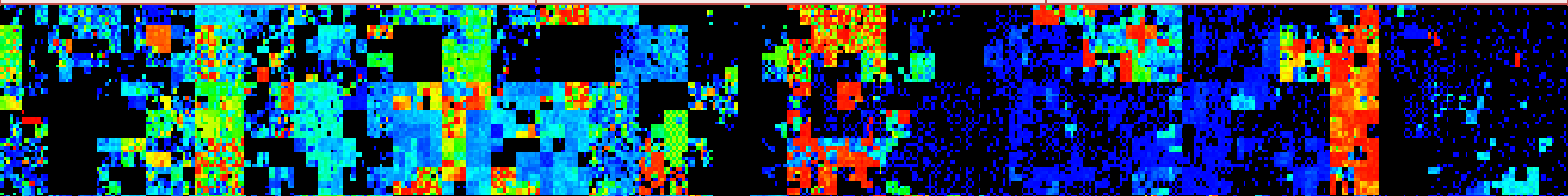
Intelligent **Video** Surveillance!...
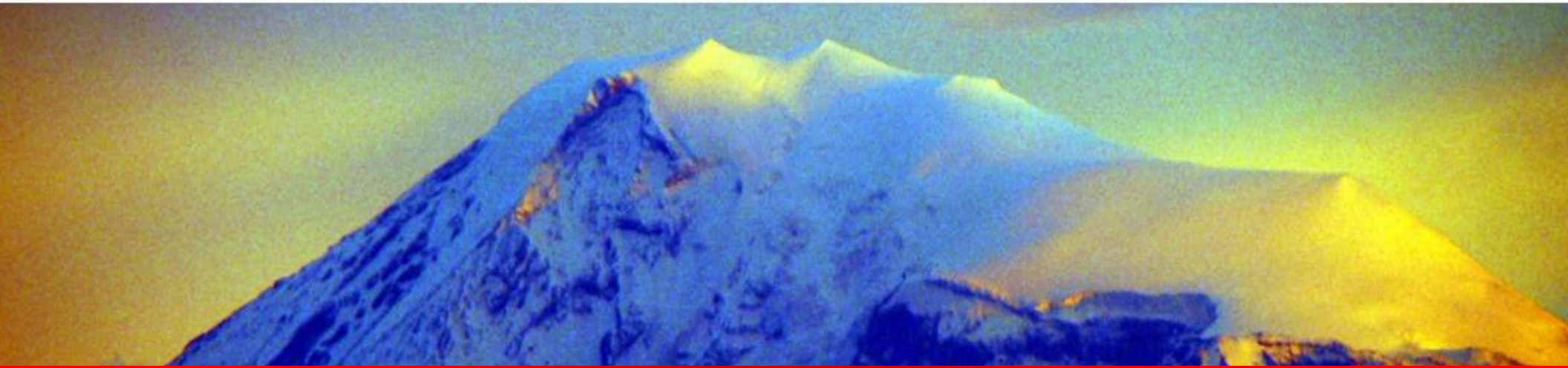
1 – 21stC Background Perspectives
"Video Intelligence"
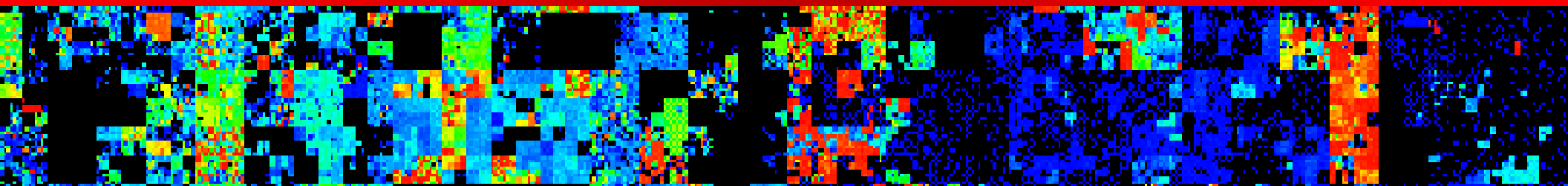
From *1970s* Cinema to *2020s* Video!

1280*720P HD
Mini DV camera

15MM FPC

Micro SD card slot
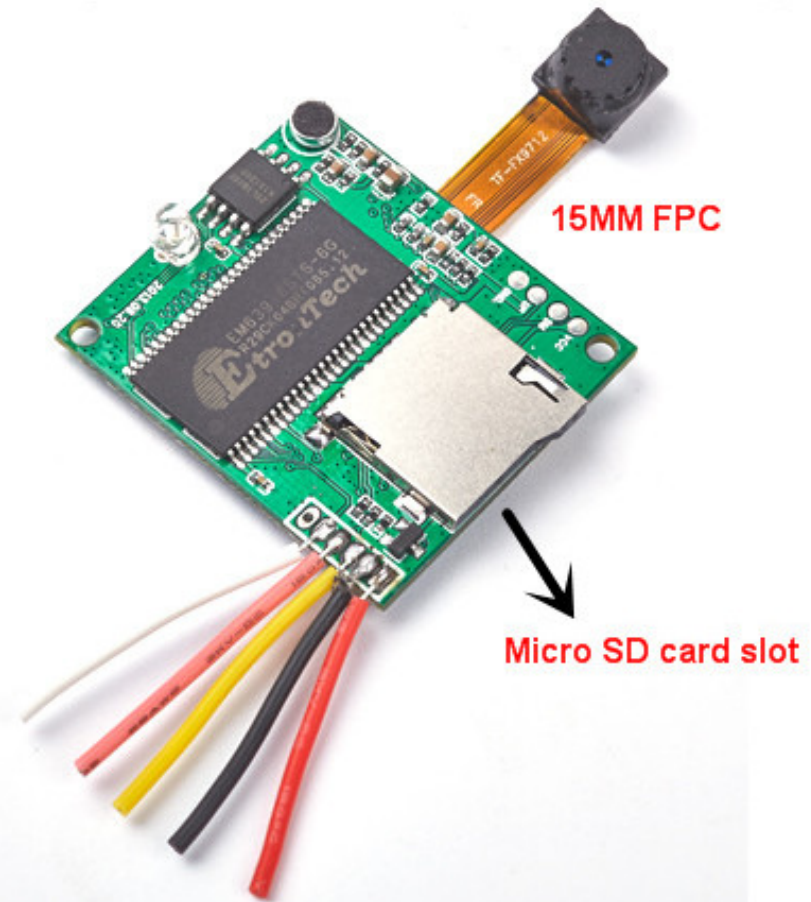
www.szfxt.com.cn

From *20ᵗʰC* CCTV to *21ˢᵗC* Intelligent Video!

- **Integration** of Physical CCTV and Cyber Security

- **Migration** from CCTV recorded on Tape/DVD to Real-Time 24/7 Video Analytics in the "Cloud"

- **Artificial Intelligence** (AI) & Deep Learning (Neural Nets) for Intelligent Video Surveillance

- **Digital Biometrics** (Retina, Facial, Vein, Fingers) now also integrated with Video Surveillance

…This talk will discuss all these Technologies & Trends for Intelligent 21ˢᵗC Video Surveillance!…

From *20ᵗʰC* CCTV to *21ˢᵗC* Intelligent Video!
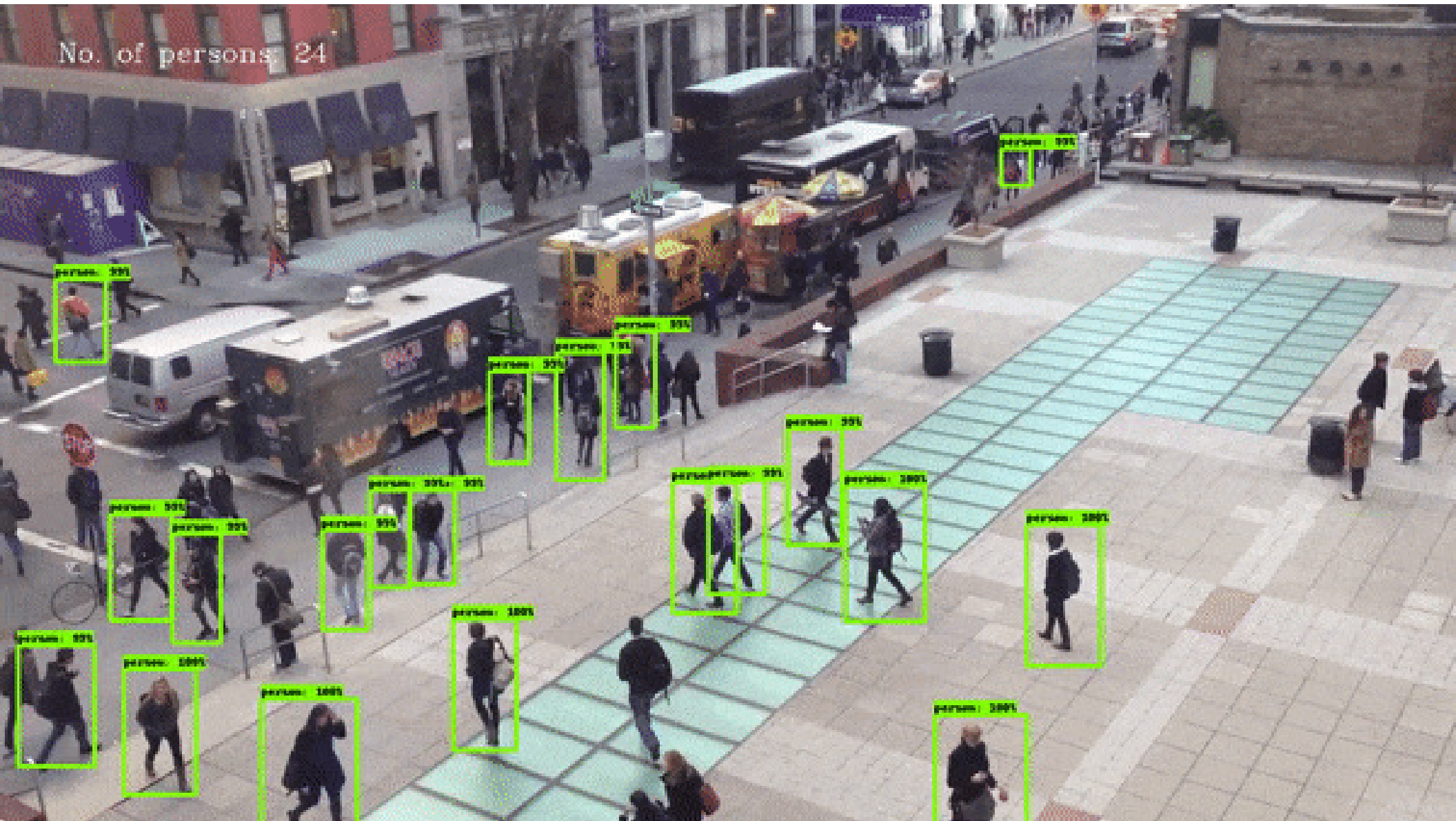
Intelligent Interactive Video Billboards!

WE'RE WATCHING YOU

Ocean Outdoor & M&C Saatchi have been Trialling **Interactive Billboards** in **UK**

Intelligent Interactive Video Billboards!

Interactive Billboards use Video Cameras to Estimate *Gender, Age & Mood* and then Display Relevant Advertisement!...

Ocean Outdoor & M&C Saatchi have been Trialling **Interactive Billboards** in **UK**

Intelligent Interactive Video Billboards!

Quividi: Intelligent Video Facial Analytics - *Age, Gender & Mood* **in "Crowded Places"**

Intelligent Interactive Video Billboards!

GENDER: FEMALE
ADULT
MOOD: 😊

GENDER: MALE
YOUNG
MOOD: 😔

GENDER: FEMALE
ADULT
MOOD: 😐

GENDER: MALE
ADULT
MOOD: 😔

GENDER: MALE
ADULT
MOOD: 😐

GENDER: FEMALE
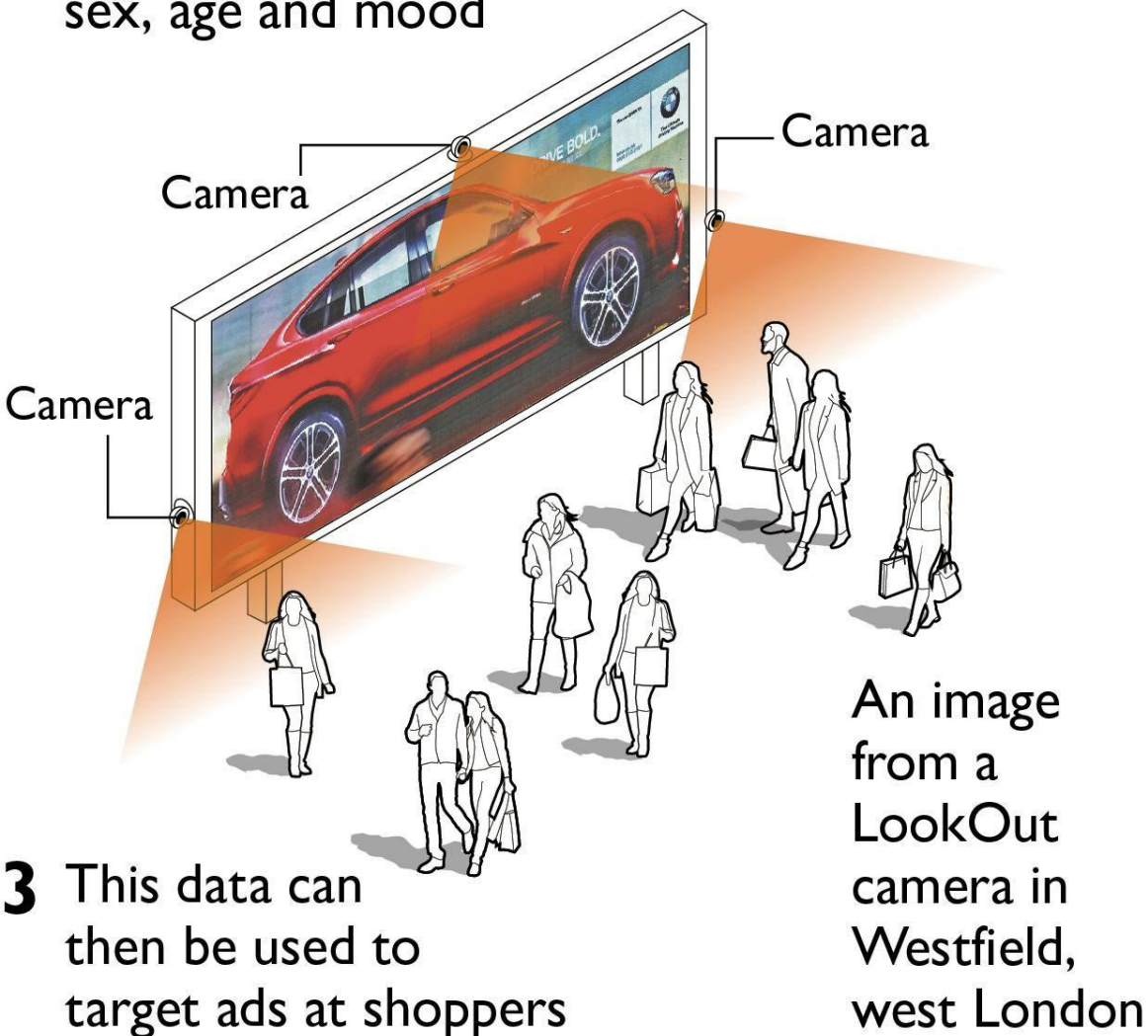ADULT
MOOD: 😔

GENDER: FEMALE
SENIOR
MOOD: 😔

Quividi: Intelligent Video Facial Analytics - *Age, Gender & Mood* in "Crowded Places"
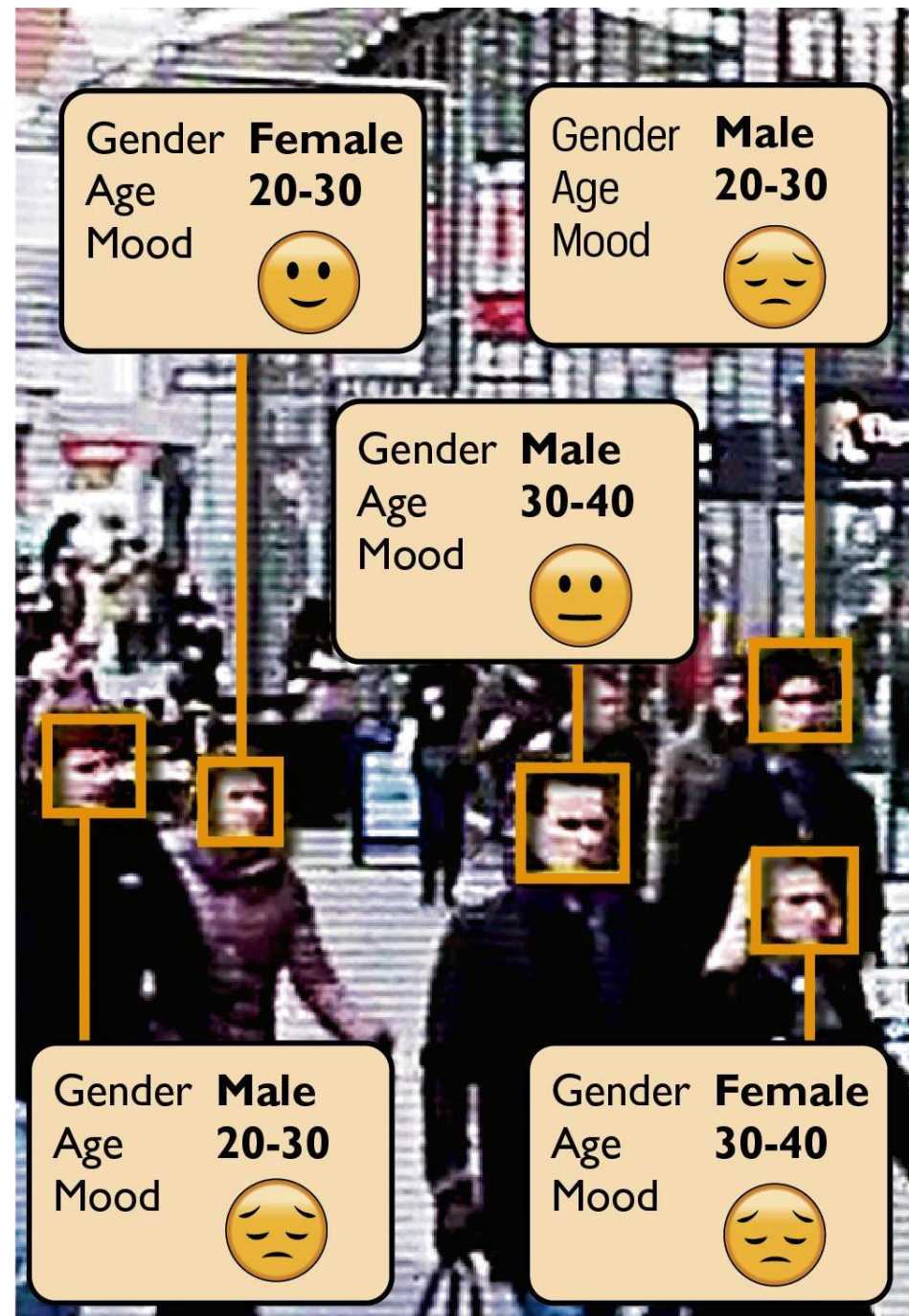
SPYING BILLBOARDS

