Quantum + Integrity

DEEPFAKE & VISUAL FRAUD DETECTION

Swiss made precision media security

© Quantum Integrity SA – December 2019

Nikolai Yezhov, pictured right of Stalin, was later removed from this photograph at the Moscow Canal. (Credit: Fine Art Images/Heritage Images/Getty Images & AFP/GettyImages)

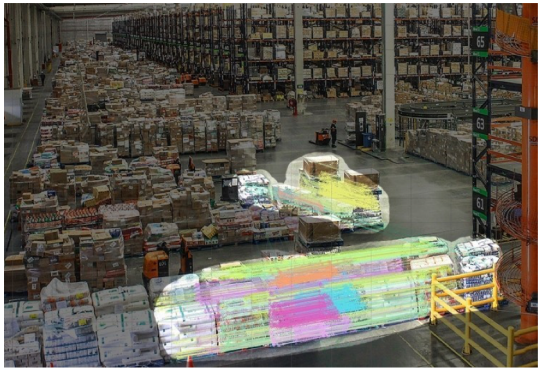
© Quantum Integrity SA – December 2019

BEFORE DEEPFAKE

- ✓ CLASSICAL MANIPULATION / FORGERY USING SOFTWARE LIKE PHOTOSHOP
- ✓ DIFFERENT ATTACK / MANIPULATION TYPES, ie: “COPY MOVE” ”SPLICING” “IN PAINTING” “CGI”
- ✓ FORGERY DETECTION IS BASED ON ATTACK OR MANIPULATION TYPE: MEANING MIGHT BE 99% EFFICIENT FOR COPY MOVE BUT 0% FOR A NEW TECHNIQUE SUCH AS IN PAINTING

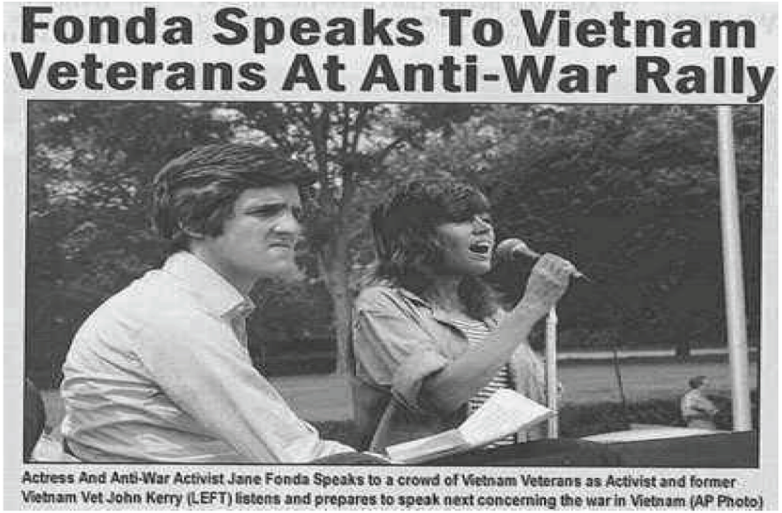
© Quantum Integrity SA – December 2019

COPY MOVE



© Quantum Integrity SA – December 2019

SPLICING



(a) Spliced Image

(b) Authentic Image

(c) Authentic Image

© Quantum Integrity SA – December 2019

INPAINTING

© Quantum Integrity SA – December 2019

CGI

© Quantum Integrity SA – December 2019

SO WHAT'S A DEEPFAKE?

DEEPFAKE IS AN AI-BASED TECHNOLOGY USED TO PRODUCE OR ALTER VIDEO CONTENT SO THAT IT PRESENTS SOMETHING THAT DIDN'T, IN FACT, OCCUR. THE TERM IS NAMED FOR A REDDIT USER KNOWN AS DEEPFAKES WHO, IN DECEMBER 2017, USED DEEP LEARNING TECHNOLOGY TO EDIT THE FACES OF CELEBRITIES ONTO PEOPLE IN PORNOGRAPHIC VIDEO CLIPS.

© Quantum Integrity SA – December 2019

© Quantum Integrity SA – December 2019

PROBLEM

DEEPFAKES ARE A THREAT TO GLOBAL SECURITY

ECONOMIC SECURITY

POLITICAL STABILITY

PERSONAL INTEGRITY

© Quantum Integrity SA – December 2019

PROBLEM

THE TECHNOLOGY TO DEVELOP DEEPFAKES IS ACCELERATING

PER DAY, 20 B IMAGES & VIDEOS UPLOADED TO SOCIAL & TRADITIONAL MEDIA.

