ICTLab

Digital Forensics – AI & Computer Vision



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THE COMPANY

About us

2016

iCTLab was founded in 2016 as a **spin-off of the University of Catania**, born from the collaboration of the company's founders.



Prof. Sebastiano Battiato
Founder & Scientific Advisor



Dr. Antonino Paratore
Founder & Digital Forensics Expert

OUR MISSION

To bring to every analysis the **expertise** gained between **academic research** and **real cases**, bringing out what matters from **digital and multimedia data**.

THE COMPANY

Our team

Our multidisciplinary team combines scientific and technical expertise so that each area strengthens the others' workflows

1



Scientific Advisor

Strategic guidance and specialist advice to ensure scientific rigour in every project

2



Digital Forensics Experts

Specialists in the recovery and analysis of digital evidence using certified, state-of-the-art methodologies

8



AI & Computer Vision (including 2 Ph.D.s)

Experts dedicated to Research and Development and to building innovative Artificial Intelligence solutions, with a particular focus on Computer Vision and Advanced Multimedia Analysis

3



Administration, HR and Communications

Integrated management of business processes, human resources, and internal and external communications

The two sides of iCTLab

BLACK

Digital Forensics

The **Digital Forensics** business line focuses on solving cases with cutting-edge technologies that leave no detail overlooked, with the aim of **revolutionising** forensic investigations.



WHITE

AI & Computer Vision

The **AI & Computer Vision** business line is the Research and Development arm that creates innovative products and software, in particular **Artificial Intelligence solutions**

ICtLab

Digital Forensics

- Device Analysis
- Event Reconstruction
- Data Recovery



DIGITAL FORENSICS

We detect, analyse, reconstruct and solve

WHO WE HELP

We work with **public prosecutors, lawyers and private clients**, providing forensic technical consultancy to solve highly complex cases

HOW WE WORK

We use **innovative** methodologies and **cutting-edge** technologies to analyse crime scenes and leave no element overlooked

WHAT WE RECONSTRUCT

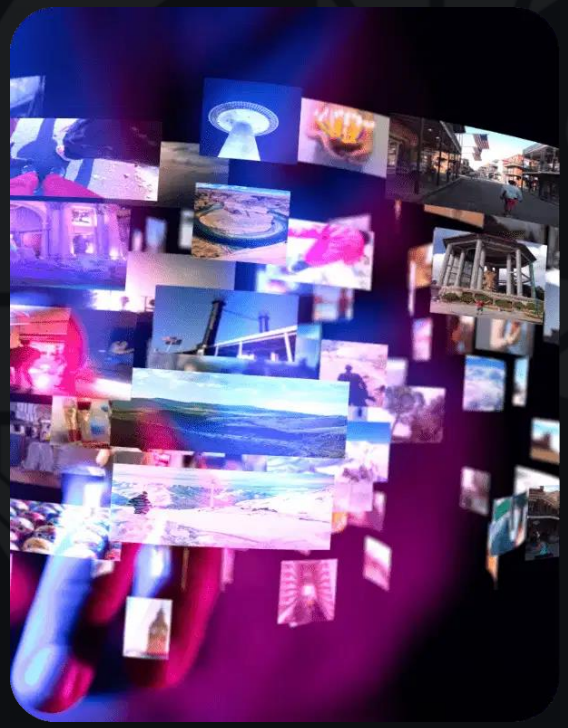
We reconstruct cases by exploring millions of unknown possibilities and recreating every detail in purpose-built **3D environments**



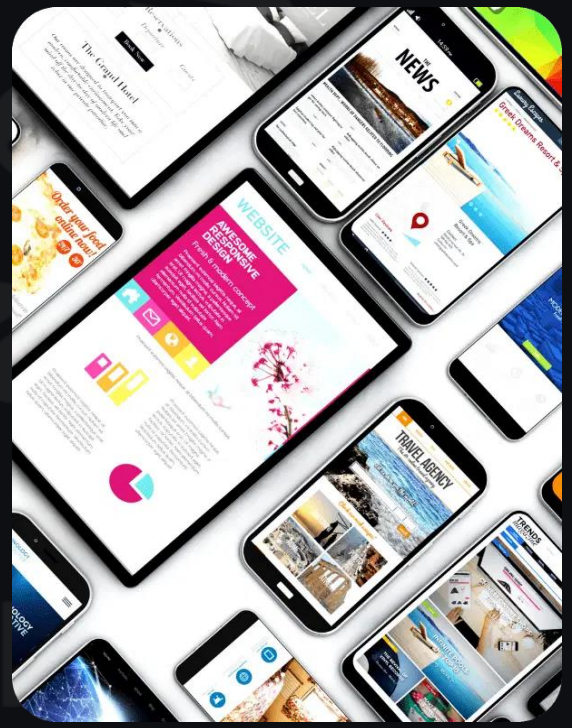
DIGITAL FORENSICS

Analysis Services

Worried about your privacy, need to verify the authenticity of media, or recover information from blurry footage? We've got you covered.