The ads that change to appeal to passers-by

1 Three cameras give the billboard eyes

2 The cameras identify people's sex, age and mood

Camera
Camera
Camera

3 This data can then be used to target ads at shoppers

An image from a LookOut camera in Westfield, west London

Gender	**Female**
Age	**20-30**
Mood	🙂

Gender	**Male**
Age	**20-30**
Mood	😔

Gender	**Male**
Age	**30-40**
Mood	😐

Gender	**Male**
Age	**20-30**
Mood	😔

Gender	**Female**
Age	**30-40**
Mood	😔

Source: Ocean Outdoor/Sunday Times

Video Billboards: Sunday Times – April 2019
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1st Internet Video Conference: Nov 1994
Moscow (ИКИ РАН) to Washington (NASA)

1st Internet Video Conference: Nov 1994
Moscow (ИКИ РАН) to Washington (NASA)

1ˢᵗ Internet Video Conference: Nov 1994
Moscow (ИКИ РАН) to Washington (NASA)

1st Internet Video Conference: Nov 1994

Internet MBONE = "MultiCast BackBone"
Институт космических исследований
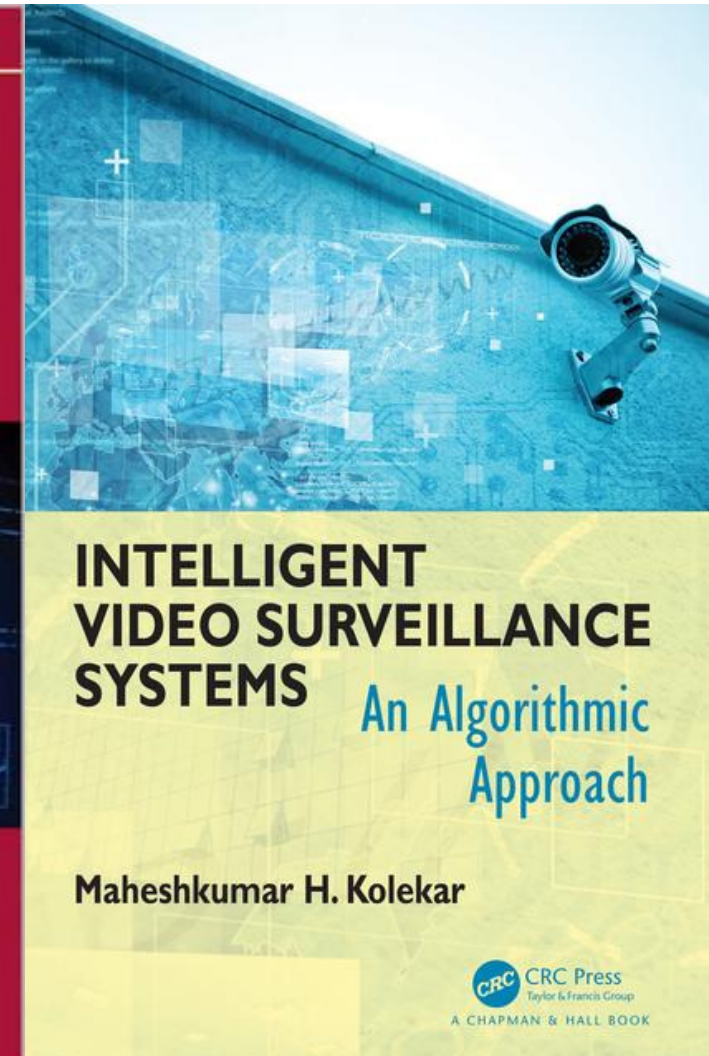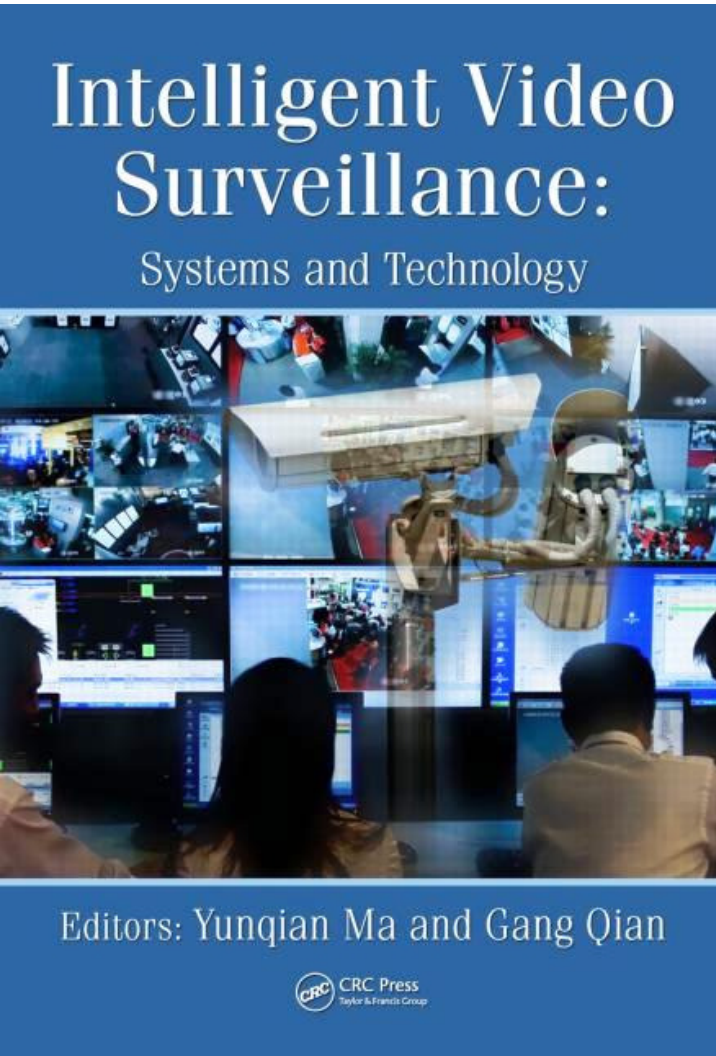* Monday 28th November 1994 - 22:00 *

IKI - Institute of Space Science–22:00
RAS-Russian Academy of Sciences
NASA - Washington DC, USA – 14:00
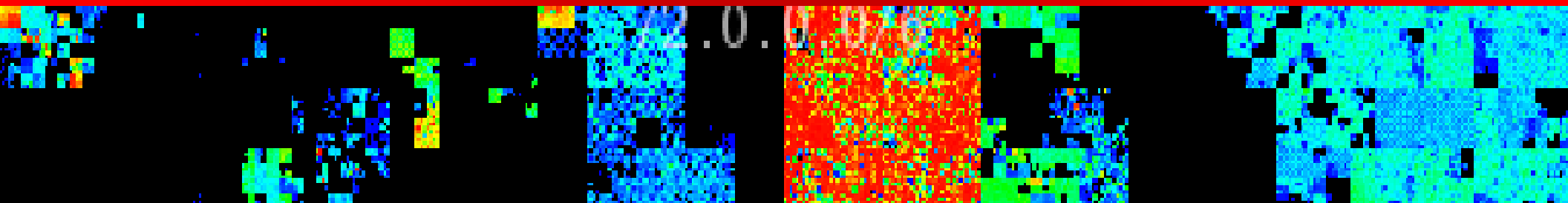
Recent Professional Publications
"Intelligent Video Surveillance"

Intelligent Video Surveillance: Systems and Technology

Editors: Yunqian Ma and Gang Qian

CRC Press
Taylor & Francis Group

NETWORKS AND TELECOMMUNICATIONS SERIES

Intelligent Video Surveillance Systems

Edited by Jean-Yves Dufour

iSTE

WILEY

INTELLIGENT VIDEO SURVEILLANCE SYSTEMS
An Algorithmic Approach

Maheshkumar H. Kolekar

CRC Press
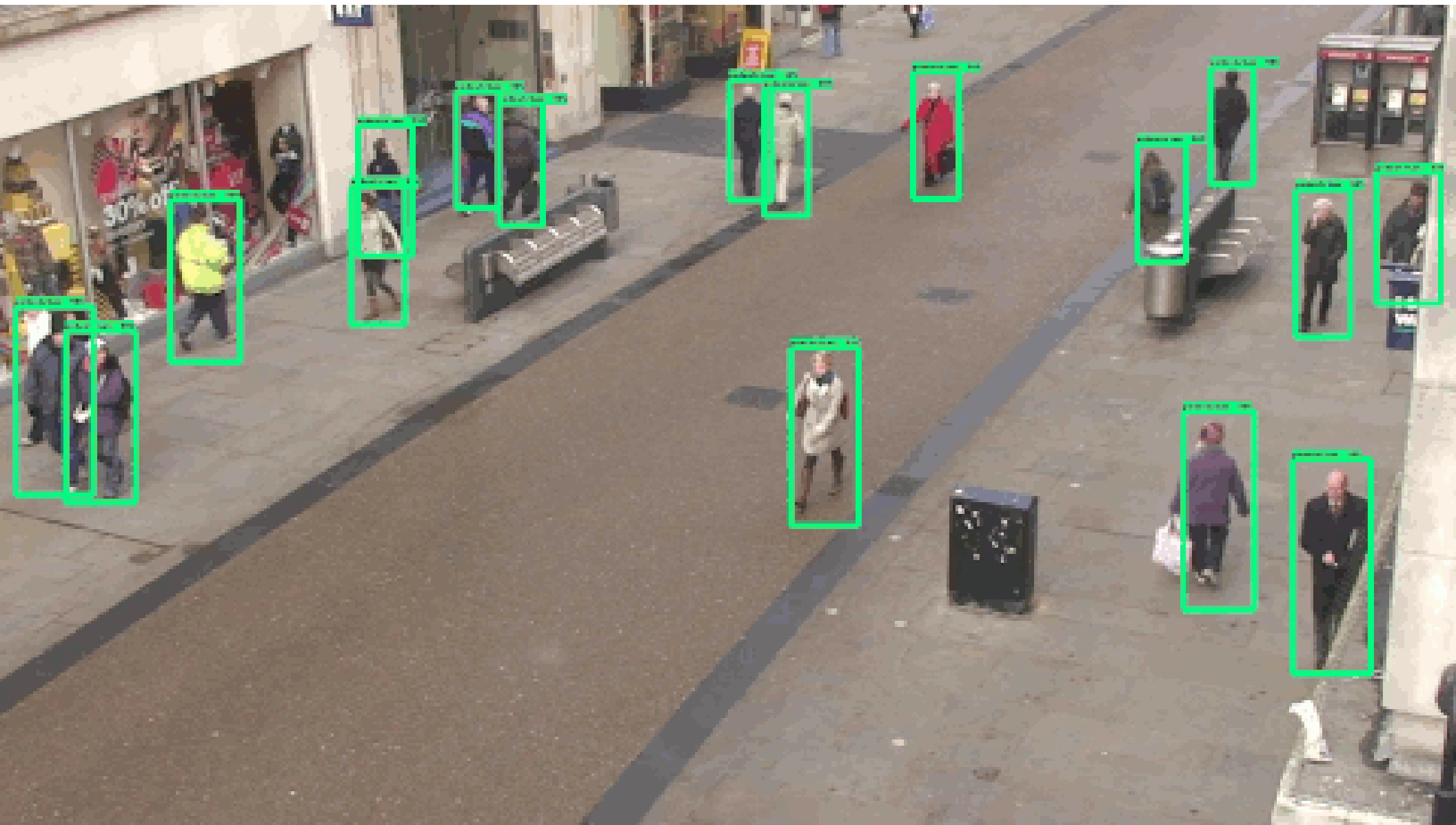Taylor & Francis Group
A CHAPMAN & HALL BOOK

Intelligent **Video** Surveillance!...

2 – **Smart** Cities & Event **Surveillance!**

"Crowded Places"

Video Analytics in "Crowded Places"

Video Analytics in "Crowded Places"

Panasonic Genetec: FacePro Face Recognition
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UK National **Counter-Terrorism Security** Office – **NaCTSO**
"Crowded Places": *Examples*

- Theatres & Concert Halls
- Transportation Hubs
- Sports Events & Stadiums
- Schools & College Campus
- Retail Shopping Malls
- Hospitals & Healthcare
- Places of Worship
- Resorts & Theme Parks

UK National Counter-Terrorism Security Office – NaCTSO

Crowded Places Guidance

See the latest guidance for your sector. Click on your sector to begin:

- NIGHT-TIME ECONOMY
- CINEMAS AND THEATRES
- STADIA AND ARENAS
- RETAIL
- HEALTH
- EDUCATION
- PLACES OF WORSHIP
- HOTELS AND RESTAURANTS
- MAJOR EVENTS
- VISITOR ATTRACTIONS
- COMMERCIAL CENTRES
- TRANSPORT

@ www.gov.uk/government/publications/crowded-places-guidance

NaCTSO
National Counter Terrorism Security Office

COUNTER TERRORISM POLICING

Planning considerations for each attack type to support an evacuation/invacuation/lockdown

Appendix C: Attack type

Click on an attack type to read the factors for consideration when planning or instigating an evacuation, invacuation to a protected space or lockdown. Actions should be reasonable, necessary and proportionate based upon the risk.

- FIREARMS AND WEAPONS ATTACK
- VEHICLE AS A WEAPON
- PBIED
- IED
- VBIED – NON PEN
- VBIED – PENETRATIVE
- BOMB THREAT
- CBRN
- UVIED
- POSTAL IED

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"Crowded Places": Security Defences

- Intelligent Video Surveillance & AI Analytics
- Biometric Technologies & Facial/Retina ID
- Intelligent Perimeter Fencing (Fibre/Sensors)
- Secure Access Doors & Gates with Video Link
- Scanning Devices for Malicious Assets - CBRN
- Real-Time Command & Control Centre Team
- Converged Dashboard: Physical & Cyber Feeds
- Active Intelligent Aerial Video Drone Surveillance

....Effective $ecurity for "Crowded Places" requires $$$ Investment in $ecurity $kills & $olutions!....

Intelligent Video Surveillance!...

3- Case Studies: Recent Terror Events

"Urban Terrorism"
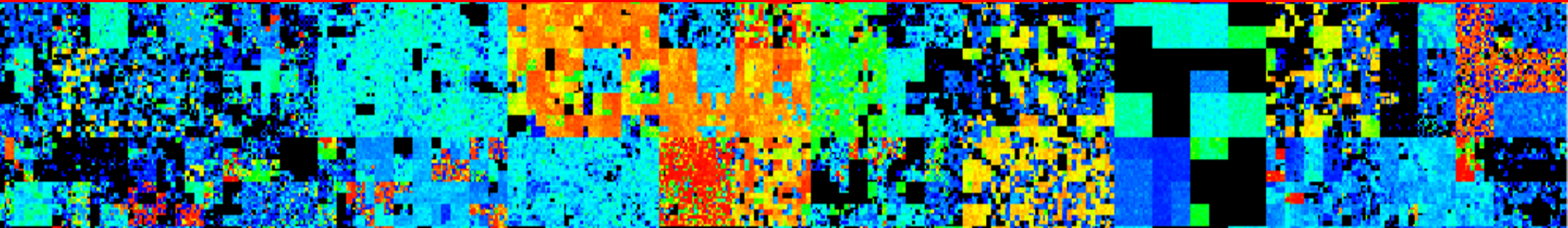
21ˢᵗC Warfare: "Urban Terrorism"

Terror attacks in Western Europe since 2012

Monday
Manchester concert bombing
at least
22 killed

March 22, 2016
Multiple attacks in Brussels
35

Dec. 19, 2016
Christmas market attack in Berlin
12

Nov. 13, 2015
Multiple attacks in Paris
130

July 22, 2016
Shopping mall attack in Munich
9

July 14, 2016
Nice Bastille Day attack
86
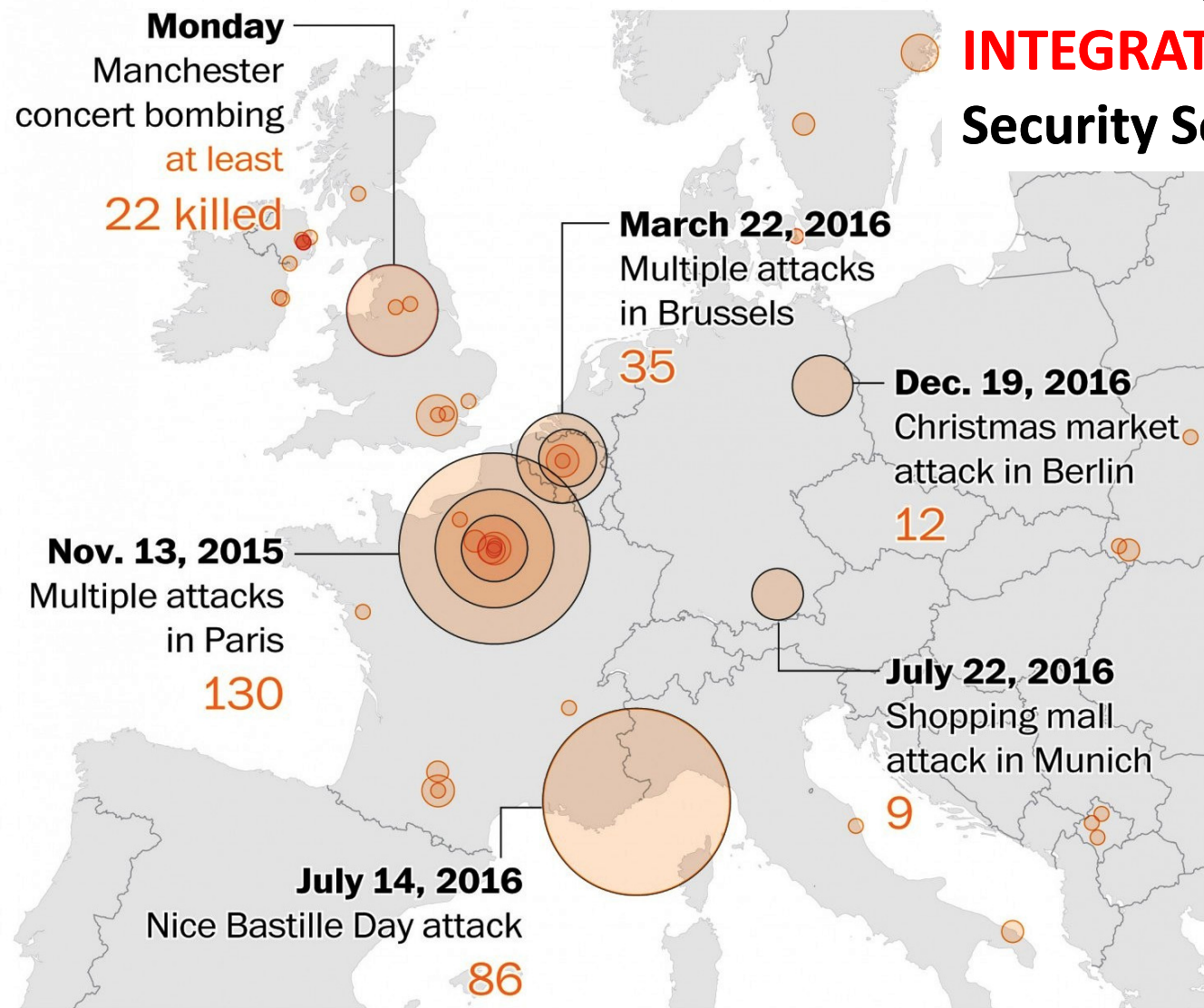
Source: IHS Jane's Terrorism and Insurgency Center

THE WASHINGTON POST

Defence against "Urban Terror" needs INTEGRATION of PHYSICAL & CYBER Security Solutions = SMART SECURITY

"Bad Guys" use Cyber Tools & Resources to extensively Research & Launch Major Physical Terror Attacks!