© Quantum Integrity SA – December 2019

CUTTING-EDGE DEEP FAKE

© Quantum Integrity SA – December 2019

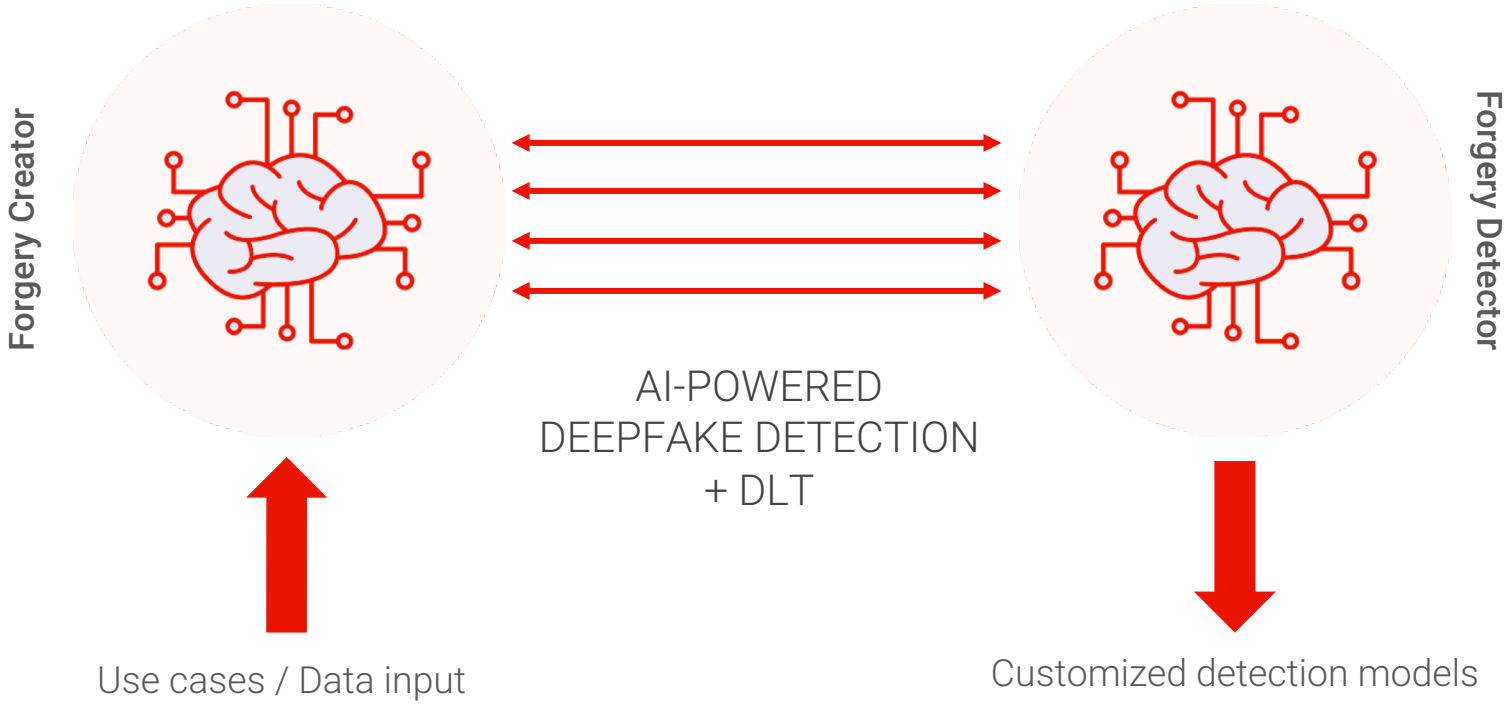
THE REALITY

- ✓ TODAY A GAN NETWORK CANNOT BE USED TO CREATE A MOVIE FROM SCRATCH. NOR FOR THAT MATTER CAN IT MODIFY AN ENTIRE VIDEO.
- ✓ SOFTWARE IS AVAILABLE TO USE GAN ON SPECIFIC CONTENT (E.G. FACES), BUT AS OF YET WE DO NOT HAVE A FEEPFAKE CREATIO EX NIHILO.
- ✓ IN THE GEMINI MAN EXAMPLE, WILL SMITH'S SALARY WAS HALF OF WHAT IT COST TO CREATE THE DEEPFAKE.
- ✓ THIS WILL OF COURSE CHANGE AS TECHNOLOGY IS ADVANCING EXPONENTIALLY.