01 **Multimedia Content**



02 **Devices**



03 **Event Reconstruction**



04 **Web Data**

DIGITAL FORENSICS · CASE STUDY

Reconstructing a bullet’s trajectory

An examination to determine the moment a shot was fired and, from it, the trajectory of the bullet.

THE CASE

Analyse the position of Subject 1 when the shot was fired at Subject 2, and determine whether the trajectory was direct or indirect.

EVIDENCE EXAMINED

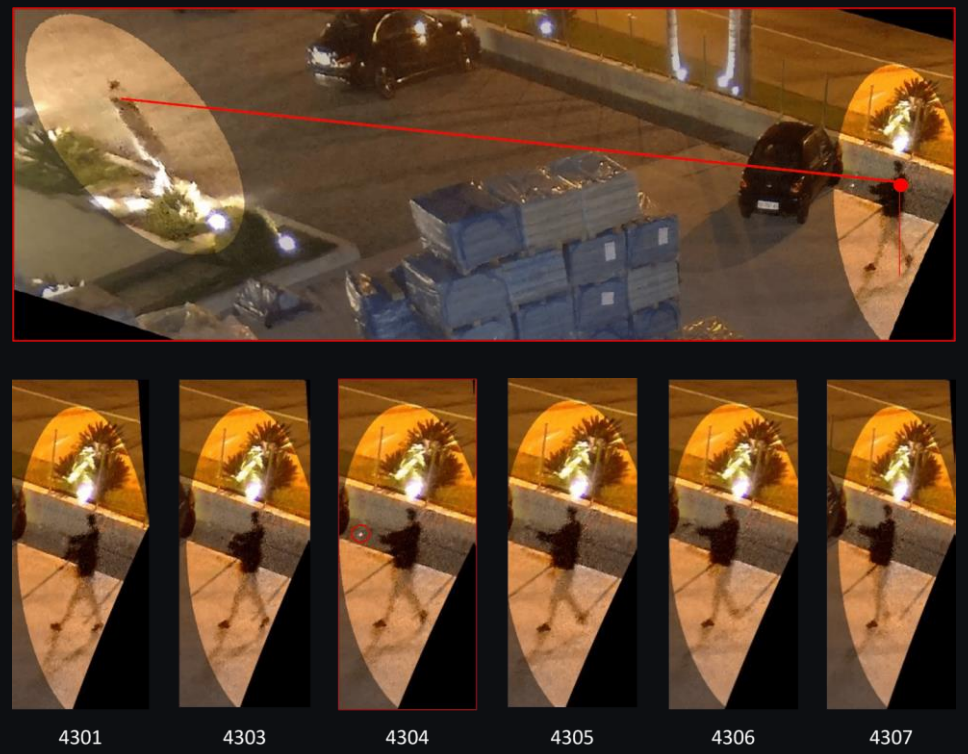
Review of video footage stored on a USB drive, extracted from the CCTV cameras of a commercial business.

TECHNIQUES USED

Enhancement of the video frames using Amped FIVE software.

CONCLUSIONS

Analysis of the key frames, enhanced with Amped FIVE, showed that Subject 1’s line of fire was not aimed at Subject 2. A detailed study of the positions and of the angle of the shooter’s arm revealed that the weapon was pointed at the ground. This orientation caused the bullet to ricochet rather than hit Subject 2 directly.



DIGITAL FORENSICS · CASE STUDY

Simulating uncertainty

Reconstructing the dynamics of a road accident through simulations built on the analysis of evidence found at the scene.

THE CASE

An elderly woman is hit by a car while crossing the road.

EVIDENCE EXAMINED

Assessment of the points of impact on the car, the skid marks on the road surface and the fractures suffered by the victim.

TECHNIQUES USED

On-site survey of the accident scene and reconstruction of the events in a 3D simulation.



CONCLUSIONS

After reconstructing the scene in three dimensions, we ran a series of simulations to replicate all the unknown variables, starting from the few known ones. The ultimate goal was to understand whether the parties involved could have had sufficient mutual visibility and speeds to avoid the accident.