(1) **DarkWeb** for **Weapons!**
(2) **Research** Urban Targets
(3) **Social Media** for Comms
(4) **Recruitment** & Training
(5) **Ransomware** for CA$H..

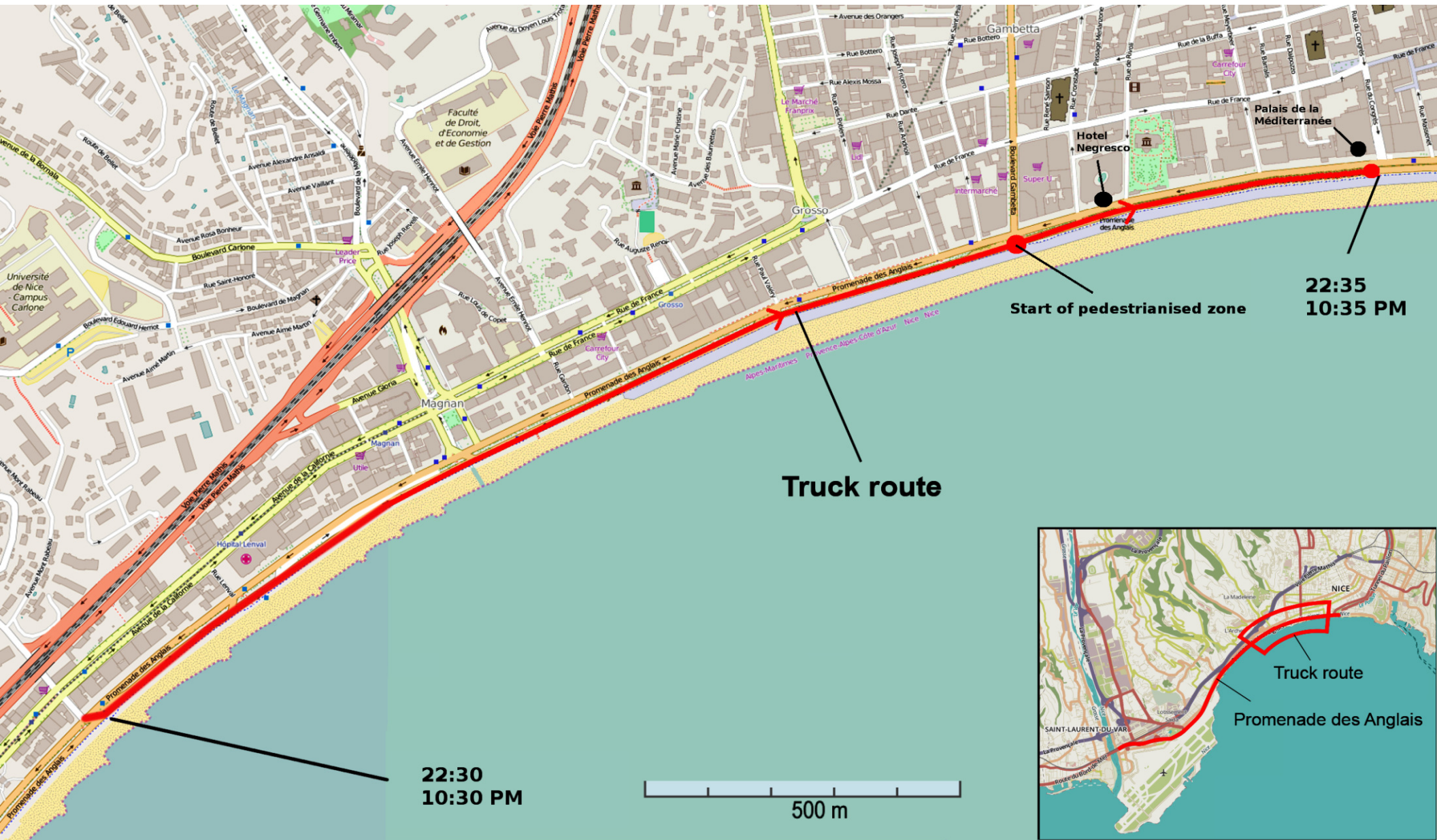# Nice Truck Terror Attack: 14th July 2016

Palais de la Méditerranée

Hotel Negresco

22:35
10:35 PM

Start of pedestrianised zone

Truck route

22:30
10:30 PM

500 m

Truck route

Promenade des Anglais

NICE

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Nice Truck Terror Attack: 14th July 2016

NICE MATIN

ON THE PHONE
MARGARET BRENNAN
FOREIGN AFFAIRS CORRESPONDENT

TERROR ATTACK IN NICE
AT LEAST 75 DEAD, DOZENS INJURED
TRUCK RAMS CROWD; WAS CARRYING GUNS, GRENADES

CBSN

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Cyber Criminal Team Skillset!...

- Skills required by the **"Bad Guys"** to launch and manage major Cyber Crime Campaigns:

    - **ICT:** Cyber Technical Specialist (Hacking Tools)

    - **Finance:** Money Laundering & Campaign Budget

    - **HR-Human Resources:** Headhunting Cyber Talent!

    - **Intelligence:** Recruit "Insiders" in Business/Govt

    - **Project Management:** Co-ordinate Campaign!

    - **Security:** Detect "BackDoors" both in the Physical and Cyber Defences of the Target Business/Govt

    ...In summary, the **"Bad Guys"** will often organise themselves as an *Criminal Cell or Illegal Business*!

Recent Terror Events: *Case Studies*

- **Moscow** – Nord-Ost Theatre – October 2002

- **London** – Metro & Bus Attack – July 2005

- **Paris** – Charlie Hebdo Attack – Jan 2015

- **Tunisia** – Marhaba Hotel, Sousse – June 2015

- **Paris** – Bataclan Theatre – Nov 2015

- **Brussels** - Airport Attack – March 2016

- **London** – Westminster – March 2017/Aug 2018

- **Manchester** – Arena - June 2017

....**ALL** Cultural, Tourist & Transport Facilities are vulnerable to attack in **EVERY** City & Country!

Paris Terror Attack: *Charlie Hebdo-Nov2011*

Deadly attack on satirical French magazine

At least 11 people were killed and 10 injured in a shooting at the Paris offices of Charlie Hebdo, a magazine fire-bombed in November 2011 a day after it carried a caricature of the Prophet Muhammad

La Défense

Champs Élysées

Eiffel Tower

FINI DE RIRE!
CHARLIE HEBDO

At least two attackers seen firing Kalashnikov rifles

Paris
FRANCE

P A R I S

2km
1.25 miles

Source: Wire agencies

© GRAPHIC NEWS

Brussels Airport: *Terror Attack–March 2016*

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Terror Events: *1st Oct 2018 - Wiki*

Date	Type	Dead	Injured	Location	Details	Perpetrator	Part of
1	Suicide car bombing	2 (+1)	5	Mogadishu, Somalia	A suicide car bomber by the group Al-Shabaab struck a EU convoy carrying Italian soldiers in Somalia's capital Mogadishu, killing 2 civilians and injuring at least 5.[1][2]	Al-Shabaab	Somali Civil War
1	Shooting	3	4	Bosaso, Somalia	Islamic state attackers shot dead 3 Ethiopians and injured 4 in Bosaso town, the attackers fled the scene.[3][4]	Islamic State	Somali Civil War
1	Bombing	1	2	Kirkuk Governorate, Iraq	A bomb attack by Islamic State insurgents left an Iraqi Policeman dead and as well as 2 others injured in the oil rich province of Kirkuk,Iraq.[5]	Islamic State	Iraqi insurgency
1	Bombing	0	0	Hawija, Iraq	A group of Islamic State insurgents placed bombs and detonated them on an electricity pylon in Hawija district in Kirkuk, leaving Iraq's Hawija district in total darkness.[6]	Islamic State	Iraqi insurgency
1	Bombing	1	4	Baghdad, Iraq	Two sticky bombs detonated in a Baghdad neighborhood killing a person and leaving four others injured while destroying two vehicles.[7]	Islamic State	Iraqi insurgency
2	Suicide bombing	14 (+1)	**40**	Kama District, Afghanistan	A suicide bomber killed 14 people and injured around 40 at an election rally in the Kama district of the Nangarhar Province, the Islamic State claimed responsibility through Amaq.[8][9]	Islamic State	War in Afghanistan
2	Shooting, Bombing	3	8	Awaran District, Pakistan	Terrorists opened fire and bombed a convoy killing 3 Pakistani Security personnel and injuring 8 more at the Awaran District of Balochistan, Pakistan, no group has claimed responsibility although separatist groups have done similar attacks in that area in the past.[10][11]	Balochistan Liberation Army (suspected)	Insurgency in Balochistan

Terror Incidents: 1st to 14st Oct 2018 = 72

Terror Events: *Early Oct 2018 - Wiki*

9	Bombing	2	0	Mandera, Kenya	Two teachers were killed when Al-Shabaab hurled an improvised explosive device (IED) into one of the two blocks housing non-local teachers, during a a militant raid in the Mandera County.[63]	Al-Shabaab	Spillover of the Somali Civil War
9	Grenade attack	1	0	Dhale, Yemen	An newly-recruited Yemeni officer was killed by a grenade attack in the southern province of al-Dhalea when unknown militants threw a grenade toward his car.[64]	Al-Qaeda in the Arabian Peninsula (suspected)	Yemeni Civil War
10	Bombing	1	4	Tikrit, Iraq	A civilian was killed and another four were injured when a bomb went off behind a fuel station in Iraq's Tikrit city.[65]	Islamic State (suspected)	Iraqi insurgency
10-13	Shooting, Kidnappings, Bombings	37 (+58)	100+	Deir ez-Zor Governorate, Syria	Over a hundred people were kidnapped from a displacement camp by the Islamic State in the Deir ez-Zor Governorate, Syria, fighting between US backed Syrian Democratic Forces (SDF) and the Islamic State between October 10 and October 13 has resulted in 37 deaths of the SDF and at least 58 of the Islamic State.[66][67]	Islamic State	Syrian Civil War
10	Mortar attack	1	10	Latakia Governorate, Syria	Militants shelled with mortars several parts of the Latakia Governorate, Syria killing a person and injuring 10.[68]	Militants	Syrian Civil War
10	Shooting	8 (+48)	11	Lake Chad, Chad	Eight Chad soldiers were killed and at least eleven were injured in clashes with Boko Haram jihadists in the Lake Chad region, 48 Jihadists were allegedly killed afterwards in a counter-terrorism operation by Chad Soldiers.[69][70]	Boko Haram	Boko Haram insurgency
10	Shooting	10	0	Al Anbar Governorate, Iraq	At least 10 Iraqi security forces were killed when Islamic State insurgents attacked a gas field on the western part of the Anbar Province.[71]	Islamic State	Iraqi insurgency

Terror Incidents: 1st to 14th Oct 2018 = 72

Intelligent **Video** Surveillance!...

4 – Integrated Cyber & Video Dashboard
"Cyber Convergence"

Ship: HMT Ascanius – Devonport to Durban - 1917

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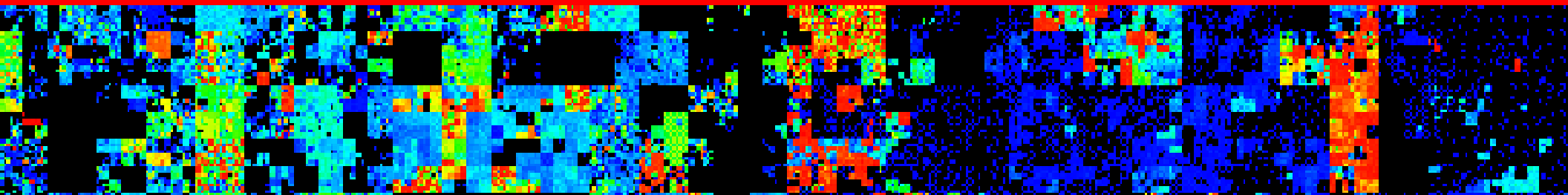Naples, Italy – 3ʳᵈ/4ᵗʰ June 2019
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Regional CCTV *Control & Surveillance*

CCTV Control Room Operators with Multiple Displays need Cyber Analysis Tools Including High Speed Video Analytics, Facial Recognition and Data Mining Tools

Integration of *Physical and Cybersecurity*

Integrated CSO-led Management Team – *Merged HQ Operations*

Physical Security & Video Operations   Cyber Security Operations

Shared
Alerts

Smart Security = *Virtual Integration*

Corporate CSO-led Security Team   Integrated Management,
                                                       Training, Standards, Plans
ONE – Dashboard!   *ONE – Architecture!*

Final phase of Cyber-Physical Integration - Embedded Intelligence in ALL Devices - Internet of Things

VIDSYS: Converged Cyber-Physical Security

www.vidsys.com : *New York Traffic Control Centre*

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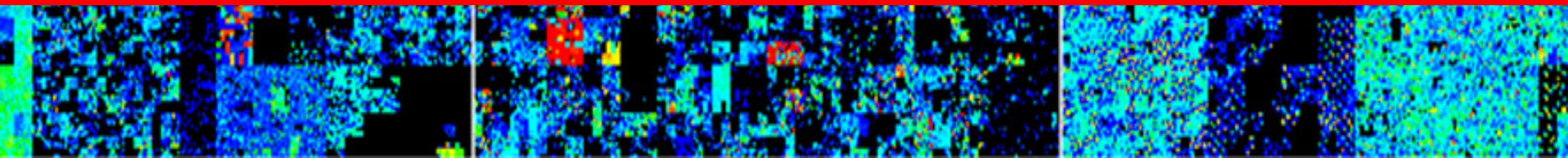
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Metro Surveillance: *Charing Cross, London*

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Real-Time Surveillance: *Transportation*

Intelligent **Video** Surveillance!...

5 – Advanced Cyber Analysis Tools
"AI Video Analytics"

Practical Applications of Artificial Intelligence & Big Data Analytics to Video Surveillance!...

- Target Tracking: Real-Time Multi-Camera Tracking through Facial & Behaviour Profiles

- AI Video Apps for Retail Store - Self-Check-Out

- Intelligent Big Data Search for Terror Networks

- AI Security Diagnostics for Satellite Images

- Smart Video Surveillance for "Crowded Places"

.....Integrated Multi-Source 24/7 Surveillance using Video, Mobile Financial & Bio-Profiles!...

.....& Chinese Unicorns: Sensetime & Megvii (Face++)

Practical Applications of Artificial Intelligence & Big Data Analytics to Video Surveillance!...

Artificial Intelligence & Deep Learning

VMS

Edge-based Video Analytics

ISP Intelligent Video Analytics: ips-analytics.com

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Artificial Intelligence & Deep Learning

Umbo Computer Vision – **Web: umbocv.ai**

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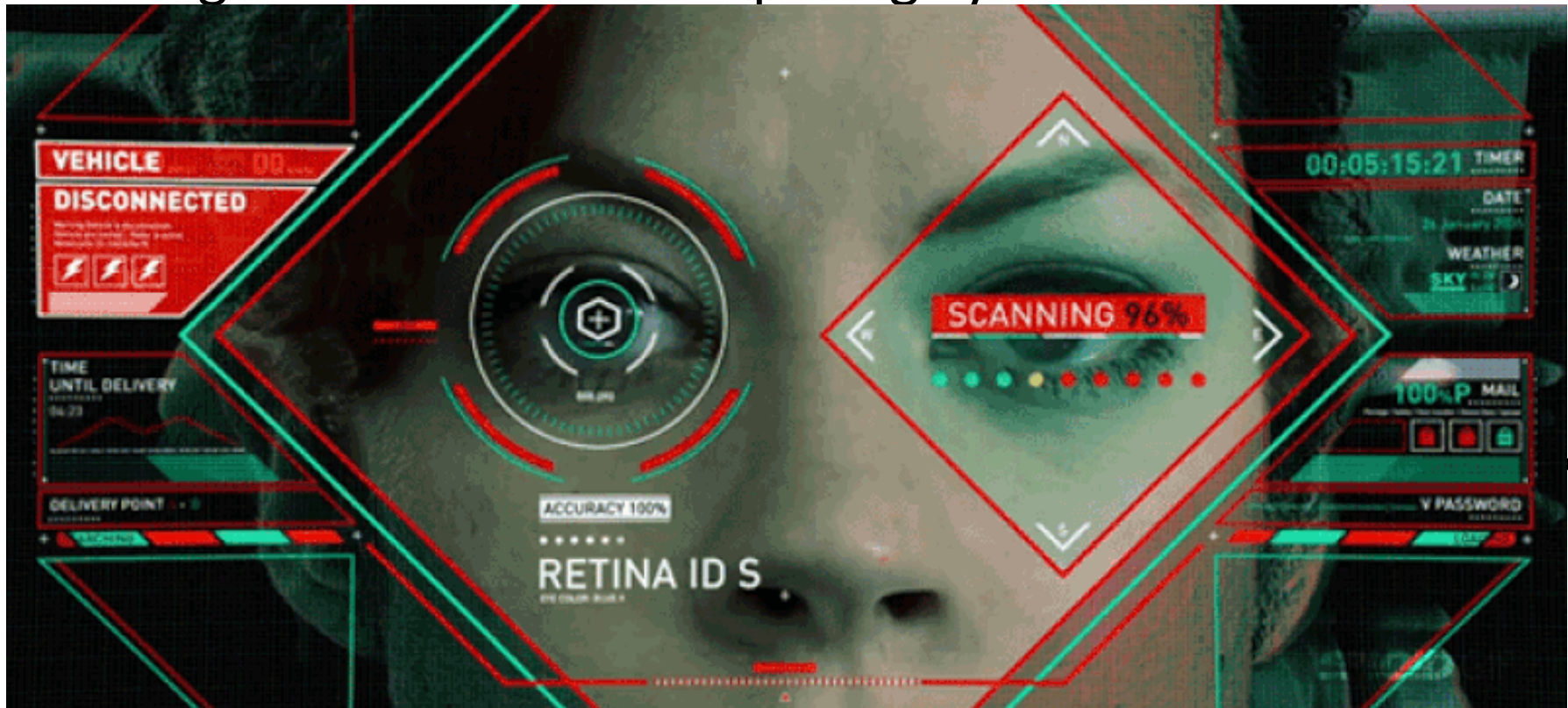© Dr David E. Probert : www.VAZA.com ©

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Artificial Intelligence & Deep Learning

Umbo Computer Vision – Web: **umbocv.ai**

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Artificial Intelligence & Deep Learning

