



cyclope.ai

AI-POWERED VEHICLE CLASSIFICATION FOR TOLLING TARIFICATION

Emmanuel Léger CEO

CONTEXT : WHAT IS CYCLOPE.AI ?

KEY FIGURES

53M
treated photos

3
products

3
patents accepted
or in-progress

25
employees

OUR PRODUCTS



OUR EXPERTISE

Image processing

Artificial intelligence

At-scale deployment

TARGETED SCOPE

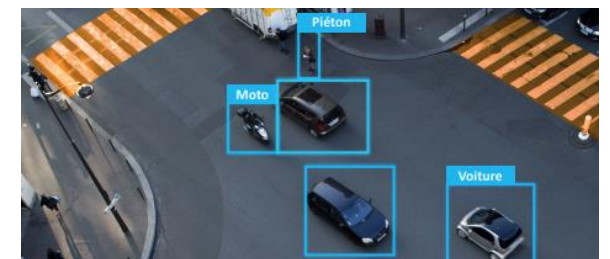
TOLL



ROAD



CITY



THE PAIN

VEHICLE CLASSIFICATION AT TOLL PLAZA

An impactful challenge for
all road operators



3 MAIN PAINFUL IMPACTS

INTERCOM CALLS

Real time



Many frictions
at toll plaza

CUSTOMER CLAIMS

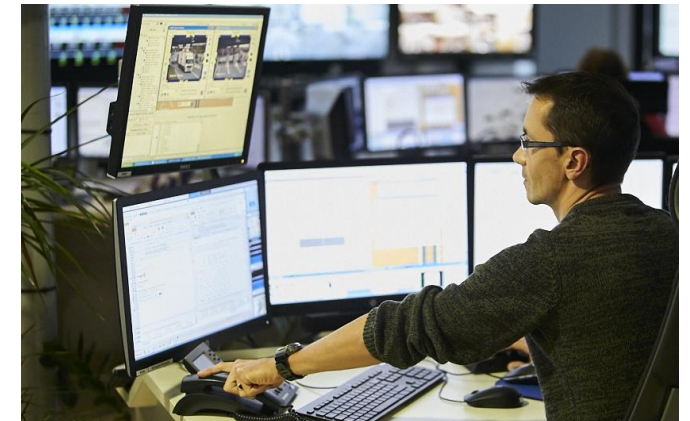
Delayed



Customers
unsatisfaction

OPERATORS WORKLOAD

Real time and delayed



Time-consuming
correction process

BIG IMPACT, BIG FIGURES

Key figures estimate

5-10%

of class errors

30-40%

of teleoperators working time

Focus on VINCI Autoroutes

17 M / year

Forced transactions
in real time

7,2 M / year

In delayed time

23 000 hours / year

Manual reprocessing

10 %

Of corrected errors were
cases of undercharging



HOW HAVE WE FIXED THE PROBLEM ?