DIGITAL FORENSICS · CASE STUDY

Recognising the camouflage pattern of a shoe

THE CASE

Assessing whether the pattern and design of the shoes worn by people filmed in two videos, recorded at different times, are compatible.

TYPES OF ANALYSIS

Visual analysis of the videos, filtering and enhancement with Amped FIVE software, pixel-level image analysis.

EVIDENCE EXAMINED

Review of footage from two surveillance cameras.
The review identified people wearing camouflage-patterned shoes. In the first video, one of the two subjects, with his face uncovered, is wearing camouflage-print shoes. In the second video, a hooded man is wearing similar shoes. The shoes were then compared.
Once the subjects had been identified, the unique details made it possible to recognise the brand of the shoes as “Adidas”.



CONCLUSIONS

The manufacturer confirmed that the model is unique, ruling out the possibility of two pairs with an identical pattern. The evidence indicates a high degree of compatibility between the shoes, supporting the hypothesis that they belonged to the same person filmed at two different times.

ICtLab

AI & Computer Vision

- Artificial Intelligence
- Computer Vision
- Multimedia Analysis



Multimedia files hold no secrets for us

ARTIFICIAL INTELLIGENCE

We deliver innovative products built on our own **Artificial Intelligence**

RESEARCH AND DEVELOPMENT

We are actively engaged in **Research and Development** through our collaboration with the University of Catania and other research institutions

MULTIMEDIA PROCESSING

We process multimedia files of every **type** and in any **volume**, cataloguing them easily with our AI.



Visualize

Turns visual data into **concrete** action, from urban monitoring to industrial safety

VisuAlize is a **video-aware AI assistant** that analyses video streams in real time and delivers actionable insights through a conversational interface, acting as a vigilant, intelligent eye.

Real-time analysis of video streams

Intuitive conversational interface

Actionable insights for data-driven **decisions**



Icon

Boosts efficiency, reduces errors, frees up time for high-value work

Icon is an **AI chatbot** that answers complex questions in natural language by analysing large volumes of documents, providing **precise answers** with exact citations, powered by AI and RAG technology.

Fast analysis of **large archives** of data

Precise answers to **complex questions**

Tailored **strategic** suggestions



AI & COMPUTER VISION · PLATFORM

Our ever-evolving AI

CAVE™



TO GET CLARITY

AI to clean up and improve your content

Photo denoising
Video stabilisation
Audio noise removal



TO EXTRACT

AI to help you analyse your content

Structured data extraction
Scene understanding
Activity recognition



TO TRUST

AI to help you avoid fake content

Audio authenticity
Image tampering
Video deepfakes



TO DISCOVER

AI to explore large databases and find insights

Natural-language queries
Large database search
People, places and dates

Four actions to extract **value** from multimedia data of any size, for every need.

CAVE · VERIFY

Deepfake detection research

Deepfake generation techniques keep evolving. For years, **Prof. Sebastiano Battiato** and the iCTLab R&D team have researched state-of-the-art **deepfake detection** methods.

This research is the foundation of **Verify**: the know-how to detect fake audio, images and video.

EXAMPLE FROM OUR RESEARCH



Selected scientific papers on the topic:

- Guarnera, L., Giudice, O., & Battiato, S. (2020). Deepfake detection by analyzing convolutional traces. In *Proceedings of the IEEE/CVF conference on computer vision and pattern recognition workshops* (pp. 666-667).
- Guarnera, L., Giudice, O., Nießner, M., & Battiato, S. (2022). On the exploitation of deepfake model recognition. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition* (pp. 61-70).
- Casu, M., Guarnera, L., Caponnetto, P., & Battiato, S. (2024). GenAI mirage: The impostor bias and the deepfake detection challenge in the era of artificial illusions. *Forensic Science International: Digital Investigation*, *50*, 301795.

AI & COMPUTER VISION · USE CASE

Image Analysis

Automatic image analysis for captioning and tagging

NEED

To automatically analyse and categorise large volumes of images according to specific criteria.

OUR SOLUTION

We developed an AI system that combines two modules:
- **Image Captioning**: automatic description of the image content
- **Custom Tagging**: labelling based on a custom taxonomy

Image Input



AI Processing

Output

Caption: Smiling arab man in the desert drinking from a white cup

Tags:
- Man
- Arab
- Desert

AI & COMPUTER VISION · USE CASE

Smart Digitalisation

Advanced digitisation and search of scanned documents

Need

Investigators must analyse **large sets of scanned police files** on organised-crime cases.