(1) Traditional Intelligent Video Surveillance

(2) "Umbo Light" Computer Vision with Human Segmentation

Umbo Computer Vision – **Web: umbocv.ai**

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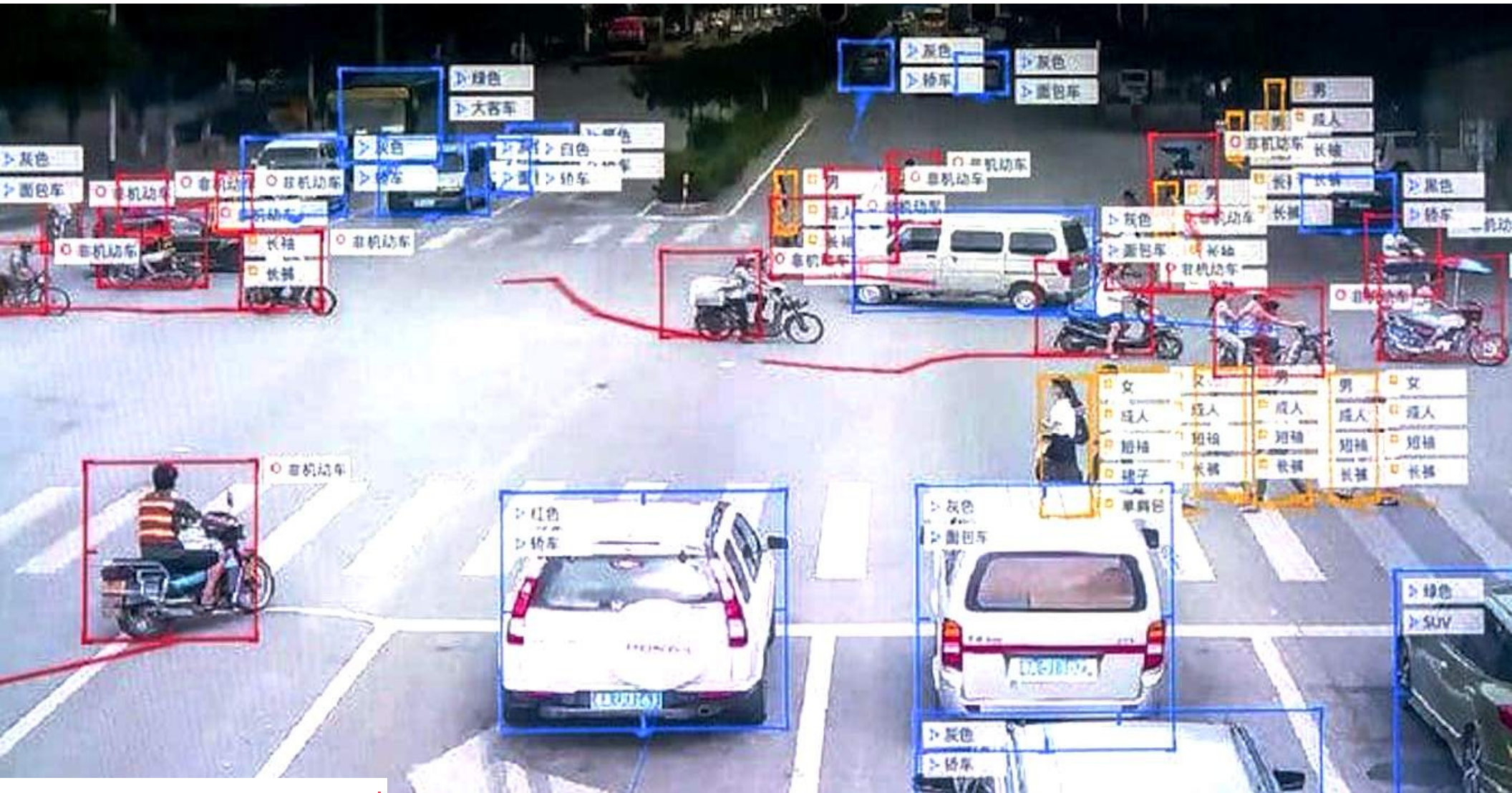© Dr David E. Probert : www.VAZA.com ©

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"Cyber" Tracking & Profiling: *"Bad Guys"*

- Mitigating Global Crime & Terrorism requires us to **Profile & Track** the "Bad Guys" in "Real-Time" with Intelligent Networked Computing Systems:

  - 3D AI Video Analytics from CCTV Facial Profiles
  - Track On-Line Social Media, eMail & "Cell" Comms
  - Scan "DarkNet" for "Business Deals", Plans & Messages
  - Check, Track & Locate Mobile Communications
  - Track "Bad Guys" in National Transport Hubs
  - Deploy RFID Devices to Track High-Value & Strategic "Assets"
  - Use Real-Time ANPR for Target Vehicle Tracking

...Cyber Computing Smart Apps can now Track Massive Databases of Target "Bad Guy" Profiles *@ Light Speed!...*

"Cyber" Tracking & Profiling: *"Bad Guys"*

- Mitigating Global Crime & Terrorism requires us to **Profile & Track** the "Bad Guys" in "Real-Time" with Intelligent Networked Computing Systems:

...Cyber Computing Smart Apps can now Track Massive Databases of Target "Bad Guy" Profiles *@ Light Speed!...*

SENSETIME : *AI Cyber-Bio Surveillance*

SENSETIME :*AI Biometric Video Analytics -"Chinese Unicorn"*

商 汤 科 技 www.sensetime.com

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SENSETIME : *AI Cyber-Bio Surveillance*

SENSETIME
商 汤 科 技

:AI Biometric Video Analytics -"Chinese Unicorn"

www.sensetime.com

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- Securing Your Business Data & Privacy! -

SENSETIME : *AI Cyber-Bio Surveillance*

SENSETIME :*AI Biometric Video Analytics -*"Chinese Unicorn"

商 汤 科 技 www.sensetime.com

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SENSETIME : *AI Cyber-Bio Surveillance*

商 汤 科 技 www.sensetime.com

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**53**

On-Line 3D Hi-Resolution Aerial Surveillance

Post Office
Travelex Italia Limited

Pizza restaurant
Fratelli La Bufala

"Google Maps" - *3D Aerial & Satellite Images* - Naples Airport, Italy

On-Line 3D Hi-Resolution Aerial Surveillance

"Google Maps" - *3D Aerial & Satellite Images* - Naples Airport, Italy

On-Line 3D Hi-Resolution Aerial Surveillance

"Google Maps" - *3D Aerial & Satellite Images* -   Naples Port, Italy

On-Line 3D Hi-Resolution Aerial Surveillance

Saint Mary Major at
the Holy Stone
Chagall. Sogno... • Today

Piazza
Giuseppe
Garibaldi

"Google Maps" - *3D Aerial & Satellite Images* - | **Star Terminus Hotel**

The Global Satellite Observation System
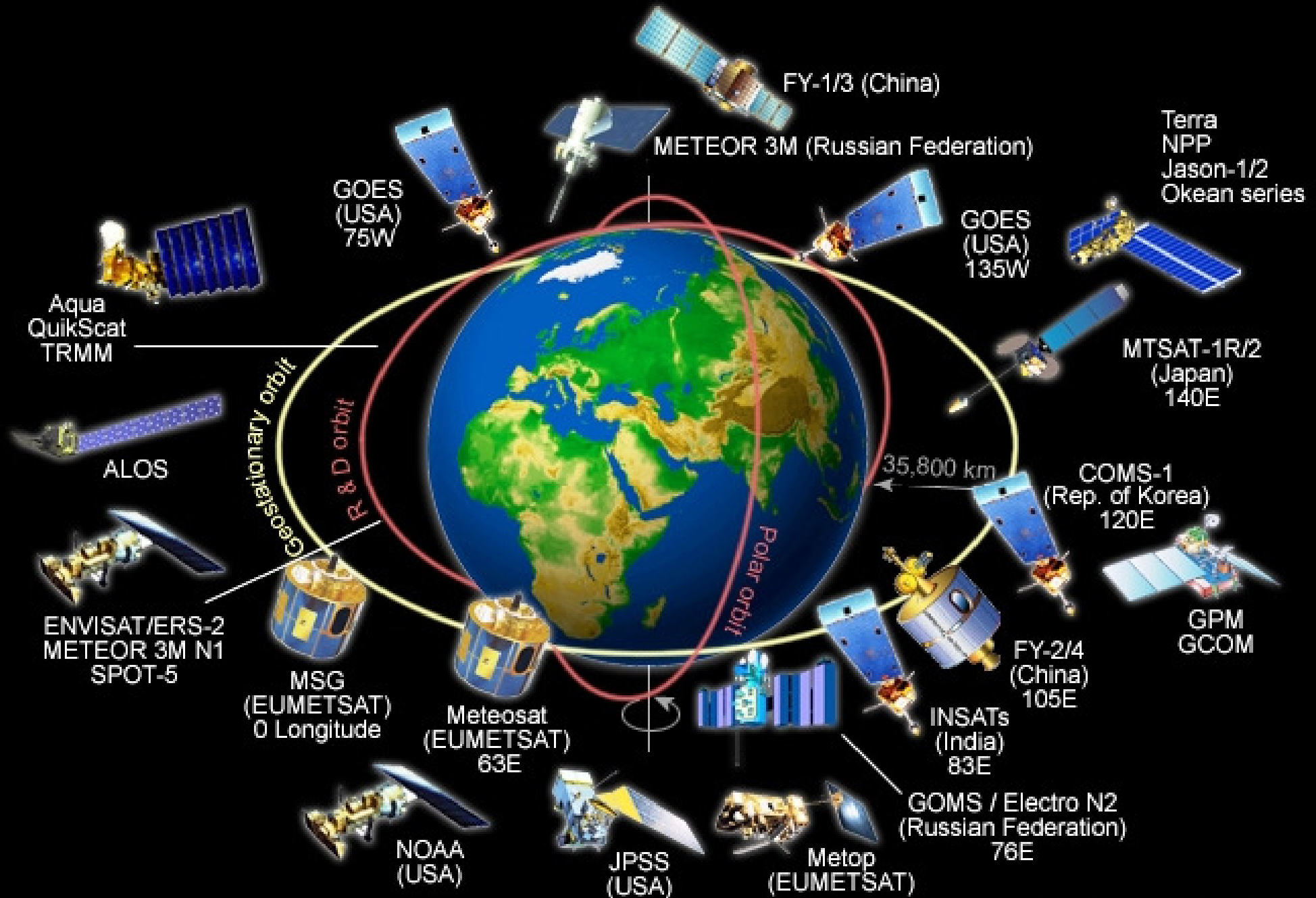
"Real-Time" Meteorological Analysis
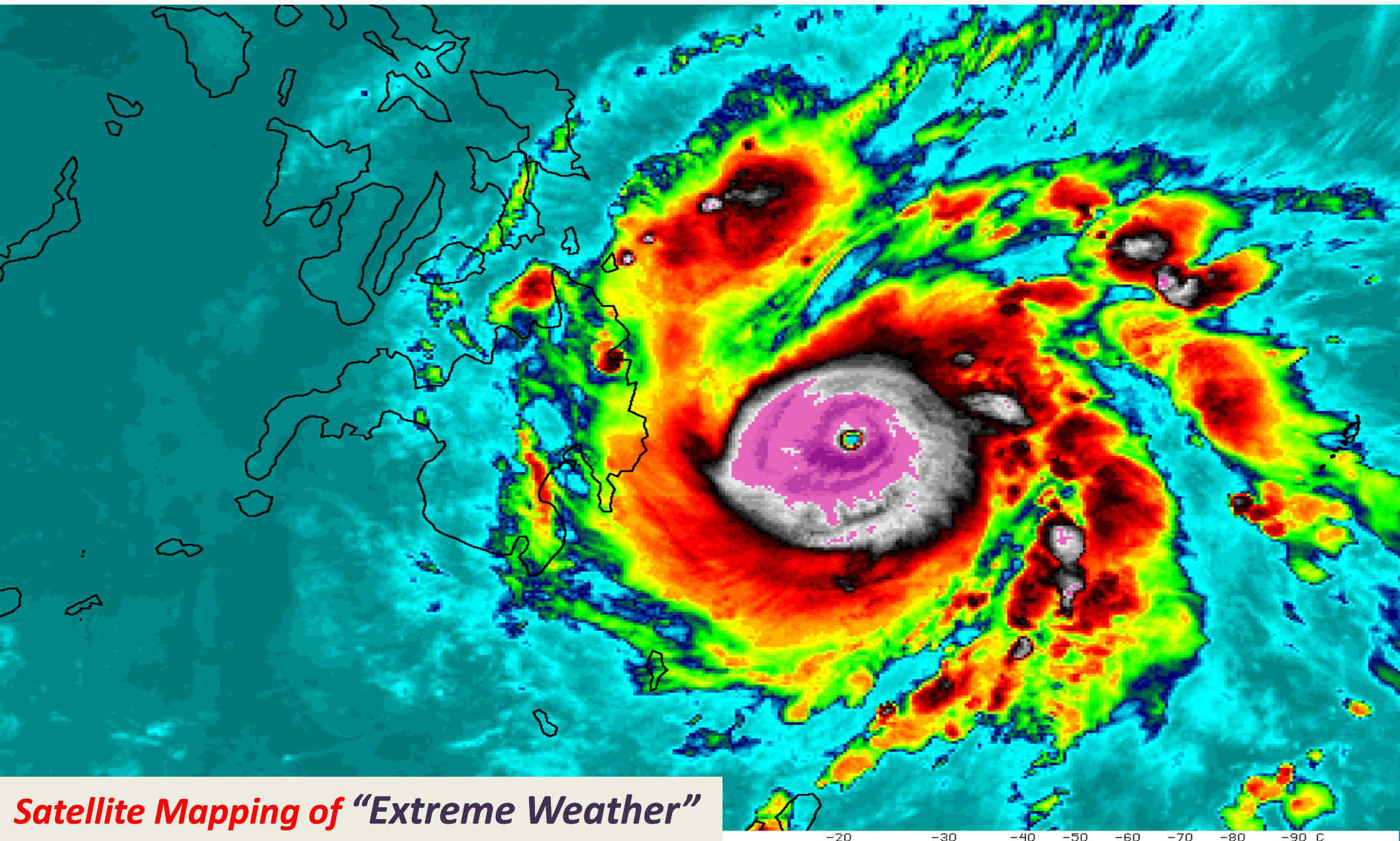
Satellite Mapping of "Extreme Weather"

MTSAT-1R - IR 10.8 MICROMETERS (CHANNEL 02) - 10:57 UTC 03 DECEMBER 2012 - CIMSS / SSEC / UNIVERSITY OF WISCONSIN - MADISON

Counter Terrorism & Cyber Security: *Newton Lee*
Total Information Awareness   *"Springer – 2015 Edition"*

Counter Terrorism & Cyber Security: *Newton Lee*

Total Information Awareness

Newton Lee

Counterterrorism and Cybersecurity

Total Information Awareness

Springer

Information Fusion & Visualization for
Intelligent Video Surveillance (IVS)
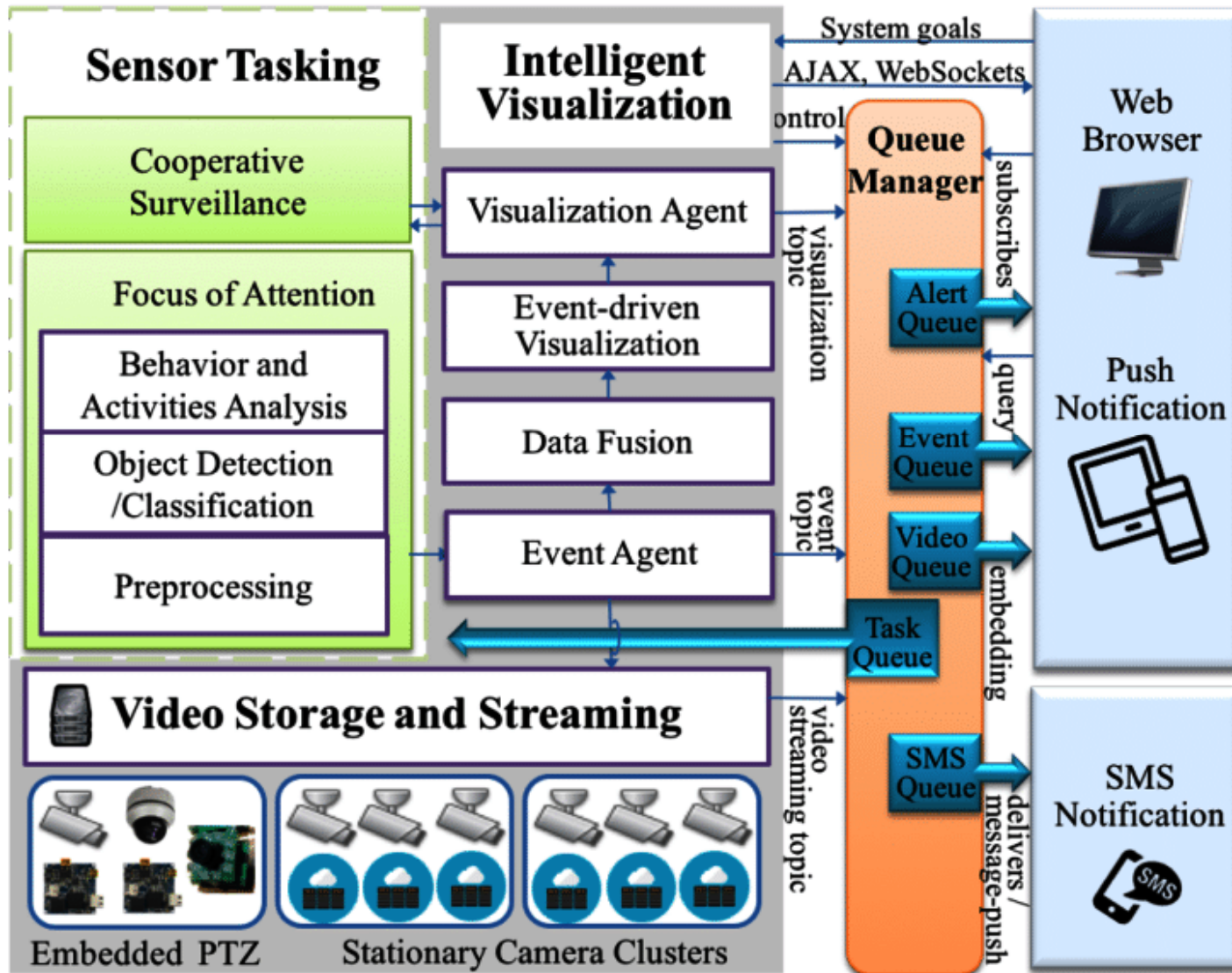
Intelligent Deep Learning
for Video Surveillance
now Global Solution!..