Ultra-performant algorithm development

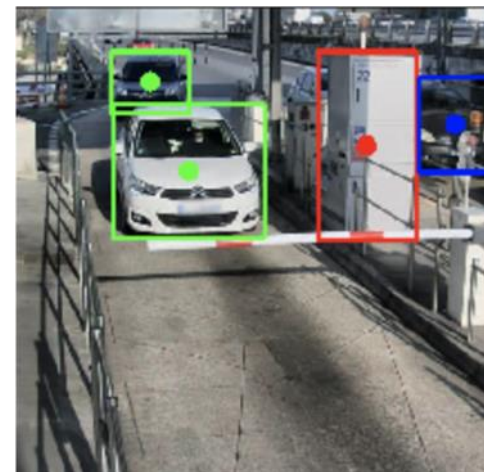
A BASIC ALGORITHM



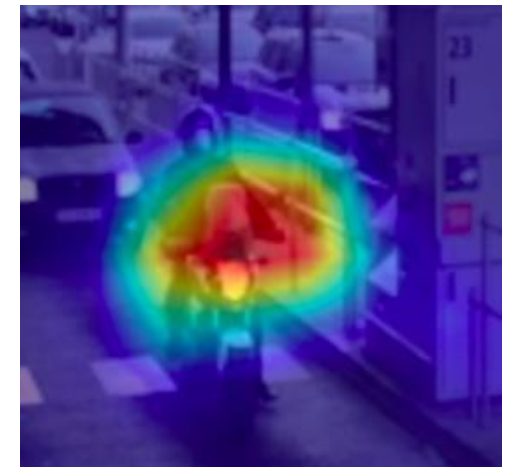