Scans are not searchable, and the legal language and layouts make **manual review slow**.

OUR SOLUTION · An AI system for:

01

Smart Digitisation

- Conversion of scans into digital text with OCR.
- Automatic linking of footnotes to the main text.

02

Building a knowledge graph

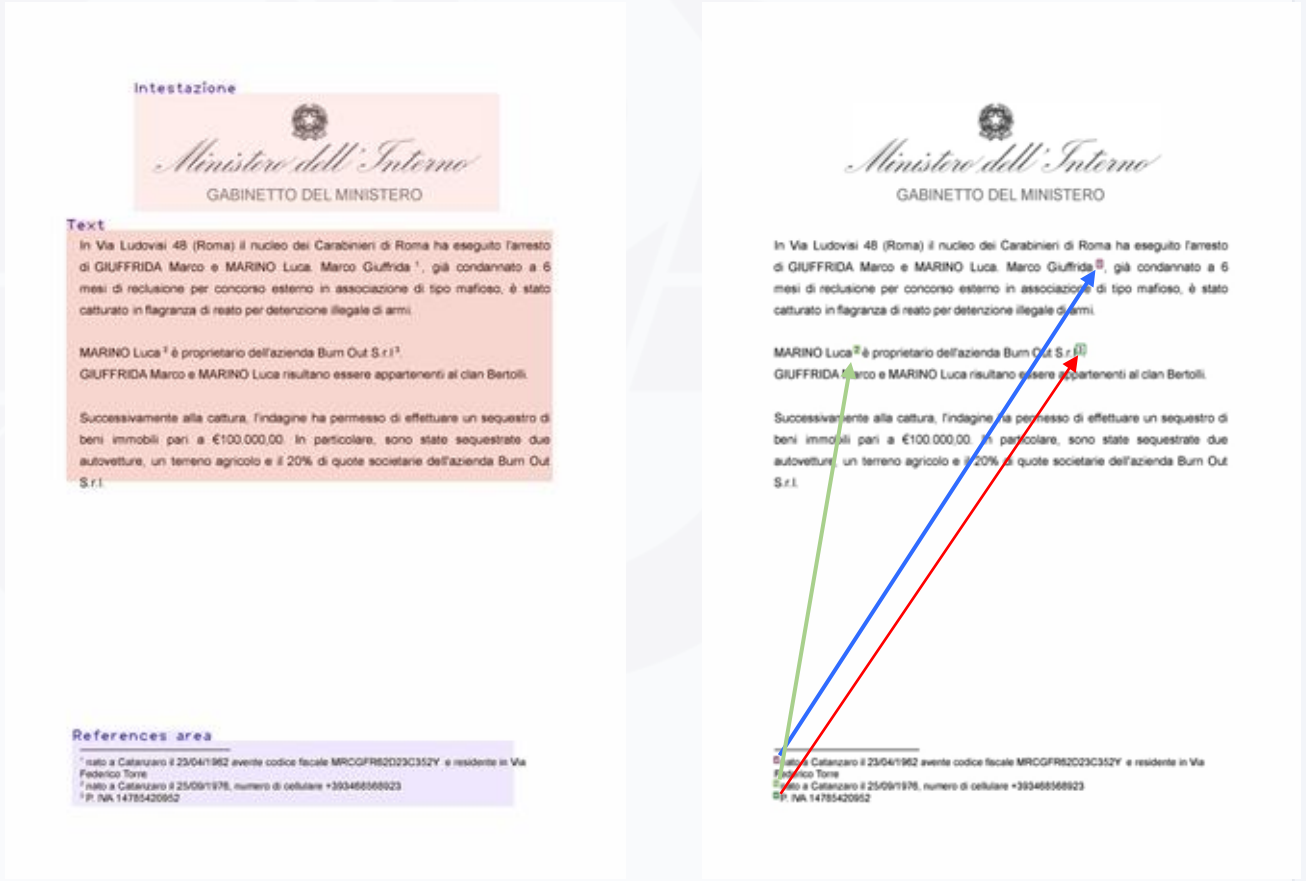
- Extraction of named entities using **Named Entity Recognition**
- Linking the entities to form a knowledge graph

AI & COMPUTER VISION · USE CASE

Smart Digitalisation

Advanced digitisation and search of scanned documents

DIGITISATION WITH iOCR



ENHANCED RESULT (TRANSLATED)