Publication Authors
Ching-Tang Fan,
Yuan-Kai wang,
Cai-Ren Huang
IEEE – Systems, Man &
Cybernetics – **Jan 2016**

Distributed Deep Learning
Intelligent Video Systems
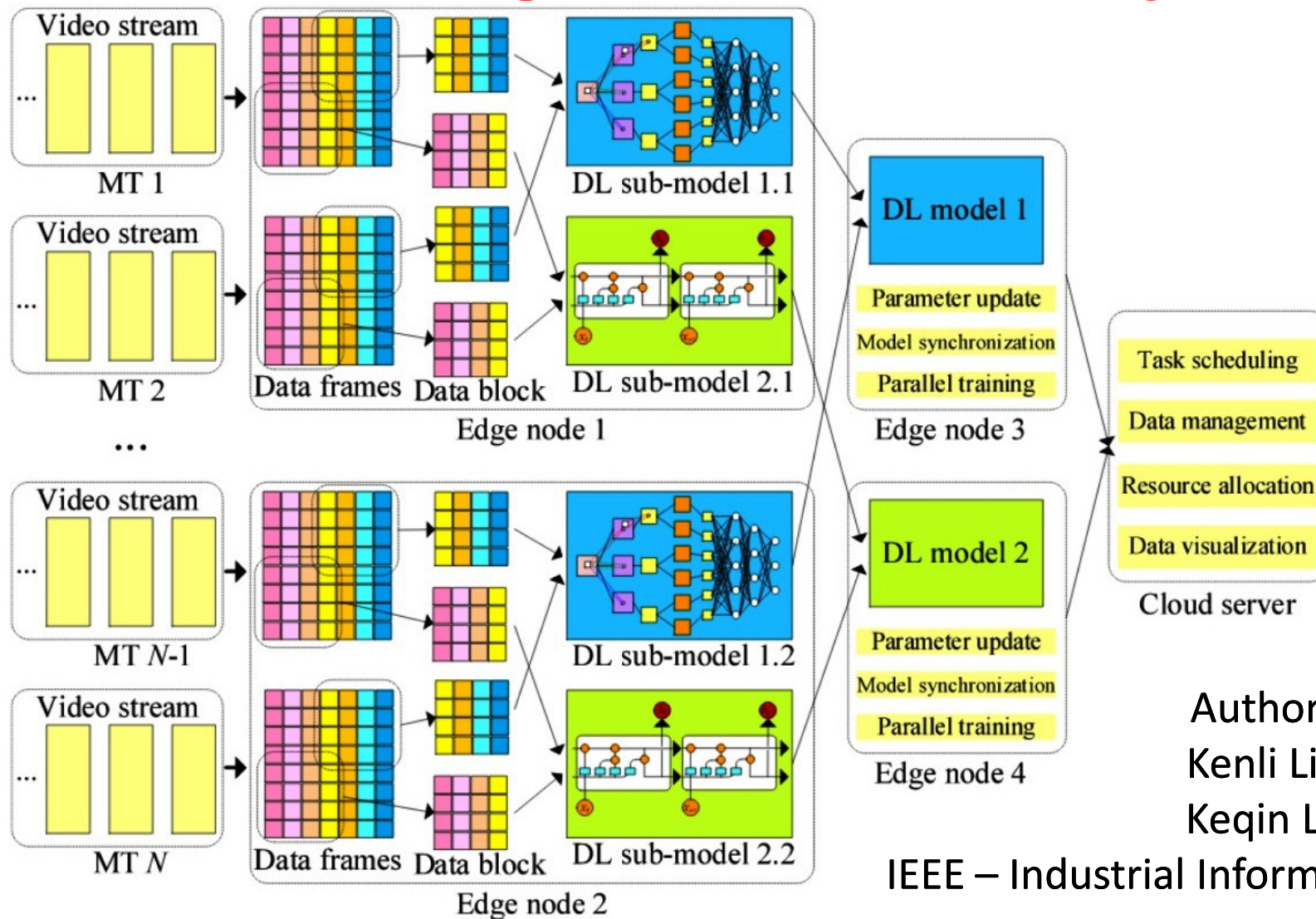
Authors: Jianguo Chen,
Kenli Li, Qingying Deng,
Keqin Li, Philip Yu
IEEE – Industrial Informatics – **April 2019**

Distributed Deep Learning

Feature maps

Feature maps

Feature maps

Feature maps

Neurons

Neurons

Input data fames

Output

Bus: 24

Truck: 37

Car: 43

Convolutional layer	Pooling layer	Convolutional layer	Pooling layer	Input layer	Hidden layer	Output layer

Feature extractor

Fully-connected classifier

Distributed Deep Learning
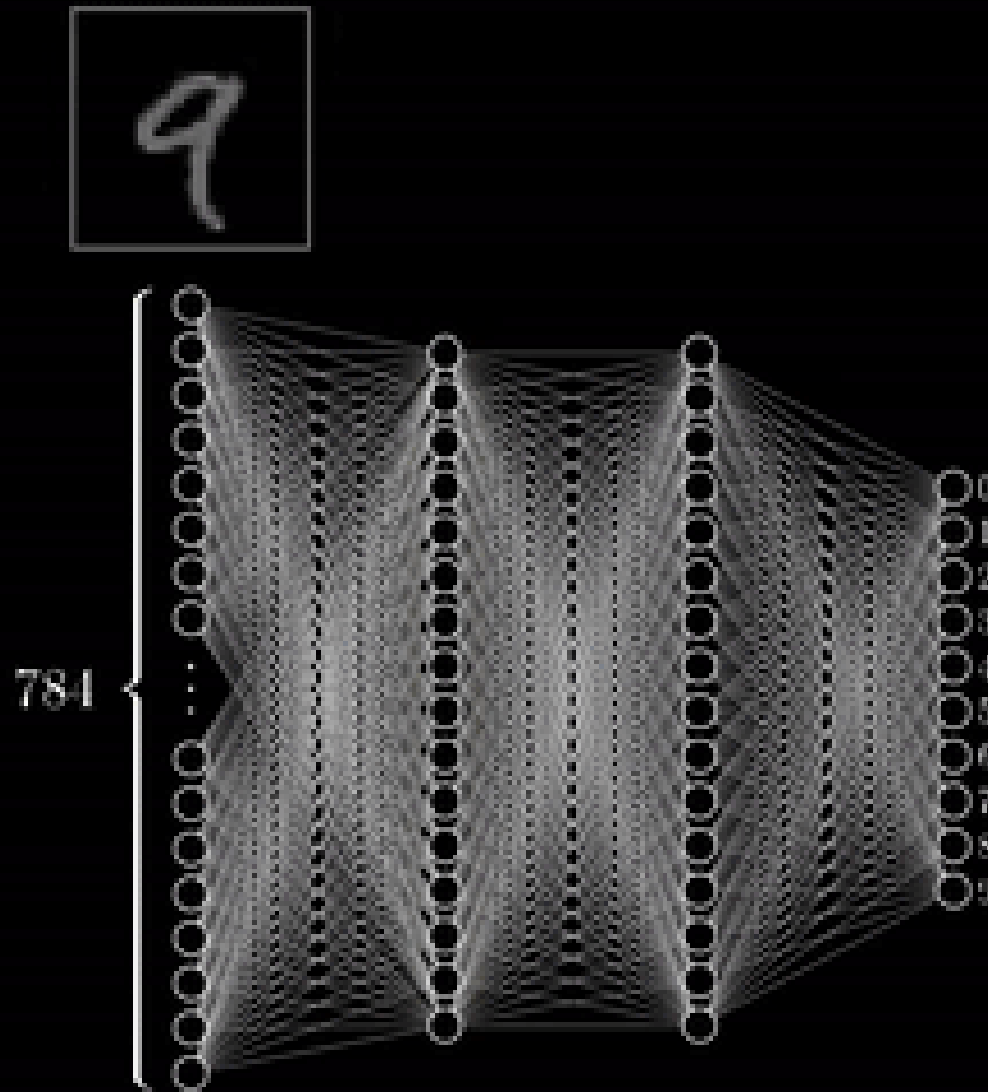
Intelligent Video Surveillance!...

6 – Biometric & Behaviourial Profiles
"Cyber Biometrics"
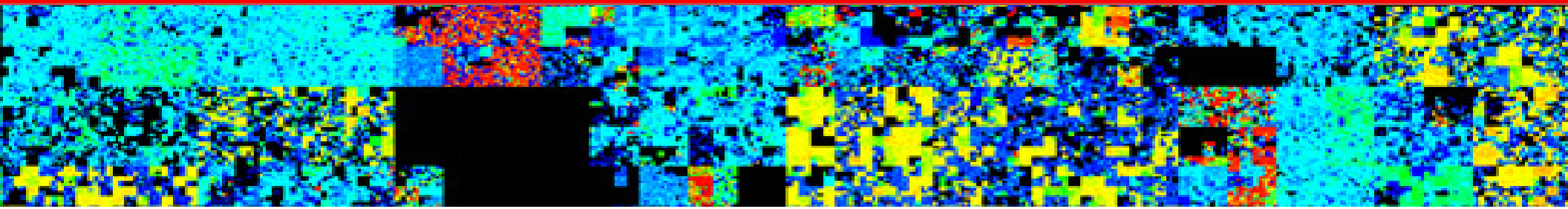
Biometrics & *RFID* Security Applications

- *Biometrics* techniques may include:
    - Finger and Palm Prints
    - Retinal and Iris Scans
    - 3D Vein ID
    - Voice Scans & Recognition
    - DNA Database – Criminal Records
    - 3D Facial Recognition
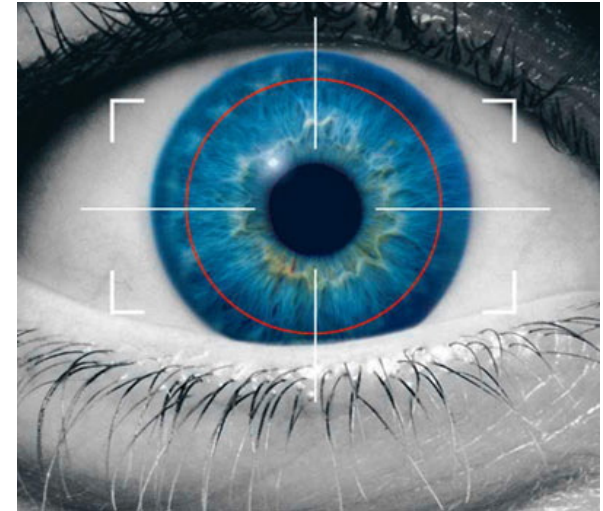
- *RFID =* Radio Frequency ID with applications that include:
    - Personal ID Cards for Building, Secure Facility Access
    - Tags for Retail Articles as a Deterrence to Shoplifting
    - Powered RFID Tags for Vehicles to open Doors, Barriers & Switch Lights
    - Plans to use RFID Tags for Perishable Products such as Fruit & Vegetables
    - Asset Tags to manage the movement of High-Value & Strategic Assets
    - Potential for Embedded Intelligent RFID Devices into Humans

Integrated *Cyber* Biometrics: *Pre-Attack*

- *Intelligent Biometrics Tools* can significantly reduce *YOUR* Risks of Cyber Threats & Attacks...

  - Device & Access Authentication by Fingerprints, Retinal/Iris Scan or Palm Vein Scan
  - Facility Access with "Live" 3D Facial Recognition
  - "Behavioural Biometrics" for Secure User Authentication
  - City/Campus Regional Tracking with Intelligent 4K Networked CCTV & Real-Time *Self-Learning* Video Analytics
  - "Live" **CBRN** Scanning for Hazardous materials – (**C**hemical, **B**iological, **R**adiological, **N**uclear)
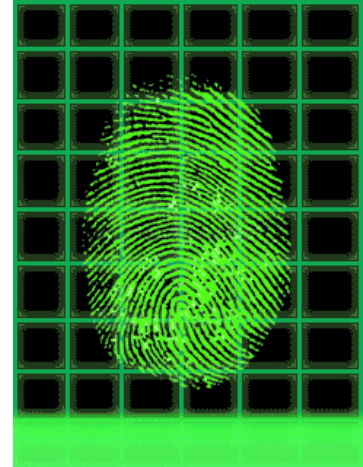
...It is crucial that *Cyber Biometrics Tools* are Integrated with the CSO-led *Business Security Operations*

Typical Cyber-Biometric Solutions

FINGERPRINTS
- 5-9 Second Processing Time
- Commonly Used in Border Management
- Also Used in Law Enforcement

FACIAL RECOGNITION
- Non-invasive Collection
- Currently Used for Passports and National ID Documents

IRIS
- Low False Acceptance Rates
- Difficult to Replicate
- Two Second Processing Time

DNA
- Establishes Familial Relationship
- Commonly Used in Law Enforcement
- Highly Unique/ Impossible to Replicate
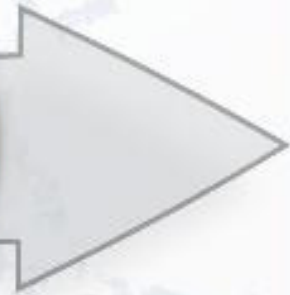
Cyber-Biometrics: *Fingerprint Solutions*

Linear Biometric *Finger Print Scanner*
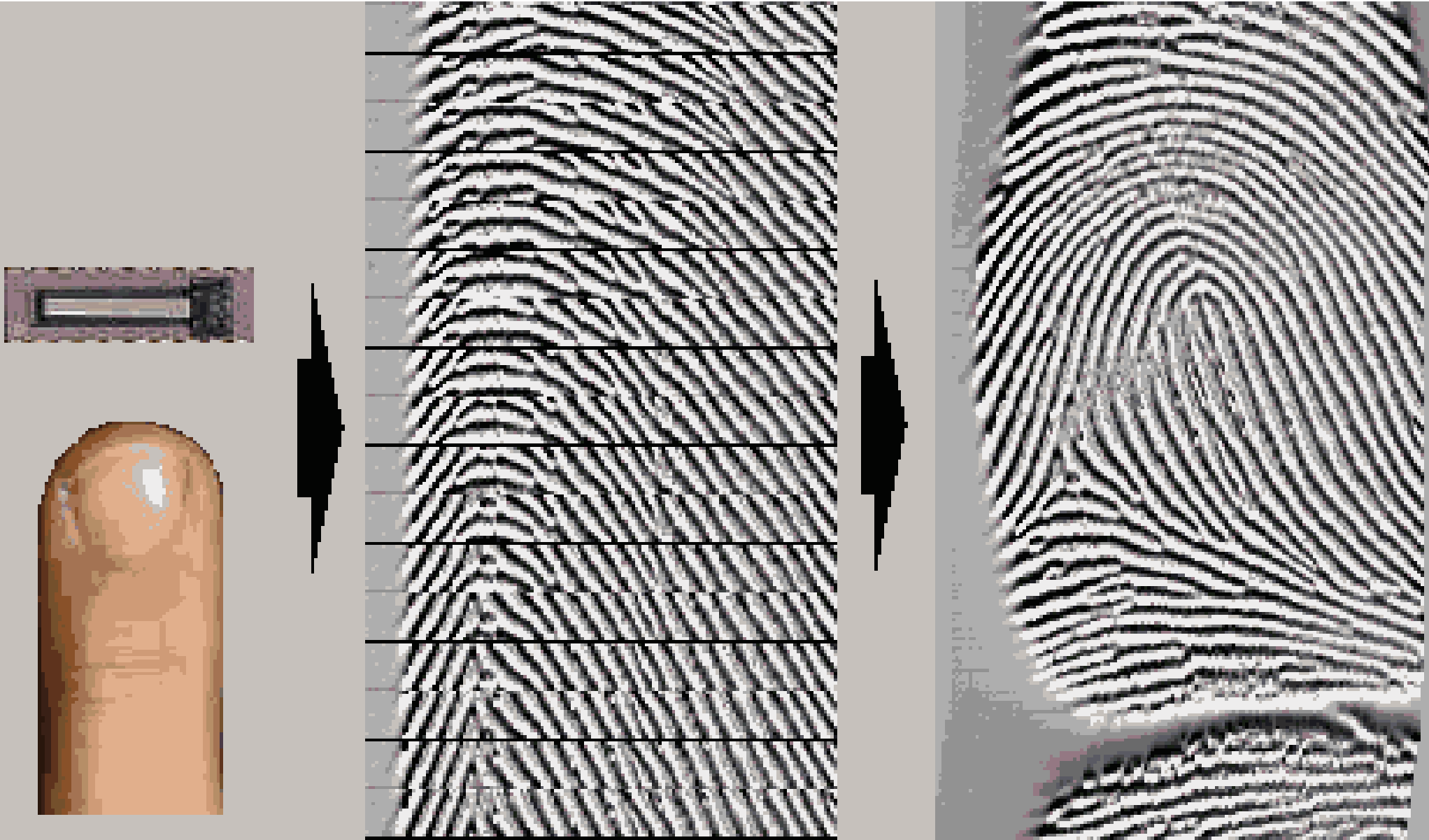
Plain Arch · Tented Arch · Ulnar Loop · Radial Loop · Double Loop Whorl · Plain Whorl · Central Pocket Loop Whorl · Accidental Whorl

Characteristic *Fingerprint* Patterns

Cyber-Biometrics: *"Live" Vein Analytics*
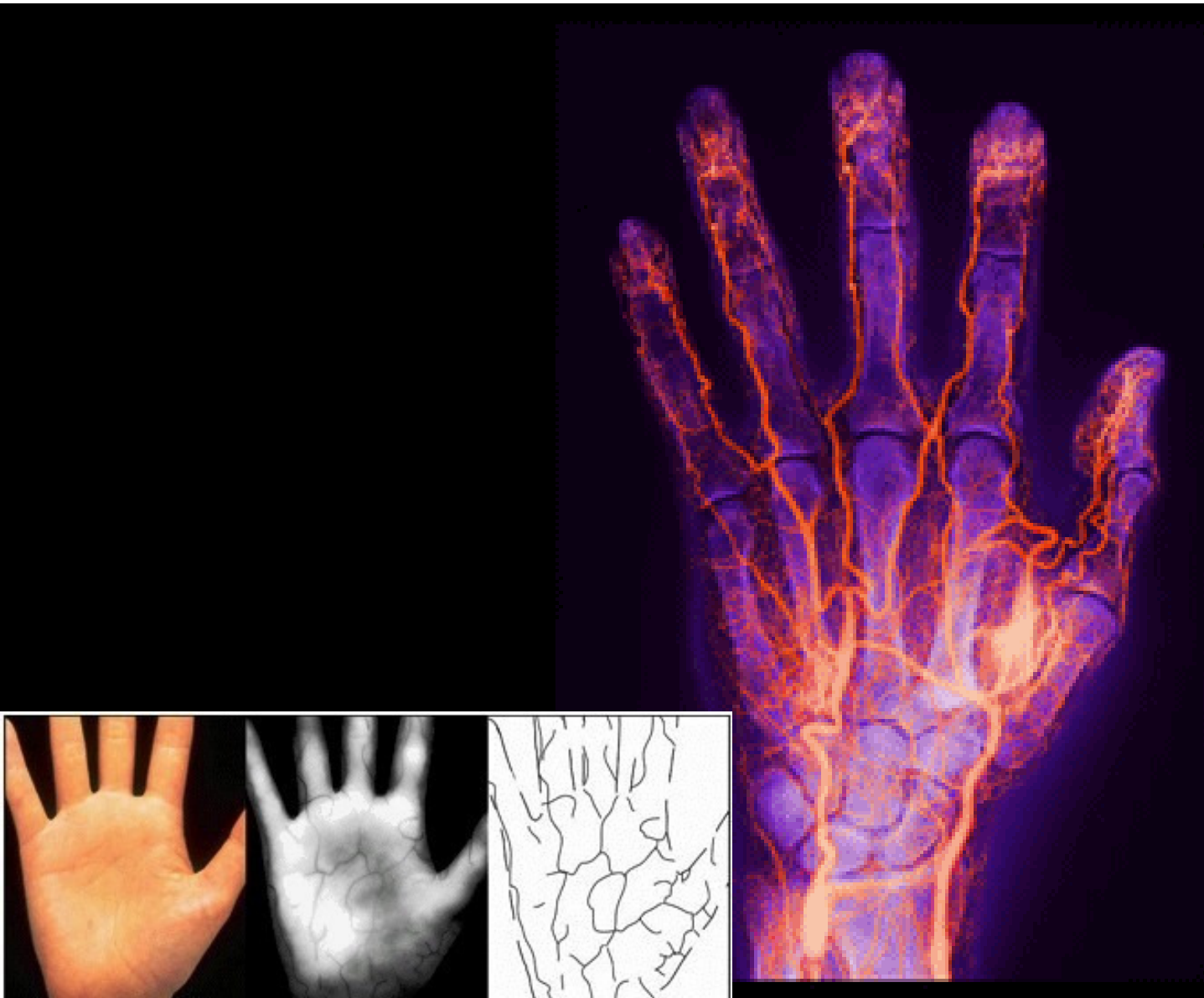
Cyber-Biometrics: *Retinal & Iris Scans*