© Quantum Integrity SA – December 2019

SOLUTION

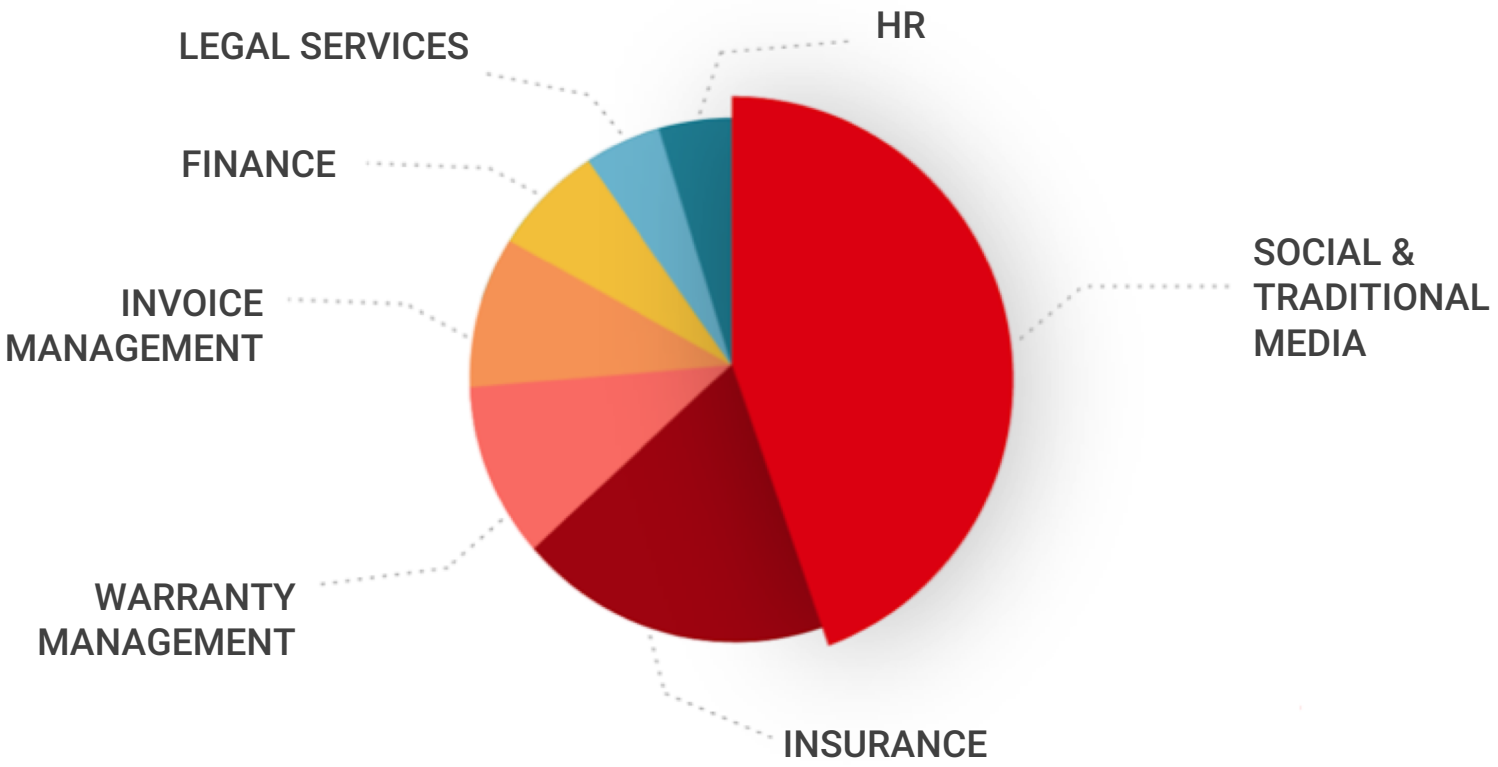
QI'S GENERATIVE ADVERSARIAL NEURAL NETWORK



© Quantum Integrity SA – December 2019

SEGMENTS

TOTAL AVAILABLE GLOBAL MARKET ESTIMATED AT OVER 70B AND GROWING



© Quantum Integrity SA – December 2019

SECTORS

INSURANCE

8%-10% of all insurance claims contain fraud

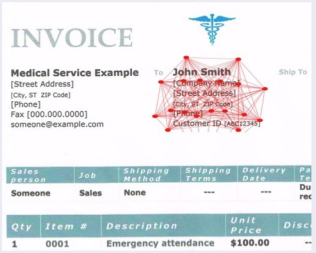
Cost to industry $100B/per yr.