LABELLED DATA



A DEDICATED AI MODEL



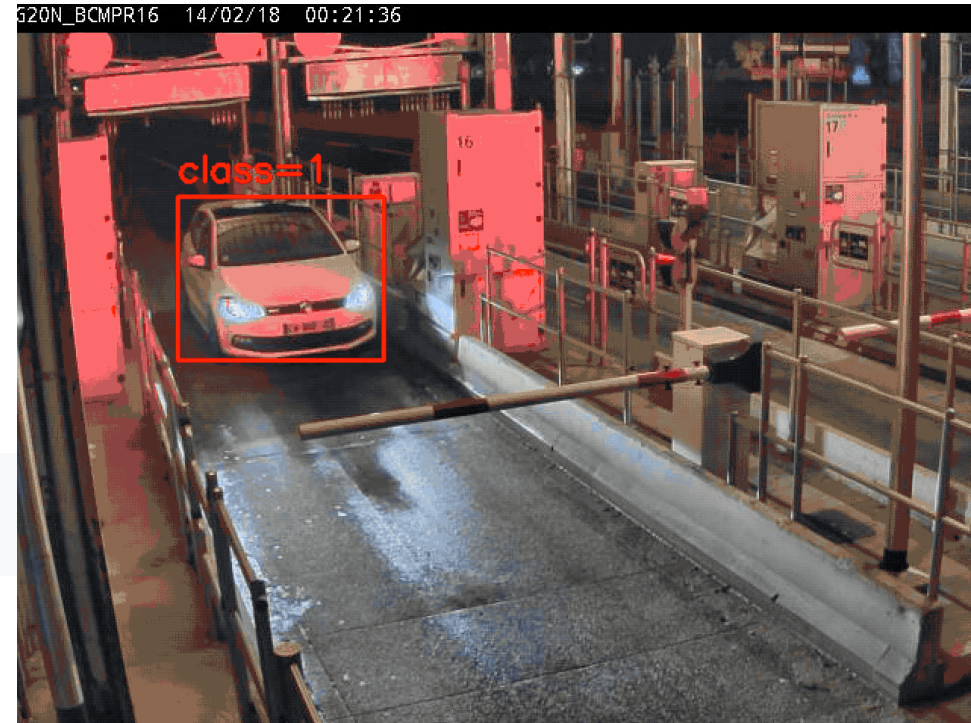
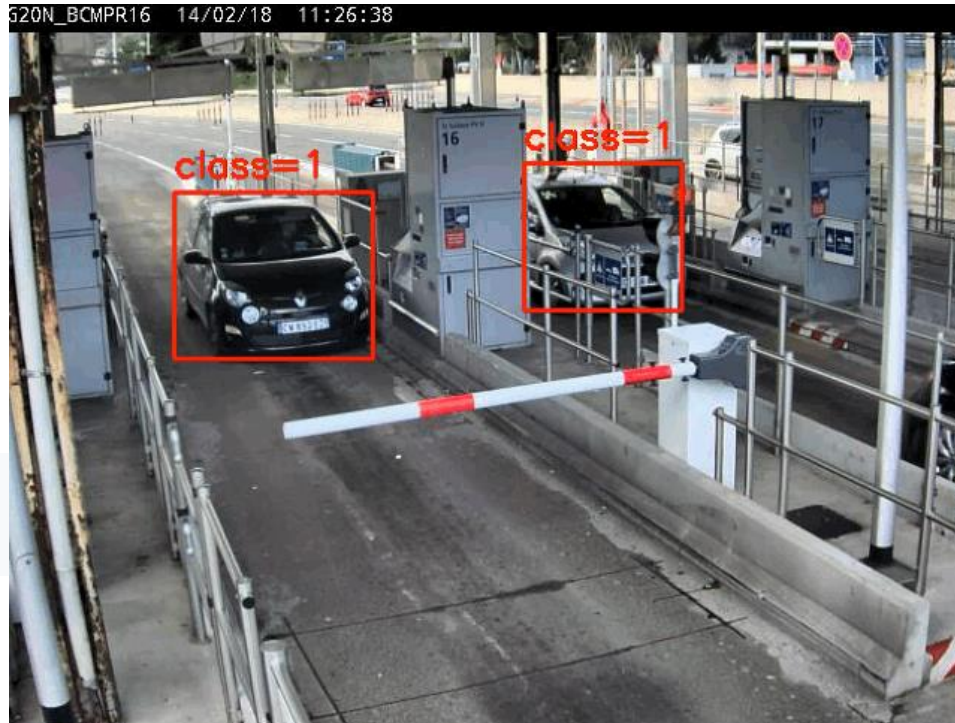
PERFORMANCE IMPROVEMENT