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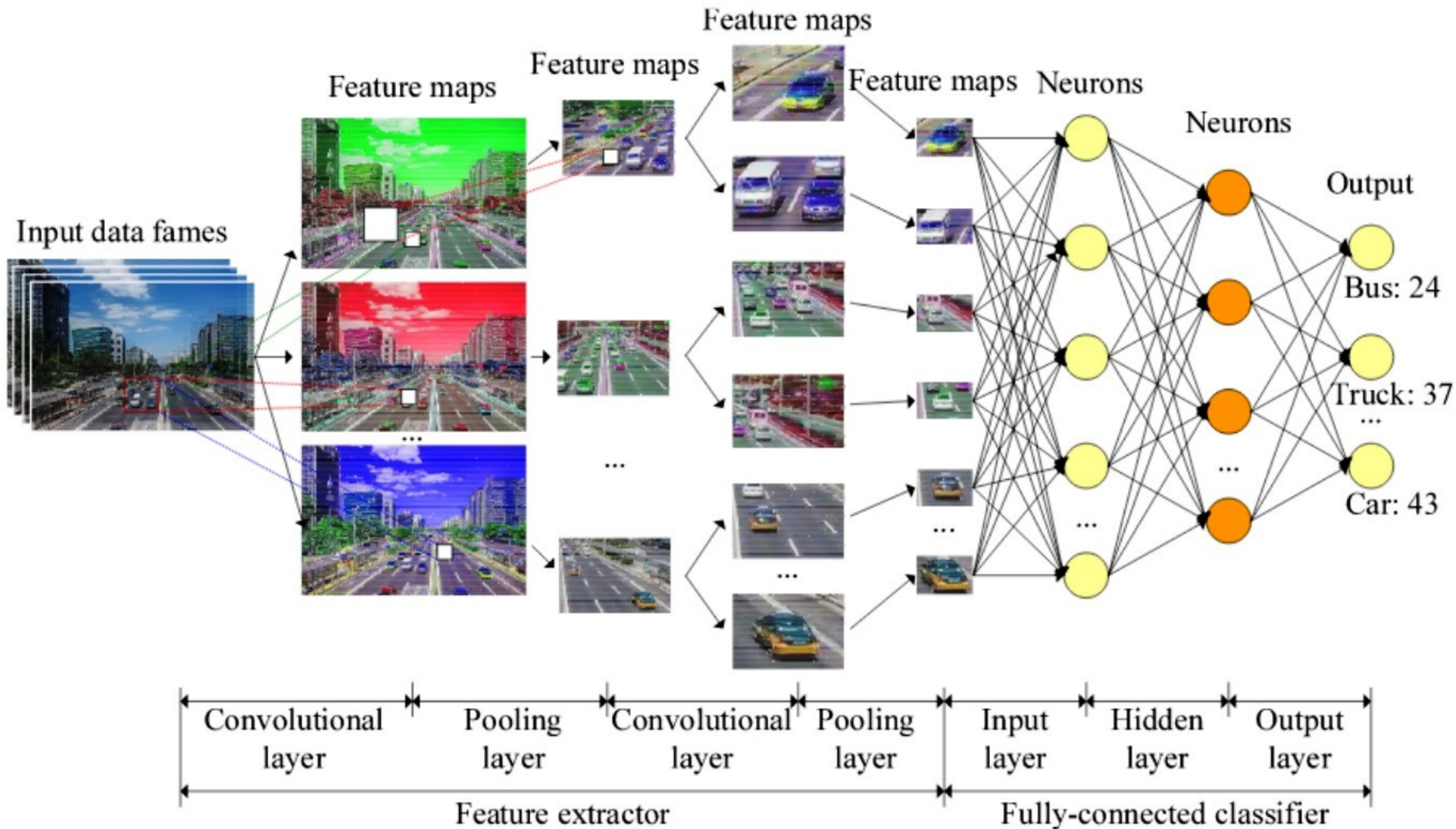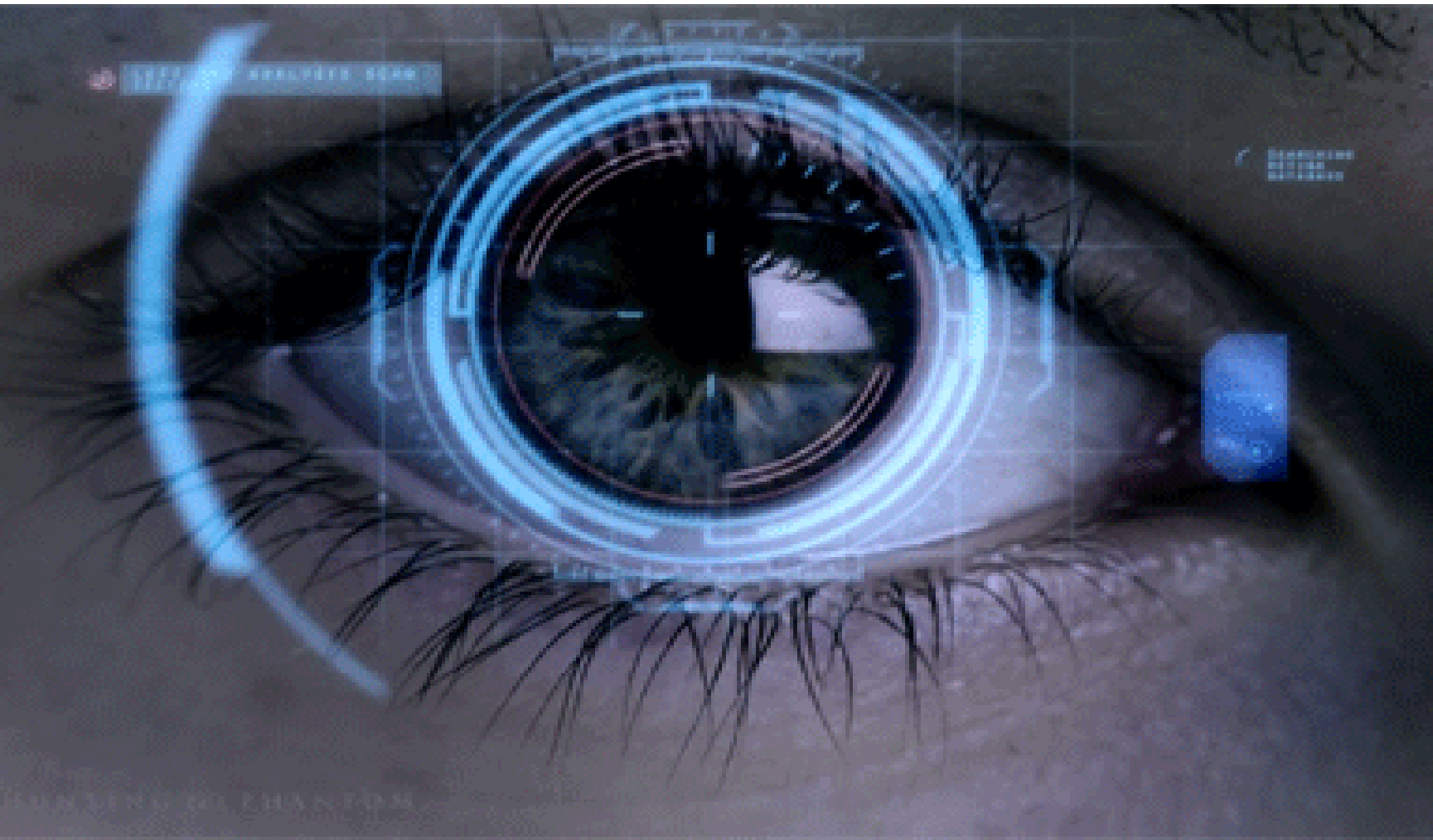# Biometric ID Authentication: "IoT"

- Biometric Security provides Crucial Cyber-Defence for the **"Internet of Things" – "IoT":**
  - Bio-ID & Authentication for ALL Secure "IoT" Devices
  - Real-Time Bio Profiling & Behavioural Modelling
  - Rapid Intrusion Alerts for "IoT" Networks & Assets
  - Bio ID Access for Secure Cloud Data & Apps
  - Mobile "IoT" Asset Tracking with Bio ID Security

...ALL Secure "IoT" Devices should be Biometric Protected to *Mitigate ID Theft and Fraud!...*

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Forensics: *Fast DNA Finger Printing*

genome

cell

chromosomes

genes

Genes contain instructions for making proteins

DNA

proteins

Proteins act alone or in complexes to perform many cellular functions

U.S. DEPARTMENT OF ENERGY

Fast DNA Sequencing:*Graphene Nanopore*

Biometrics & Forensics: Glasgow University

The work resulted in patented technology on smartcard devices that was used to enter new markets with a competitive advantage. Ecebs saw increased turnover of £530k per annum, and eventual acquisition by Trainline Investment Holdings Ltd and subsequently Bell ID. The research proposed identifying the key components of a fingerprint, the "minutiae", by their relative spatial relationships, rather than the normal practice of using global position coordinates and orientation.

These advanced biometrics authentication processes and algorithms for embedded systems led to the development of new security solutions to offer increased protection of smartcard data. The research also extended biometrics beyond traditional authentication, and utilised biometric characteristics as a gauge for physical state. In particular, research improved the efficiency of data processing,

lessening the impact on smartcard users and enabled Ecebs Ltd to develop an advanced multi-modal biometric based security solution.

The authentication research of the Interactive and Trustworthy Technologies research group has included the development of underlying technologies for biometrics on smartcards, multimodal sensors on smartphones, and online knowledge-based information. In each case, the intended goals related to improved security, usability, and effectiveness for cost reduction and increased market potential. Research also includes models of authentication for online banking, which is being used to develop new solutions for making effective choices as to which forms of authentication should be used, and which parameters should be selected in order to support better informed choices of security protection.

Interactive and Trustworthy Technologies Research Group

Dr Govan also leads GCU's involvement in the Cyber Security Challenge competition, run by GCHQ, the UK Government Communications Headquarters, to test the UK public's potential for a career in cyber security. GCU hosted one of the Challenge's 2013 cyber camps, offering candidates hands on learning experience and unique insights into what it's like to work in the cyber security industry, with Scottish Police and BlackBerry.

Cyber Security and Networks
Case Study: Biometrics and forensics for new security solutions

Research commissioned by the Government's Department for Business, Innovation and Skills (BIS), revealed that the number of cyber attacks hitting businesses has increased over the last year, with some attacks causing more than £1 million of damage. 87% of small firms experienced a cyber-security breach last year, an increase of 10%.

GCU's Interactive and Trustworthy Technologies Research Group, based within the Institute for Sustainable Engineering and Technology Research, pools expertise in computing technology and policy in industry, government, and academia; human computer interaction with research interests including novel touch based interfaces, interactive information retrieval and intelligent user interfaces; digital security and forensics; the development of technological solutions to support students; and computer security.

GCU's Dr Michelle Govan has research interests in biometrics, digital security and digital forensics techniques. Working with colleagues

Dr Mike Just and Professor Lynne Baillie, she has researched a range of trustworthy security technologies, applicable to a wider range of markets, including authentication technologies and finding solutions that balance security, usability and efficiency, addressing the common weakest links, individual passwords and the limitations of people.

The research group has a wealth of expertise in working with industry and research partners. Projects on methods of biometric authentication have included a Knowledge Transfer Partnership (KTP) project and subsequent research fellowship with smartcard technology company Ecebs Ltd. The project involved the development of multimodal biometric algorithms for authentication within embedded systems, and used control theory to develop novel feedback and feed forward approaches for fingerprint authentication.

At Glasgow Caledonian University, we work with industry and public sector partners to ensure our expertise responds to the need for real world innovation. GCU's strategic business development and knowledge transfer teams work with academic experts in our Schools and Research Institutes to support businesses with a problem-solving approach.

Contact us to find out more about building a brighter future with GCU at www.gcu.ac.uk/business.

GCU
Glasgow Caledonian University
Better business, brighter futures

Further information:
Dr Michelle Govan
School of Engineering and Built Environment
Glasgow Caledonian University

michelle.govan@gcu.ac.uk
0141 331 8192
www.gcu.ac.uk/isetr

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Private Detective: *"Sherlock Holmes"!*

"Forensics Pioneer"
a) Detective Work
b) Fingerprints
c) Ciphers & Codes
d) Footprints
e) Handwriting

Author: *Sir Arthur Conan Doyle:* 1859 - 1930

Cyber Digital Forensics: *Post-Attack*

- Evidence from Cyber Digital Forensics can help to identify the Criminals, Terrorists and Cyber Attackers:

- **Physical Forensics:**
  - Blood & Tissue Samples
  - DNA & Genetic Analysis
  - Chemical Agents, GSR, Fibres

- **Cyber Forensics:**
  - Cyber Attack IP Address/DNS/Proxies
  - Malware/Trojan/Virus Analysis
  - Botnet/DDOS , Targets & Payload
  - RansomWare/Encryption & Attack "Signatures"

...Evidence from BOTH *Cyber & Physical Forensics* will be relevant to 21stC Terror Threats & Attacks!...

Intelligent Video Surveillance!...

7 – Cyber Surveillance Economics!
"Surveillance Capitalism"
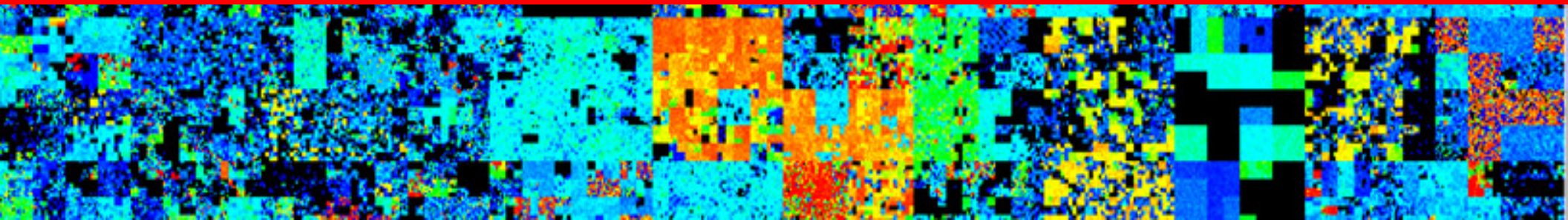
WhatsApp Messenger

WhatsApp Inc.   Communication   ★★★★☆ 88,817,675 👤

Secret Surveillance: May 2019
- Alerted by Israeli NSOGroup.COM -

nso group

Enhanced NSO Pegasus Mobile Spyware

LEGEND

COLOUR INTENSITY = number of suspected NSO customers operating infections in a country's IP space

6	
5	
3	
2	
1	
NONE	

IP space may not always correspond to a victim within the geographic territory due to factors like VPNs.

Countries labeled: CANADA, UNITED STATES, MEXICO, BRAZIL, NETHERLANDS, UK, POLAND, FRANCE, SWITZERLAND, LATVIA, GREECE, TURKEY, IRAQ, KAZAKHSTAN, UZBEKISTAN, KYRGYZSTAN, TAJIKISTAN, PAKISTAN, BANGLADESH, INDIA, THAILAND, MOROCCO, TUNISIA, ALGERIA, LIBYA, EGYPT, SAUDI ARABIA, OMAN, YEMEN, IVORY COAST, TOGO, UGANDA, KENYA, RWANDA, ZAMBIA, SOUTH AFRICA, SINGAPORE

DETAIL: LEBANON, PALESTINAN TERRITORIES, ISRAEL, JORDAN, KUWAIT, BAHRAIN, QATAR, UAE

SUSPECTED PEGASUS INFECTIONS
A GLOBAL MAP MADE WITH DNS CACHE PROBING

Bill Marczak, John Scott-Railton, Sarah McKune, Bahr Abdul Razzak & Ron Deibert

CITIZEN LAB 2018

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21stC Cyber Society: Surveillance Capitalism!

- "The Age of Surveillance Capitalism": By - Shoshana Zuboff – Published: January 2019 – *Recommended Reading!*

- New 21stC Business Economics created through Social Media, Search, Mobile Tracking and Cyber Surveillance!...

- During last 10 years, the Collation of OUR Personal & Business Data has fuelled the Growth of Social Media & Search Giants such as Google & Facebook!......

- eCommerce Growth from On-Line Retail Business such as Amazon, eBay, & Alibaba also exploits user profile data, contacts and purchase preferences!...

......Cyber Tracking & Video Surveillance are essential tools for 21stC Society but Government will need to update New Cyber Laws & Regulations to minimise Social & Economic Abuse!...

"Big Data is the New Oil": Intelligent Video & Cyber Surveillance Generates $$$ Data!