At Via Ludovisi 48 (Rome), the Rome Carabinieri unit arrested GIUFFRIDA Marco and MARINO Luca. Marco Giuffrida **[born in Catanzaro on 23/04/1962, tax code MRCGFR62D23C352Y, resident in Via Federico Torre]** , previously sentenced to 6 months' imprisonment for external complicity in a mafia-type association, was caught in the act of illegally possessing weapons. MARINO Luca **[born in Catanzaro on 25/09/1976, mobile number +393468568923]** owns the company Burn Out S.r.l **[VAT no. 14785420952]** 3. GIUFFRIDA Marco and MARINO Luca were found to belong to the Bertolli clan. Following the arrest, the investigation led to the seizure of assets worth €100,000.00. In particular, two cars, a plot of agricultural land and a 20% stake in Burn Out S.r.l. were seized.

Note: this document is a mock-up

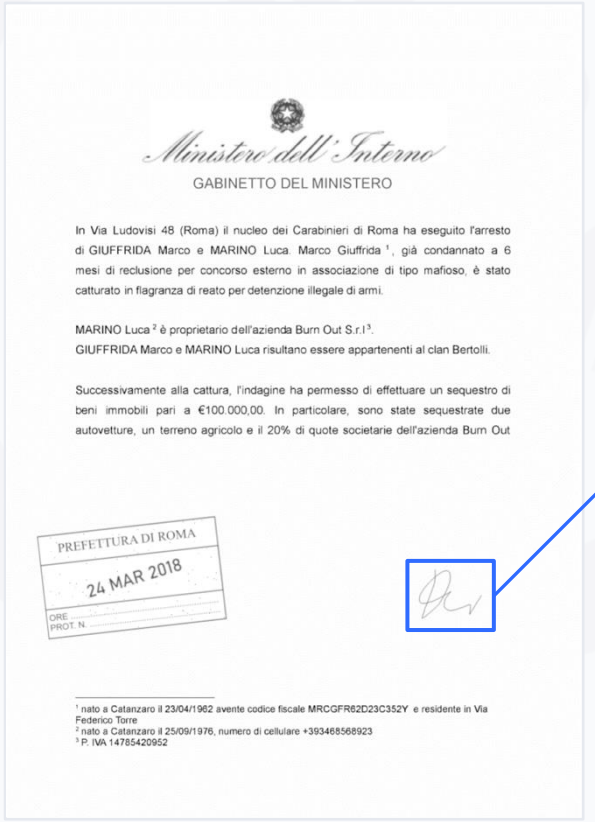
AI & COMPUTER VISION · USE CASE

Smart Digitalisation

Advanced digitisation and search of scanned documents

xenia SOFTWARE SOLUTIONS

SIGNATURE COMPARISON



Ministero dell'Interno

GABINETTO DEL MINISTERO

In Via Ludovisi 48 (Roma) il nucleo dei Carabinieri di Roma ha eseguito l'arresto di GIUFFRIDA Marco e MARINO Luca. Marco Giuffrida [1], già condannato a 6 mesi di reclusione per concorso esterno in associazione di tipo mafioso, è stato catturato in flagranza di reato per detenzione illegale di armi.

MARINO Luca [2] è proprietario dell'azienda Burn Out S.r.l [3].
GIUFFRIDA Marco e MARINO Luca risultano essere appartenenti al clan Bertolli.

Successivamente alla cattura, l'indagine ha permesso di effettuare un sequestro di beni immobili pari a €100.000,00. In particolare, sono state sequestrate due autovetture, un terreno agricolo e il 20% di quote societarie dell'azienda Burn Out

PREFETTURA DI ROMA
24 MAR 2018
ORE
PROT. N.

[1] nato a Catanzaro il 23/04/1962 avente codice fiscale MRCGFR62D23C352Y e residente in Via Federico Torre
[2] nato a Catanzaro il 25/09/1976, numero di cellulare +393468568923
[3] P. IVA 14785420952

EXTRACTED

SIGNATURE DATABASE

iOCR finds the signatures on each scanned page and extracts them.

Each one is compared with a database of known signatures to **identify the signer**.