Academic and technical partnerships



YES IT WORKS !



[!\[\]\(9dfdaff1d86ba3c1f8353b4d1b61b8c5_img.jpg\) Watch the real time demo, on restricted lanes \(only vehicles and motos\)](#)

PERFORMANCE RESULTS

Per-class accuracy obtained by Cyclope.ai method

	1	2	3	4	5	Total
Proposed	99.09	97.89	94.86	98.50	100.00	98.22
PRE OS	24.95	99.22	93.94	98.82	92.01	75.11
POST OS	26.14	98.14	86.65	95.03	91.86	73.85
CNN	97.44	98.16	80.43	85.48	100.00	94.85



THE NEED TO SCALE UP

Stakeholders contribution



OPERATIONAL EXPERTISE



DATA



EXPERIMENTATION

cyclope.ai



IMAGE PROCESSING



ARTIFICIAL INTELLIGENCE



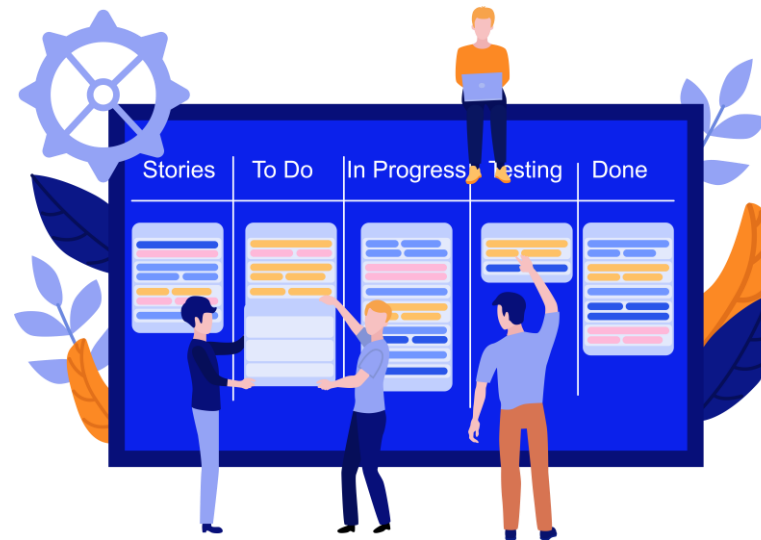
AT-SCALE DEPLOYMENT

Technical integrator



Methodology used

- 2-week sprints
- Agile methodology
- Collaboration
- Evaluation phase



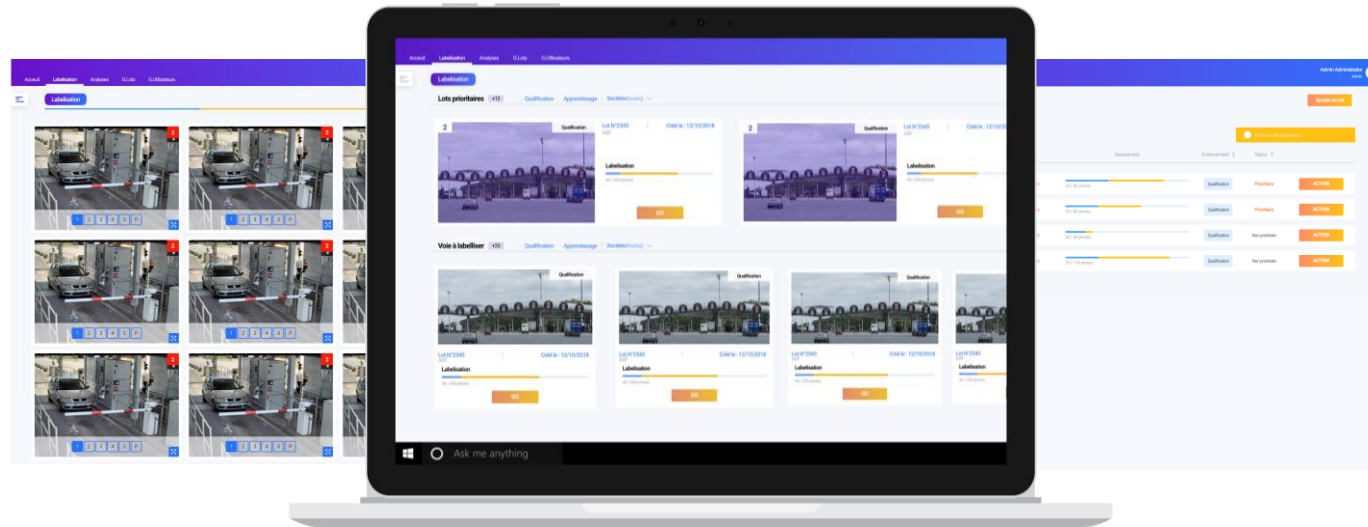
Industrially deployed
at VINCI Autoroutes :
fully integrated into
operations processes