The Age of Tech

Market capitalization of the world's most valuable public companies

■ Tech ■ Oil/Energy ■ Financial Services ■ Conglomerate

2006

Company	Market Cap
ExxonMobil	$362.5b
General Electric	$348.5b
Microsoft	$279.0b
Citigroup	$230.9b
BP	$225.9b
Royal Dutch Shell	$203.5b

2016*

Company	Market Cap
Apple	$571.4b
Alphabet	$530.6b
Microsoft	$445.5b
Amazon	$362.4b
ExxonMobil	$356.0b
Facebook	$355.6b
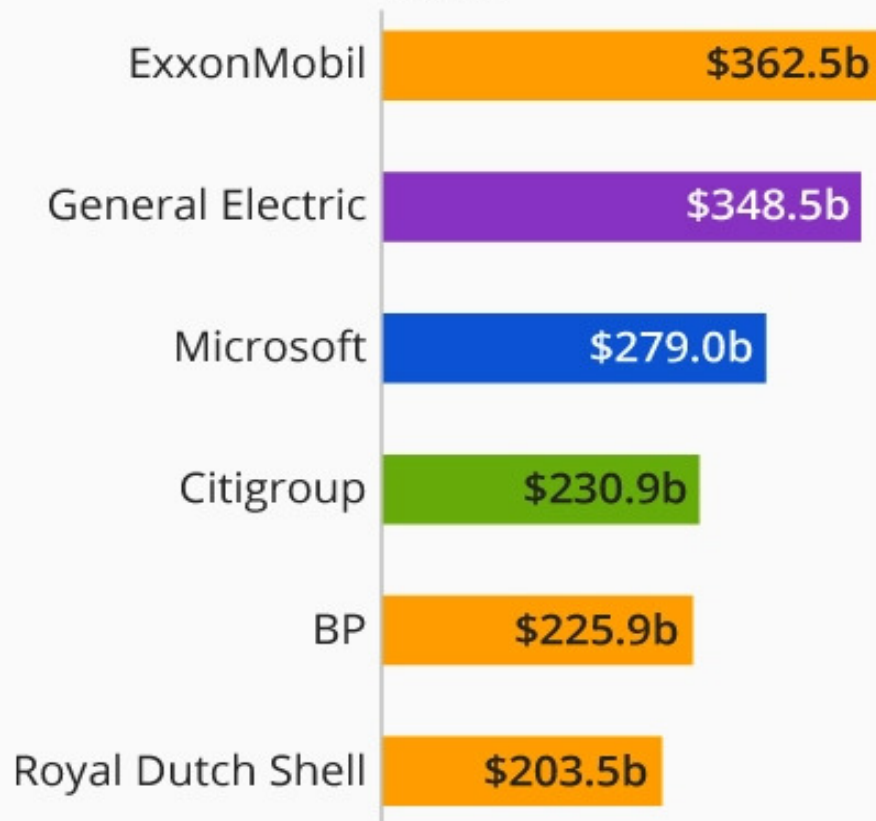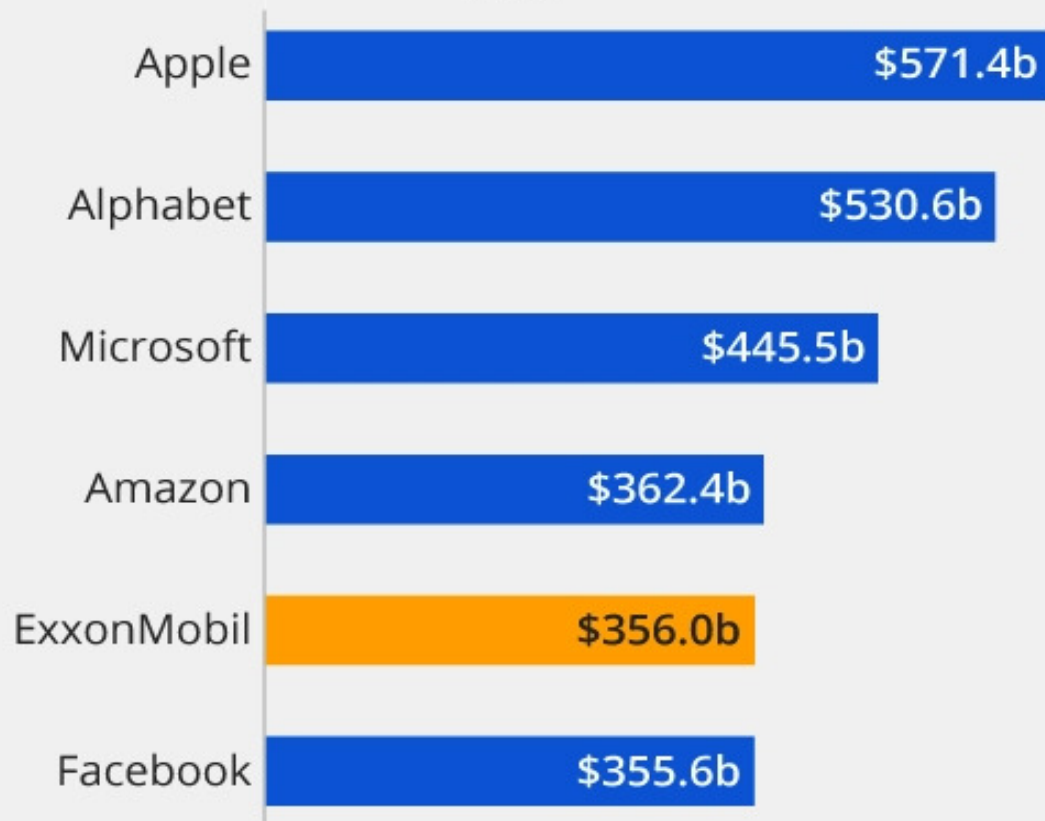
@StatistaCharts

* as of August 1, 2016
Sources: Yahoo! Finance, Forbes

statista

1984: *"Birth"* of Intelligent Networks .... & *"Death"* of Personal Privacy ?....

1984: *"Birth"* of Intelligent Networks .... & *"Death"* of Personal Privacy ?....

1984
A Novel by
GEORGE ORWELL

WAR IS PEACE
FREEDOM IS SLAVERY
IGNORANCE IS STRENGTH

BIG BROTHER IS WATCHING YOU !

ANTI SEX LEAGUE
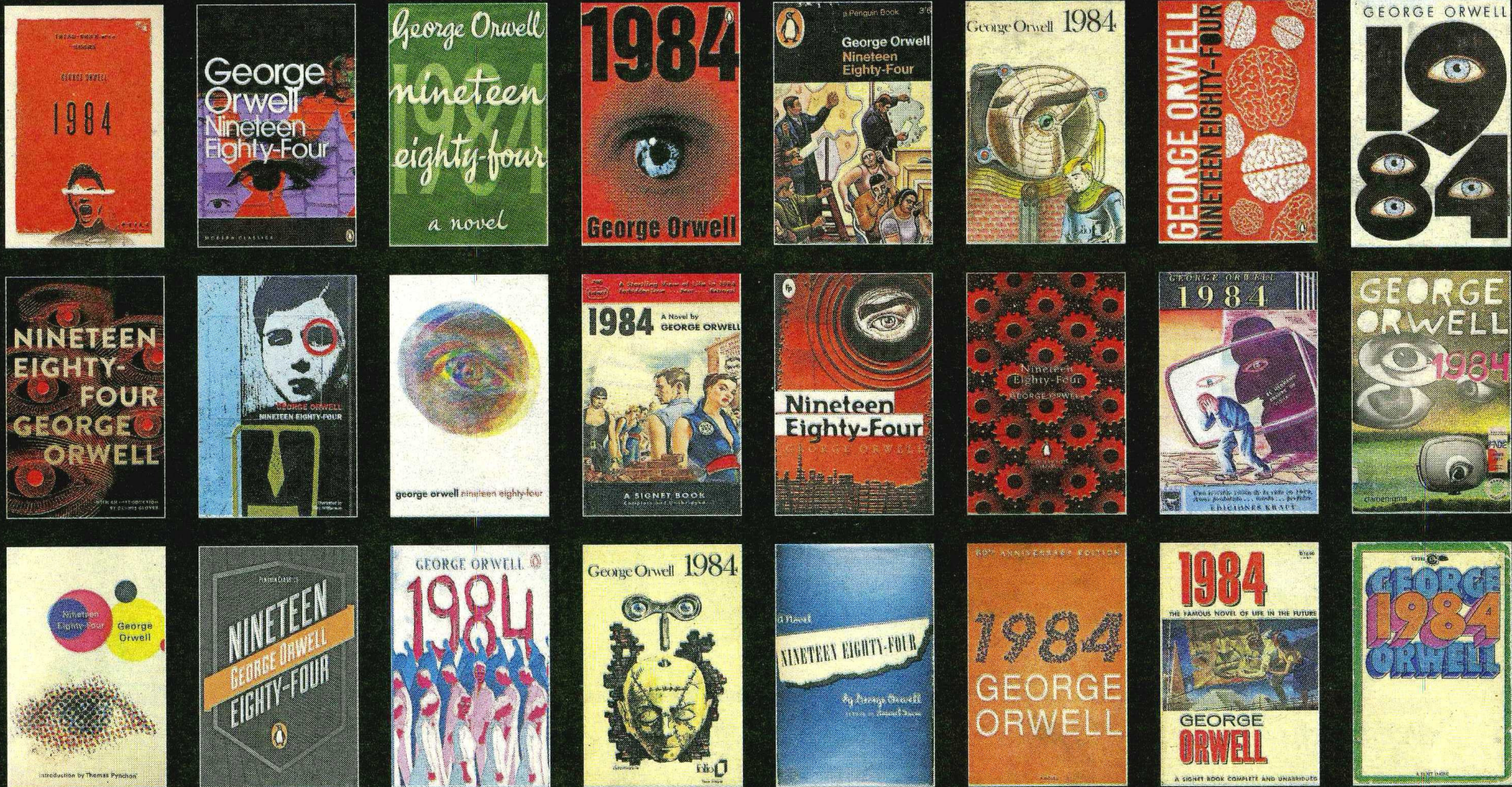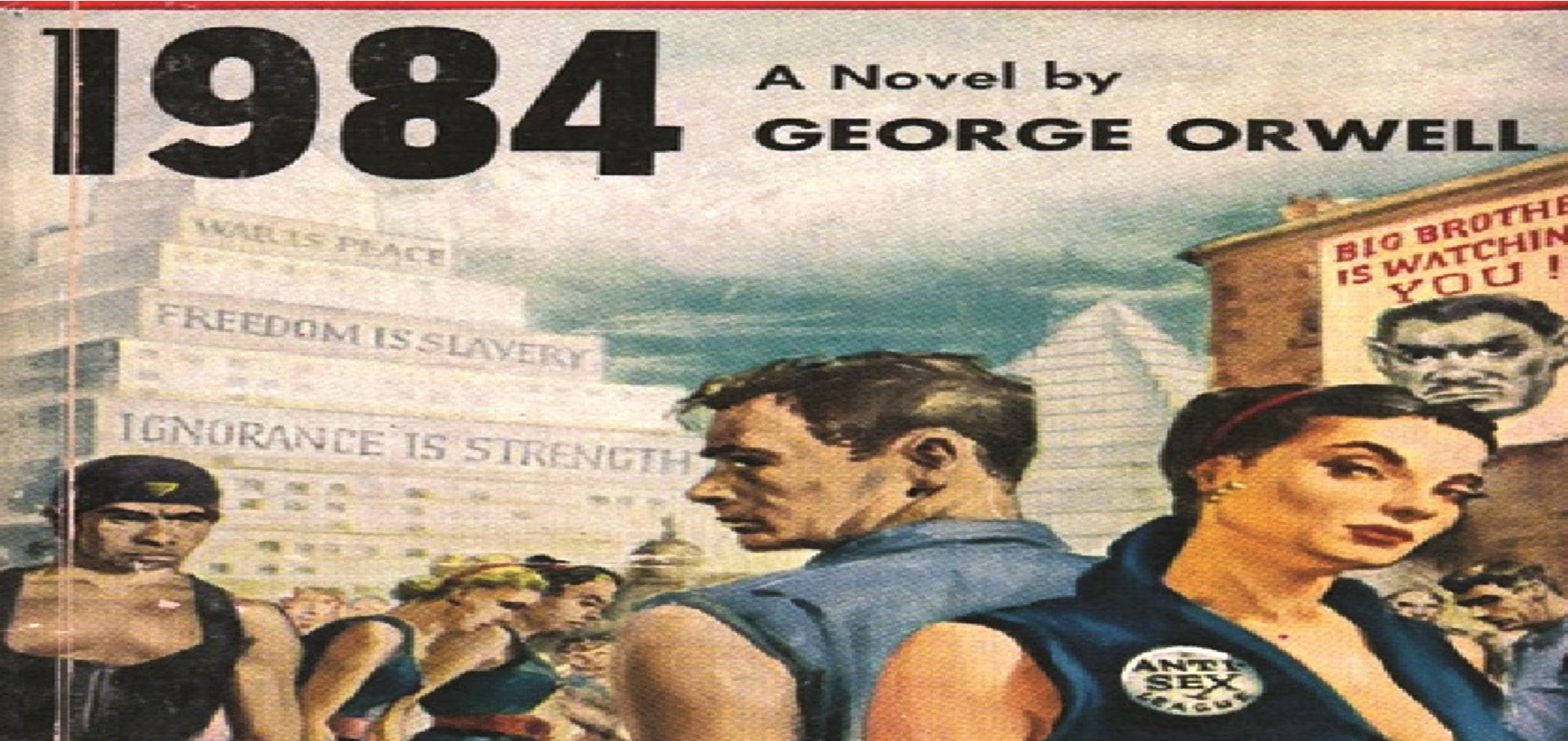
CyberVision: 1984:*Past* – 2019:*Present* – 2054:*Future?*

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1984: *"Birth"* of Intelligent Networks

BIG BROTHER IS WATCHING YOU!

New Laws for Regulation of Intelligent Video Surveillance!

Facial Recognition: Video Surveillance

Amazon Rekognition: Facial Video ID

Amazon Rekognition Overview

Object and Scene Detection · Facial Analysis · Face Comparison · Facial Recognition · Celebrity Recognition
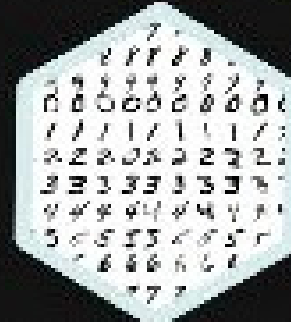
Image Moderation · Text Recognition

Amazon Rekognition: Facial Video ID

Amazon Rekognition API

Amazon Rekognition: Facial Video ID

Amazon Rekognition - Deep Learning Process

Emergent Tech ▸ Artificial Intelligence
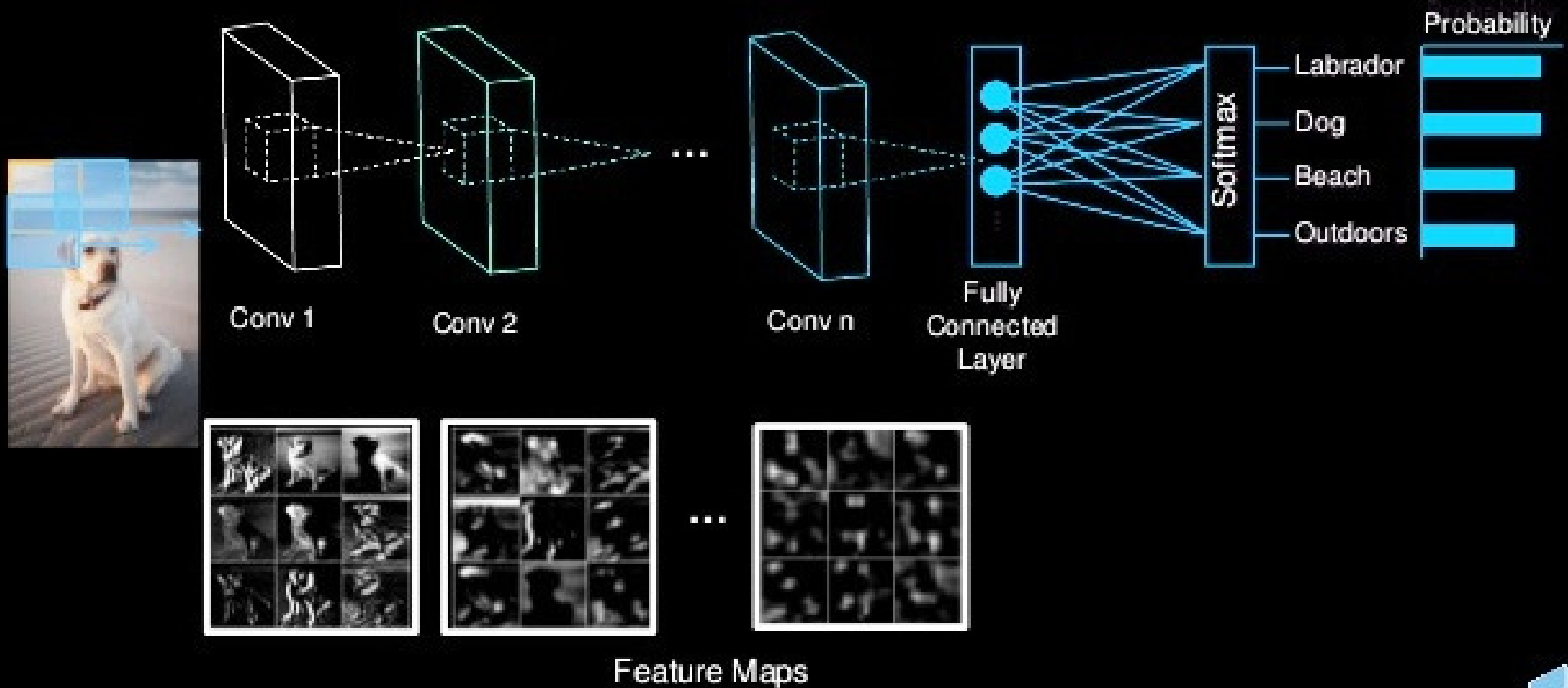
San Francisco votes no to facial-recognition tech for cops, govt – while its denizens create it

First major US city to restrict, scrutinize future Big Brother technology

By Kieren McCarthy in San Francisco 14 May 2019 at 22:24   8 💬   SHARE ▼

Breaking News

May'19 - San Francisco City bans Facial Recognition Technology!...

AI Facial Recognition Tools:

AFFECTIVA – Facial API
AMAZON – Rekognition
COGNITEC – FaceVACS
EVER.AI – Facial API/SDK
GOOGLE – Cloud Vision API
IBM – Diversity in Faces
INTELLIVISION – Face Recogniser
KAIROS – Facial API
MICROSOFT – Azure API
OPENCV – Computer Vision SW

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Intelligent **Video** Surveillance!...

8 –21stC Business Data & Privacy!...
"Adaptive Data Mining"
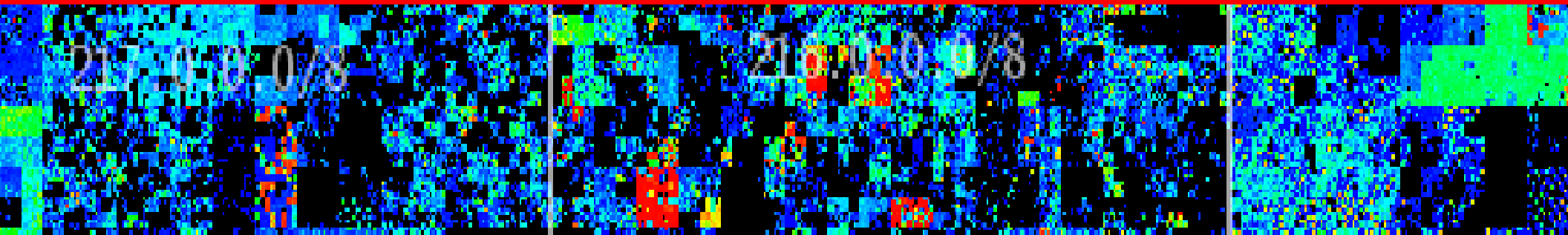
Big Data: Analytics & Adaptive Mining

- 24/7 Video Surveillance generates "TeraBytes" of "Big Data", most of which is totally redundant!