AI & COMPUTER VISION · USE CASE

Smart Digitalisation

Advanced digitisation and search of scanned documents

BUILDING THE KNOWLEDGE GRAPH WITH iNLP

GABINETTO DEL MINISTERO [Ente o Autorità 1.0] In Via Ludovisi 48 (Roma) [Luogo Specifico Noto 1.0] il nucleo [Ente o Autorità 1.0] dei Carabinieri [Ente o Autorità 1.0] di Roma [Area Geografica 1.0] ha eseguito l' arresto [Provvedimento 1.0] di GIUFFRIDA Marco [Soggetto Fisico 1.0] e MARINO Luca [Soggetto Fisico 1.0] . Marco Giuffrida [Soggetto Fisico 1.0] [nato a Catanzaro [Area Geografica 1.0] il 23/04/1962 [Riferimento Temporale Specifico 1.0] avente codice fiscale MRCGFR62D23C352Y [Codice Fiscale 1.0] e residente in Via Federico Torre] ' [Luogo Specifico Noto 1.0] , già condannato [sf:status_giuridico 1.0] a 6 mesi di reclusione [Pena 1.0] per concorso esterno in associazione di tipo mafioso [Titolo del Reato 1.0] , è stato catturato in flagranza di reato [Provvedimento 1.0] per detenzione illegale di armi [Titolo del Reato 1.0] . MARINO Luca [Soggetto Fisico 1.0] [nato a Catanzaro [Area Geografica 1.0] il 25/09/1976 [Riferimento Temporale Specifico 1.0] , numero di cellulare +393468568923 [Numero di Telefono 1.0]] ? è proprietario [sf:ruolo_qualifica 1.0] dell'azienda Burn Out S.r.l [P._ IVA [Soggetto Giuridico o Attività 1.0] 14785420952 [Partita Iva 1.0]] 3. GIUFFRIDA Marco [Soggetto Fisico 1.0] e MARINO Luca [Soggetto Fisico 1.0] risultano essere appartenenti al clan Bertolli [Associazione 1.0] . Successivamente alla cattura, l'indagine ha permesso di effettuare un sequestro di beni immobili [Bene Fisico 1.0] pari a €100.000,00 [Bene Patrimoniale 1.0] . In particolare, sono state sequestrate due autovetture [Bene Fisico 1.0] , un terreno agricolo [Bene Fisico 1.0] e il 20% di quote societarie [Bene Patrimoniale 1.0] dell'azienda Burn Out S.r.l. [Soggetto Giuridico o Attività 1.0]



People

Time

Crime/Measure

Place

Codes

Assets

AI & COMPUTER VISION · USE CASE

Automated video analysis

NEED

To automatically analyse long videos (such as full-length films), generating text descriptions and tags for every single scene.

SOLUTION

A purpose-built AI system for:
- **Automatic segmentation** of the video into distinct scenes.
- For each scene: **video captioning** (a text description of the content), generation of **relevant tags**, and a detailed scene-by-scene report combining captions and tags.

Video Input



AI Processing

Enhanced Output

Caption: A man and a woman cook various haute cuisine dishes in a quick succession of scenes.

Tags: man, woman, food, kitchen

AI & COMPUTER VISION · USE CASE

Advanced audio understanding

fides

CHALLENGE

A debt collection company needed to analyse large volumes of phone recordings to extract key information, assess call effectiveness and understand customer sentiment, while keeping sensitive data secure and processing it in real time.

SOLUTION

A scalable, on-premise, LLM-based AI system for:

- Real-time transcription of phone recordings.
- Conversation summaries and outcome classification.
- Sentiment analysis.
- Secure, regulation-compliant data processing.

TECHNICAL FEATURES

- Distributed architecture to handle high volumes.
- Auto-scaling to cope with load peaks.
- Containerised microservices for operational flexibility.
- High availability and data security.

AI & COMPUTER VISION · USE CASE

Multimedia Compliance Checker



CHALLENGE

A marketing agency needed to automatically check that the videos produced by creators matched the scripts provided, ensuring adherence to the agreed guidelines.

SOLUTION · A system based on a Multimodal LLM (Large Language Model) to:

01

Analyse simultaneously:

- The video produced by the creator.
- The original brief/script.

02

Generate complete feedback, including:

- An approved / not approved verdict.
- Detailed reasons for the decision.

03

Automate the review process,

ensuring consistency and speed.

AI & COMPUTER VISION · USE CASE

Multimedia Compliance Checker

CHALLENGE A marketing agency needed to automatically check that the videos produced by creators matched the scripts provided, ensuring adherence to the agreed guidelines.

Input



Brief:

1. Show the outer packaging, highlighting the logo and main specifications.
2. Open the box, listing all included accessories.
3. Take out the vacuum cleaner, emphasising its compact, modern design.
4. Demonstrate how easy the accessories are to fit.
5. Switch on the vacuum cleaner, highlighting its power and quietness.
6. Close by mentioning the competitive price and the 2-year warranty.