WARRANTY

8%-15% of warranty claims are fraudulent

Cost to industry $50B/per yr.

INVOICE MANAGEMENT



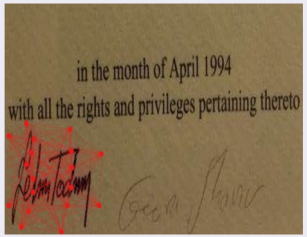
From corporate expenses to forged invoices in the workflow.

Cost to industry $100B+/yr.

BANKING

KYC in finance: mobile money transactions.

LAW



The US legal system inspects: ~100,000,000 images per year

HR

Falsified academic credentials and recommendations

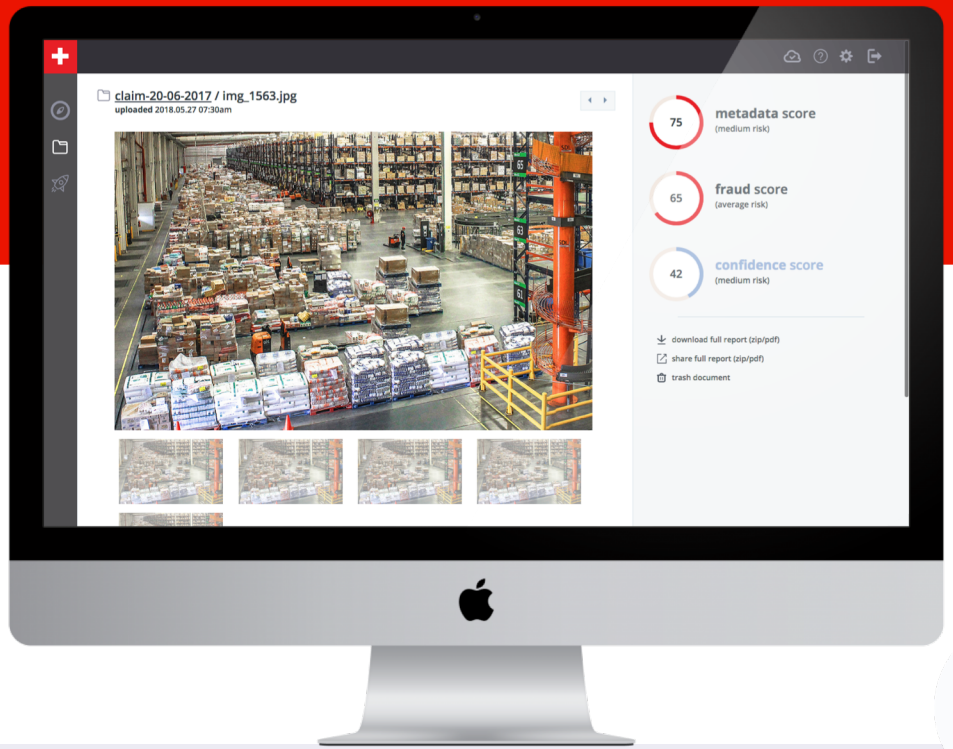
© Quantum Integrity SA – December 2019

CHALLENGES

- ✓ HOW TO WORK LIMITED DATA
- ✓ HOW MAKE A UNIVERSAL DETECTOR THAT CAN ADAPT TO USE CASES WITHOUT CHANGE IN ARCHITECTURE AND IMPLEMENTATION
- ✓ HOW TO KEEP WITH FAST PACE OF DEEPFAKE DEVELOPMENT
- ✓ AND A LAST THOUGHT: CONFIRMATION BIAS – OR WHAT TO DO WHEN PEOPLE BELIEVE WHAT THEY WANT TO BELIEVE, GOING ONLINE TO CONFIRM THEIR VIEWPOINT.

© Quantum Integrity SA – December 2019

Quantum + Integrity



Contact person:
Anthony D. Sahakian
+41 22 535 0290
anthony@quantumintegrity.ch

Quantum Integrity SA
EPFL Innovation Park
Bâtiment C
1015 Lausanne Switzerland

© Quantum Integrity SA – December 2019