- Big Data becomes relevant & valuable when "mined" with Intelligent Software Search Tools

- Practically all major DataBase Search & Mining Businesses are investing in R&D for effcent & practical Intelligent On-Line & Big Data Search!

….Intelligent Video Analytics are now ESSENTIAL to provide real-time alerts from Big Media Datasets!

......Big Data Mining, Machine Learning, Adaptive Systems & Intelligent Analytics!

William J. Tastle *Editor*

Data Mining Applications Using Artificial Adaptive Systems

Springer

Machine Learning and Cognitive Science Applications in Cyber Security

Muhammad Salman Khan

IGI Global
DISSEMINATOR OF KNOWLEDGE

Copyrighted Material
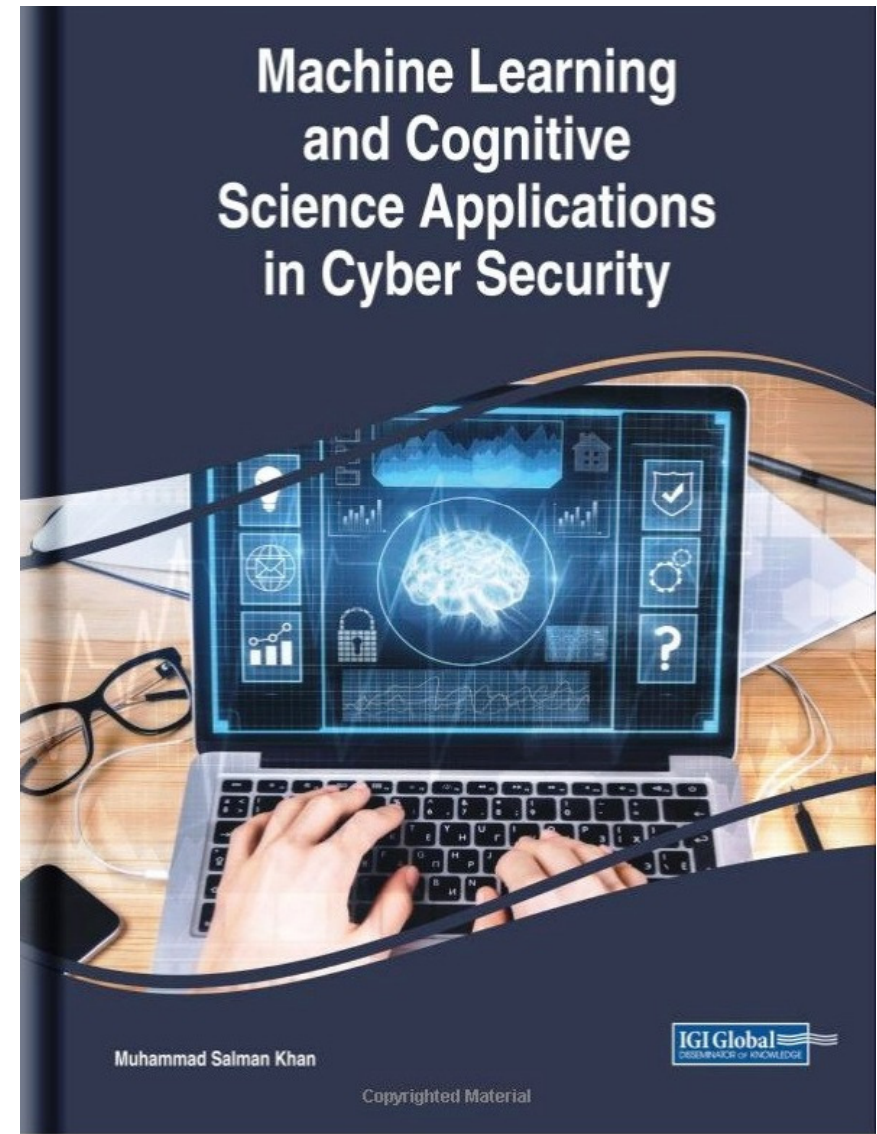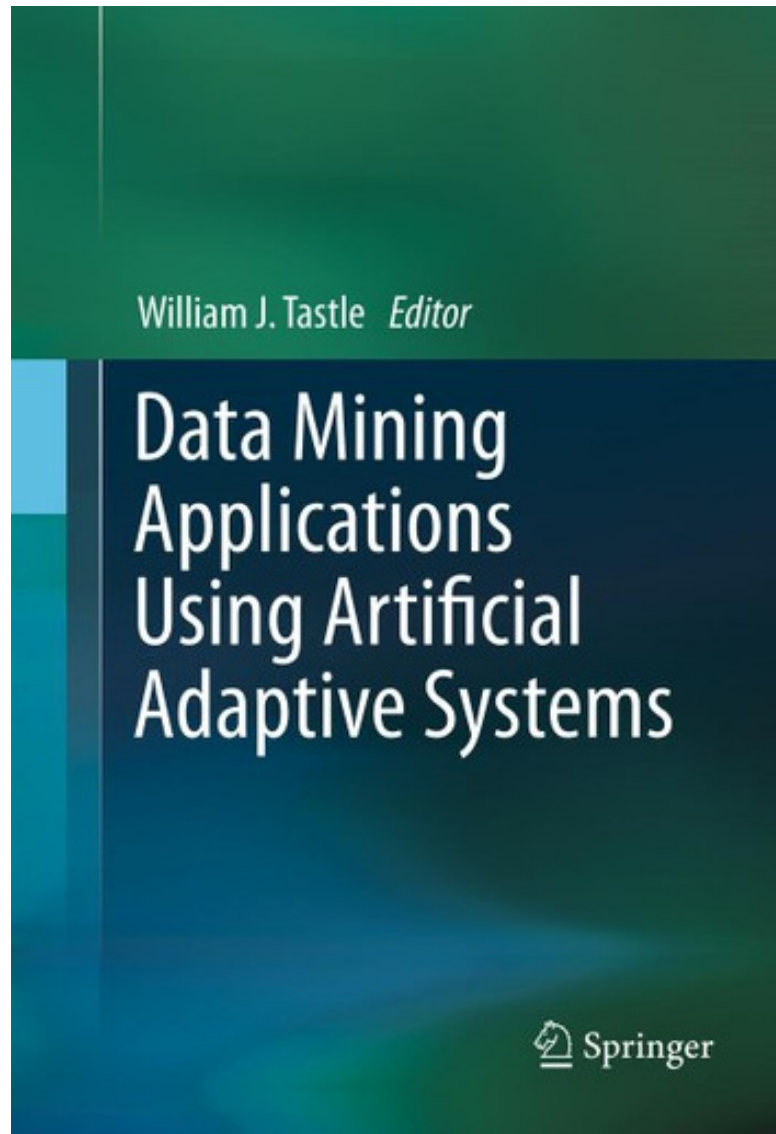
Intelligent **Video** Surveillance!...

9 – *YOUR Business Security & Surveillance*

"YOUR Business Plan"
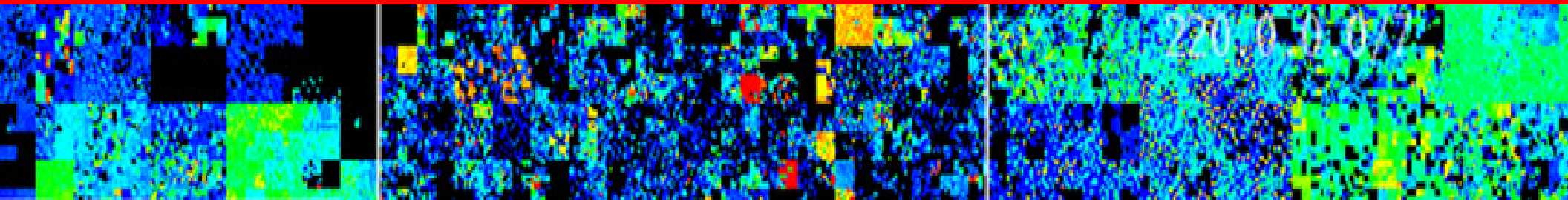
YOUR Top **3 Actions** & *Security RoadMap*

- **Action 1:** CSO-Led Board-Level Review & Audit of current Security Assets & Operations – 60 days

- **Action 2:** Investigate Major CyberSecurity Risks & Potential Threat & Attack Scenarios - 30 days

- **Action 3:** Develop Multi-Year Plan, Budget & Roadmap to Mitigate Identified Risks to include:

    a) Business-Wide "Cyber-Physical" Security Operations

    b) Upgrade *CCTV* & Integrate "Intelligent Video Surveillance"

    c) "IoT" Cyber Security for both Legacy & New Assets

    d) Professional "Cyber Security Training" & Development

    e) Security Staff Scenario Exercises for *"Terror Alerts"*

"Intelligent Video" against "Urban Terror"

24/7 Intelligent **Video** Surveillance
Securing Your Business Data & Privacy!
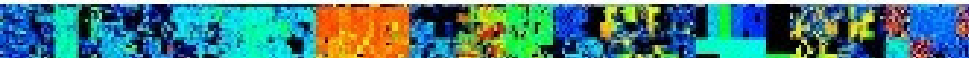
Prepare for Terror Threats & Attacks
Through *Intelligent Real-Time Cyber*
& 24/7 Video Surveillance Operations!
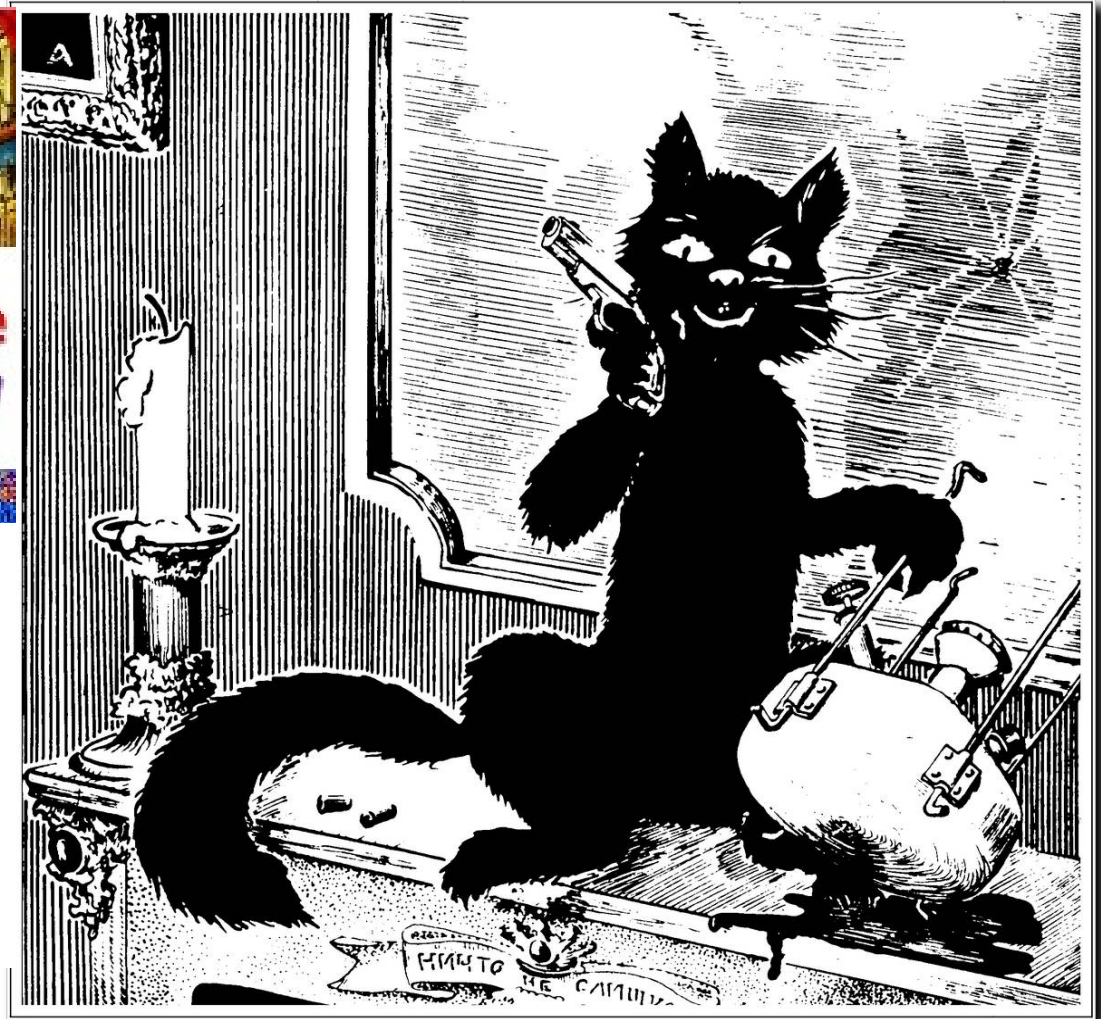
Bulgakov's Satanic Cat – Бегемот - Master & Margarita - 1972
Pen & Ink Drawing by **Dr Alexander Rimski-Korsakov (1936 – 2018)**

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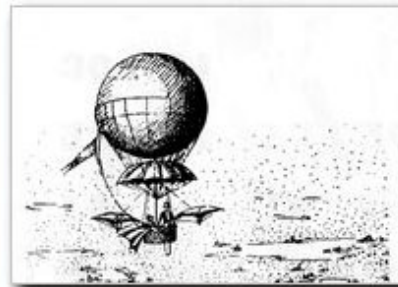
The Surrealistic Paintings of Dr Alexander Rimsky-Korsakov
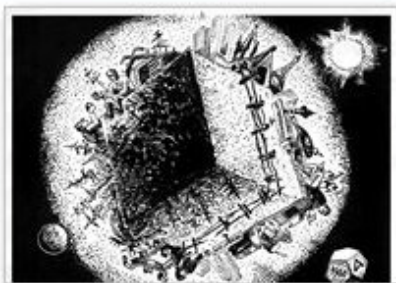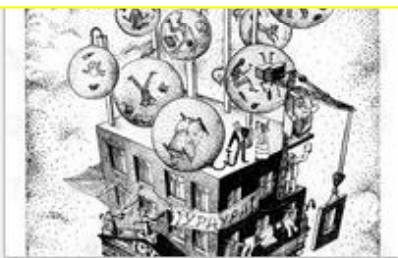
Web Link: www.valentina.net/ARK3/ark2.html

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21ˢᵗC FinTech, *Surveillance* & Futures!

"21stC CyberSecurity": Fintech, Video & 2020s!...

21ˢᵗC Trends in FinTech Security
- *AI, Deep Learning & Blockchain!* -

Dr David E. Probert
VAZA International

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Securing Your Business Data & Privacy!

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VAZA International

Effective CyberSecurity for 2020s
- *Intelligent Analytics & Modelling* -

Dr David E. Probert
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(1) FinTech Security

(2) Video Surveillance

(3) CyberFutures: 2020s+

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Download *Cyber* Slides: www.valentina.net/NAPLES2019/

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References.
1. New Castle
2. The Mole
3. The Great Coston House
4. New Bridge
5. Medina Fountain
6. Sedile of Nido
7. St Francis Saverio
8. The Arsenal
9. St Lewis
10. The Palace Gois
11. St Lucia
12. Eggs Castle
13. St Mary of the Victoria
14. Chiaja Gate
15. Chiaja Bridge
16. St Teresa Chiaja
17. The Ascention
18. St Mary in Portu
19. St Leonard

A PLAN of the CITY of NAPLES

20. The Little St Joseph
21. New St Mary
22. Cocceo Grotto
23. Virgilius's Sepulchre
24. Mergellino
25. St Eramo Castle
26. St Martin P. Certosini
27. St Lucy of the Mount
28. Calvario Mount

40. St Biaggio
41. Gr. St Augustin
42. St Eligio
43. Market Fountain
44. The Carminiello
45. St Catharine Parrocchia
46. Royal Gate of the Navy
47. Carmine Church
48. Carmine Castle

60. The Archbishoprick
61. St Lawrence P. Convent
62. Gr. St Mary
63. The Souls of the Purgatory
64. The Wisdom
65. Little St John
66. St Dominic of Calabresi
67. St Mary Caravaggio
68. New St Eramo
69. The Kings Study
70. Constantinople Gate

"NAPLES – 1800"

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Additional *Cybersecurity* Resources

"Master Class - Smart Theory & Practice"	"Master Class 2012 - Smart Design"	"21stC Armenia- 2012: Smart Economy"	"21stC Armenia - 2012: Smart Security"	"21stC Armenia: Smart Governance"
"Real-Time Armenia" - White Paper	"Real-Time Armenia" - Slides	Awesome Armenia: In Photos	Roadmap for Real-Time Armenia- Report	RoadMap for Real-Time Armenia- Slides
"Real-Time Georgia" - GITI 2008 Slides	"Real-Time Georgia" - GITI 2008 Paper	Gorgeous Georgia: In Photos	21stC Georgia: "CyberVardzia" - Paper	21stC Georgia - "CyberVardzia" - Slides
			ITU/CITEL: Cybersecurity in the Americas	ITU/CITEL: Cybersecurity Skills Building

Link: www.valentina.net/vaza/CyberDocs

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Professional Profile - *Dr David E. Probert*

- **Computer Integrated Telephony (CIT)** – Established and led British Telecom's £25M EIGER Project during the mid-1980s' to integrate computers with telephone switches (PABX's). This resulted in the successful development and launch of CIT software applications for telesales & telemarketing

- **Blueprint for Business Communities** – Visionary Programme for Digital Equipment Corporation during late-1980's that included the creation of the "knowledge lens" and "community networks". The Blueprint provided the strategic framework for Digital's Value-Added Networks Business

- **European Internet Business Group (EIBG**) – Established and led Digital Equipment Corporation's European Internet Group for 5 years. Projects included support for the national Internet infrastructure for countries across EMEA as well as major enterprise, government & educational Intranet deployments. Dr David Probert was a sponsoring member of the European Board for Academic & Research Networking (EARN/TERENA) for 7 years (1991 ➔1998)

- **Supersonic Car (ThrustSSC***)* – Worked with Richard Noble OBE, and the Mach One Club to set up and manage the 1st Multi-Media and e-Commerce Web-Site for the World's 1st Supersonic Car – ThrustSSC – for the World Speed Record.

- **Secure Wireless Networking** – Business Director & VP for Madge Networks to establish a portfolio of innovative fully secure wireless Wi-Fi IEEE802.11 networking products with technology partners from both UK and Taiwan.

- **Networked Enterprise Security** - Appointed as the New Products Director (CTO) to the Management Team of the Blick Group plc with overall responsibility for 55 professional engineers & a diverse portfolio of hi-tech security products.

- **Republic of Georgia** – Senior Security Adviser – Appointed by the European Union to investigate and then to make recommendations on *all* aspects of IT security, physical security and BCP/DR relating to the Georgian Parliament, and then by UN/ITU to review Cybersecurity for the Government Ministries.

- **UN/ITU** – Senior Adviser – Development of Cybersecurity Infrastructure, Standards, Policies, & Organisations in countries within both Europe & Americas

Dr David E. Probert is a Fellow of the Royal Statistical Society, IEEE Life Member and 1st Class Honours Maths Degree (Bristol University) & PhD from Cambridge University in Self-Organising Systems (Evolution of Stochastic Automata) , and his full professional biography is featured in the Marquis Directory of Who's Who in the World: 2007-2020 Editions.

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