Multimodal LLM

Result: Not Approved

Reason: The video does not cover the main specifications, does not highlight the compact design, and emphasises how noisy the vacuum cleaner is instead of how quiet it is.

Our story so far

2016

iCTLab is founded

2017



Partnership with **CY4GATE**

Chatbot developed for **Levi's**

iCTLab develops a proprietary **Facial Recognition solution**

Consultancy on the **Tony Drago case**

2018

Collaboration with **Moxoff**

Computer Vision software for MyAv S.p.A. robots



ROME
Maker Faire
THE EUROPEAN EDITION

smau

2019

Exhibited at **SMAU** Milan and **Maker Faire** Rome

iCTLab rebrand

RESS SOLAR



2020

ReSolar project delivered

Significant growth in requests for forensic consultancy

Research focus on Deepfake Detection

L&T

2021

Collaboration with **L&T**



SICILIAE STVDIVM GENERALE
1434

2022

Record revenue
Projects with UniCT

iCTLab files a patent for its 3D VR
Ballistic Analysis System

2023

Joined the European projects KDT **ARCHIMEDES** and **R-PODID**

Exhibited at **Maker Faire 2023**

2024

Patent granted for the **3D VR Ballistic Analysis System**

Exhibited at the **Smart City Expo World Congress**

Launch of the **EDIH INNOVA project**

2025

Joined the European project **TWIN-LOOP**

Record revenue and value of production

2026

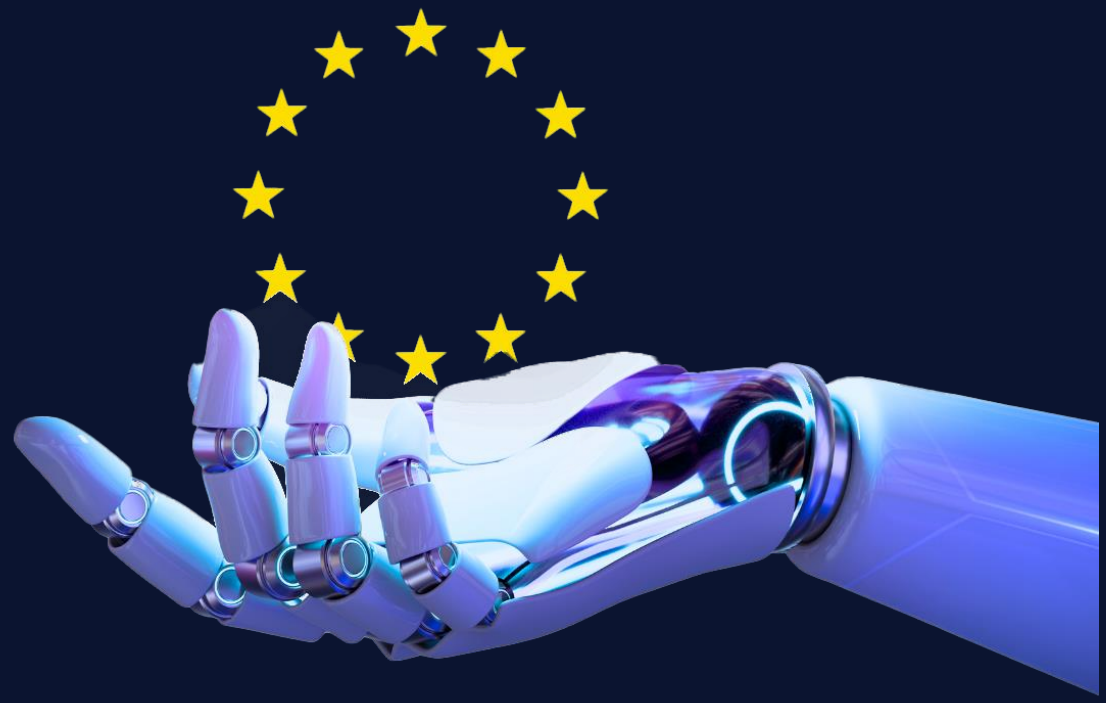
10th anniversary of the company's founding

EU AI Act ready

In line with the European Union's **AI Act**, we are working rigorously to ensure that our artificial intelligence systems comply with the regulation, with a view to subsequently issuing a **certification** of compliance to validate our **adherence** to these standards.