THE OUTCOME : A DISRUPTING PRODUCT

TOLLESENSE

The 1st AI software dedicated to toll class correction

- Fully compliant with GDPR



Trained on

~50 M
vehicles

4
of R&D
months

>
99 %
performance rate

< 250
ms
processing time

TOLLSENSE INTERFACE DEMO

Menu icon

Labellisation

Classe: **1** 2 3 4 5 P

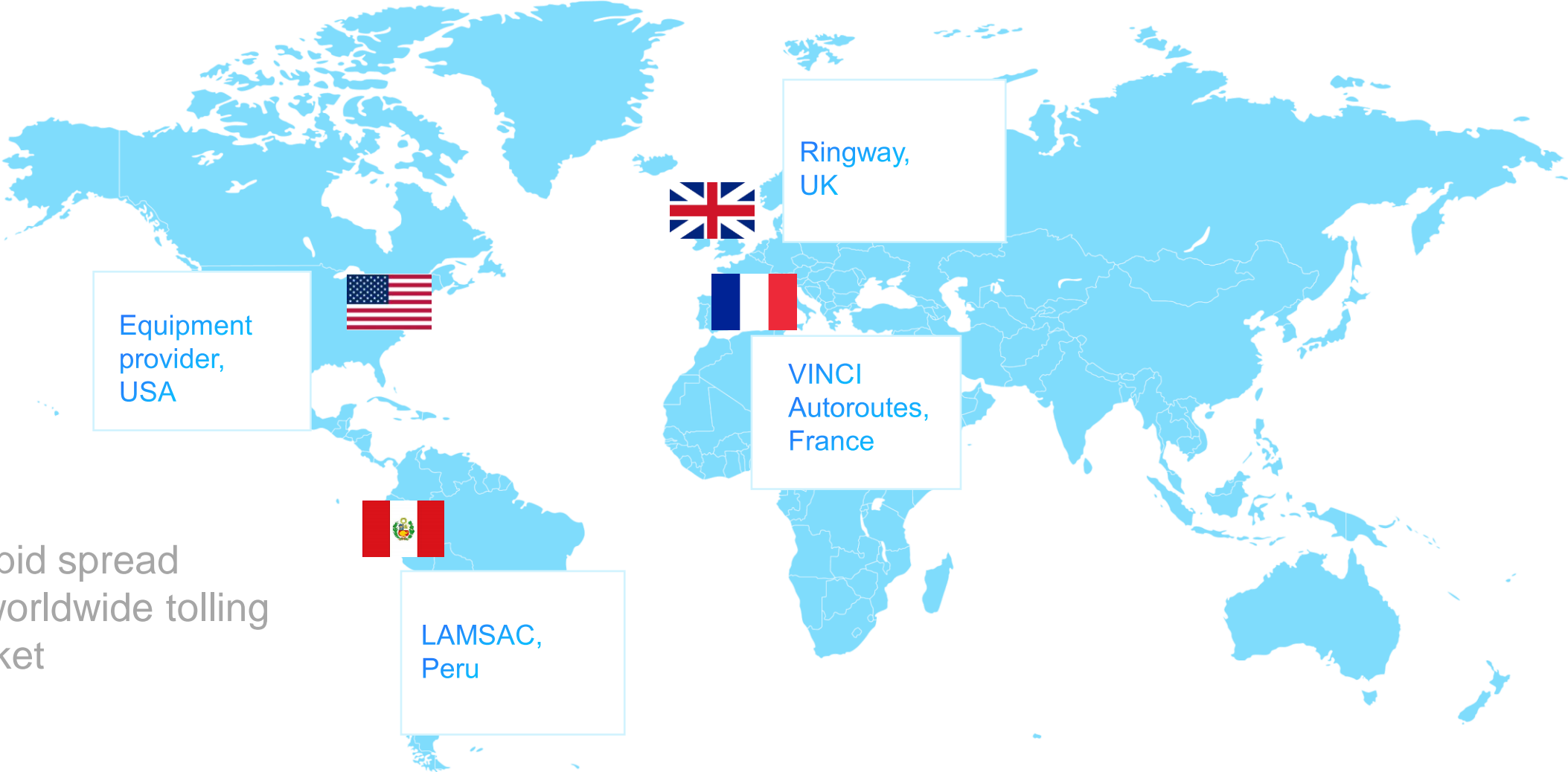
Valider

Retour

0 / 38 photos

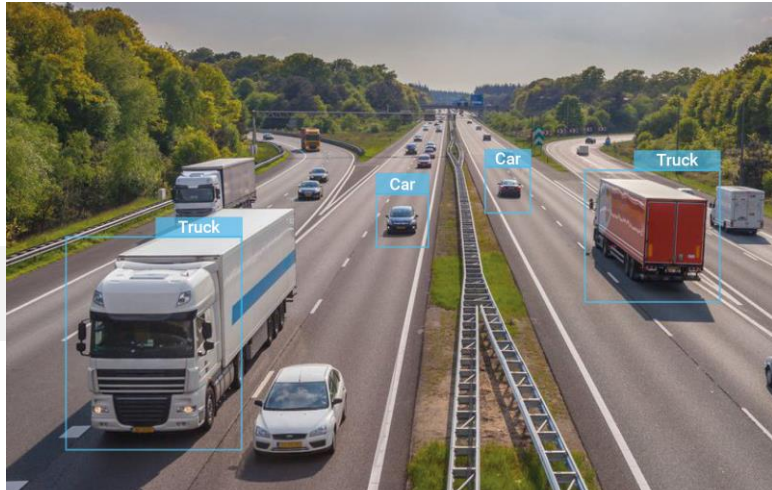
Grid of 12 images showing vehicles at a toll booth. Each image includes a small number in the top right corner and a row of buttons (1, 2, 3, 4, 5, P) below it. A blue arrow button is located on the left side of the grid.