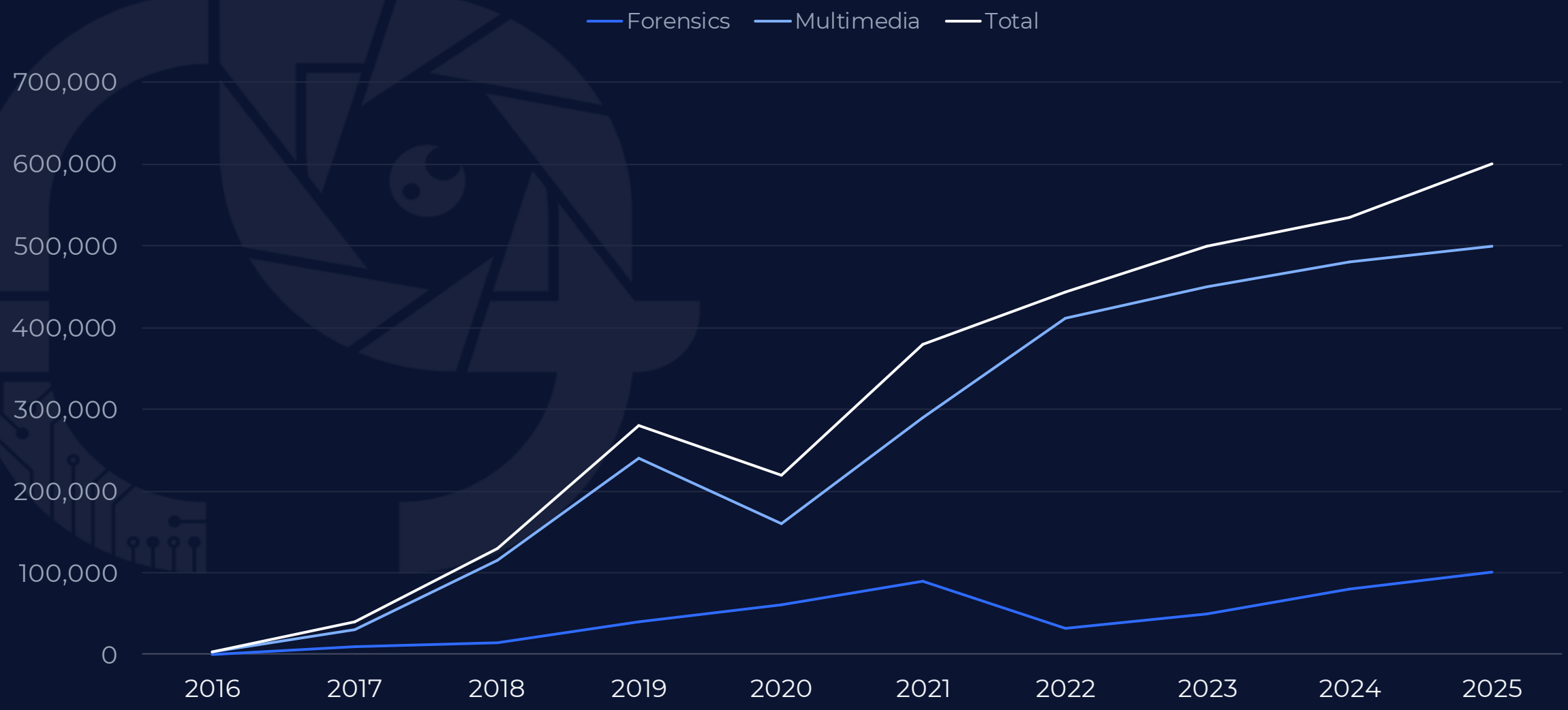
Our efforts aim to verify that our artificial intelligence systems and their operations comply with the regulatory framework set out in the AI Act.

We are committed to promoting **transparency**, **accountability** and **ethical practices** in the field of artificial intelligence.



THE COMPANY

iCTLab in numbers



Events and Awards

In both **2021** and **2022** iCTLab ranked in the TOP 3 at the **Legal Tech Awards**, which assessed 80 legaltech companies on their economic and financial foundations, long-term growth potential and company earnings.

In 2024 iCTLab received the "**Technological Innovation Award**" at the 6th edition of the Forensics Awards and was included in the **Legaltech Report** on the best legaltech companies in Italy







Events and Awards

iCTLab was also included in the first Legal Tech Report by 4cLegal and Gruppo 24 Ore.

The report featured the **LexIcon**, **iOCR** and **CAVE** solutions as innovative Digital Forensics and Legal Tech tools, confirming our commitment to technological excellence in the legal sector.

Read the report

4cLegal

GRUPPO 24 ORE

Clients & Partners





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