SOME FIRST CUSTOMER REFERENCES

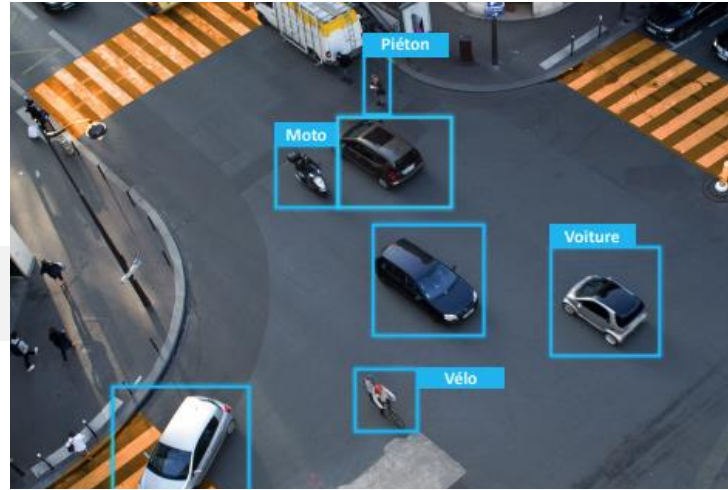


A rapid spread on worldwide tolling market

FURTHER DEVELOPMENTS



ROAD CLASSIFICATION



CITY CLASSIFICATION



FREE FLOW SYSTEM

In R&D : a camera-based-only Free Flow system



The 1st AI-powered counting solution through video analysis

WAYPULSE PRODUCT DEMO

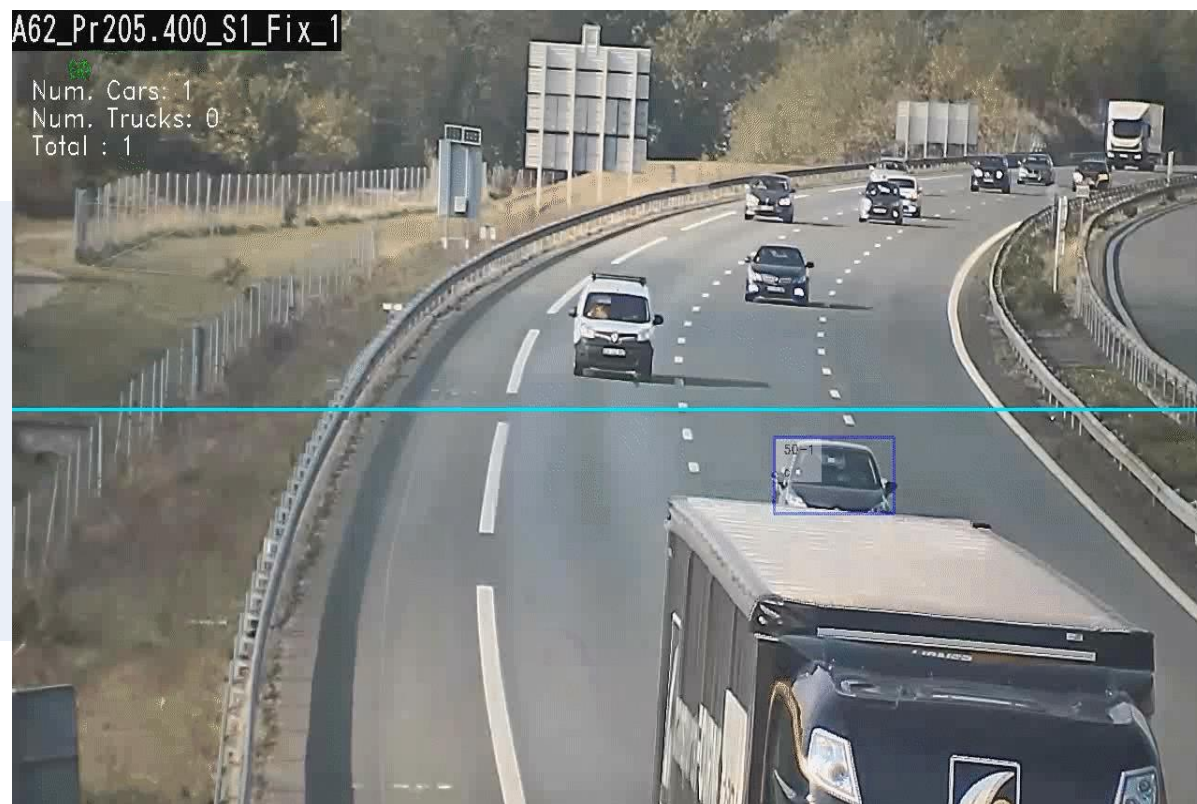
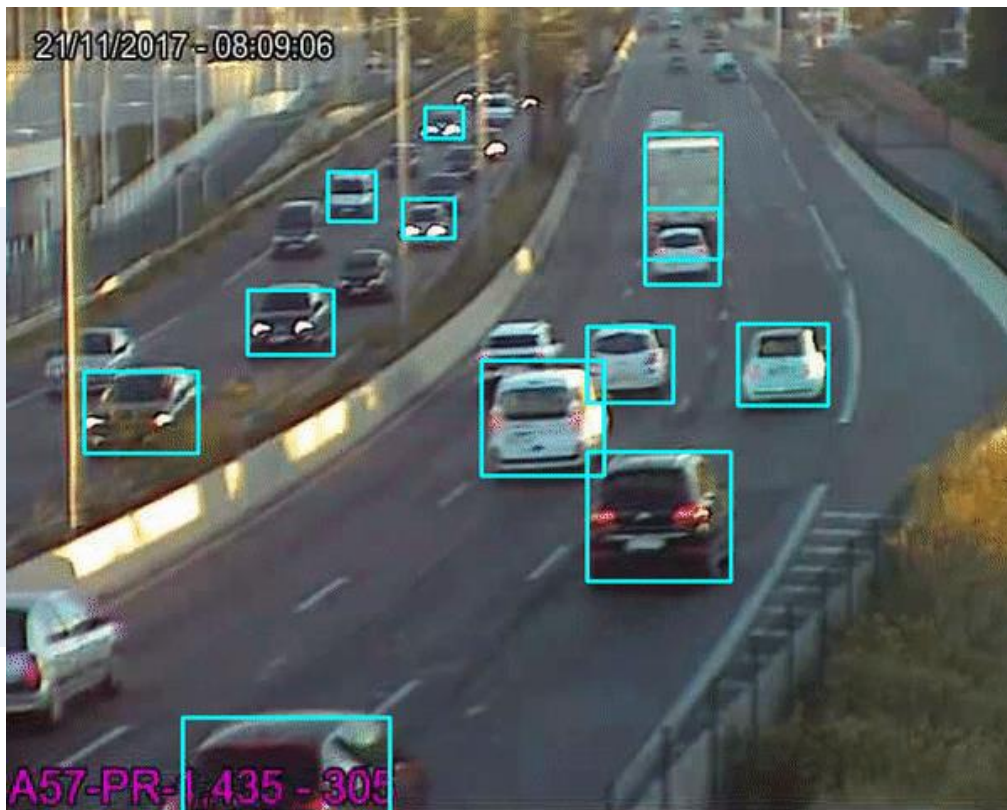


PLATE READING DEMO



A DEDICATED TEAM

TECHNOLOGICAL EDGE

A state-of-the-art expertise in Artificial Intelligence, specifically applied to industry challenges

8 data scientists

6 nationalities

4 PhDs

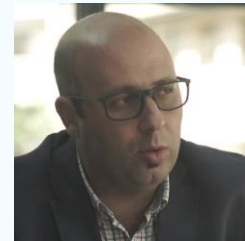
1 patent in 2018
on classification

LEADING TEAM



Emmanuel LEGER
CEO

- Managing Director of DataCity - innovation program with the city of Paris and NUMA
- Co-Founder of Westwing France
- 10-years at Total Group : founder of Awango



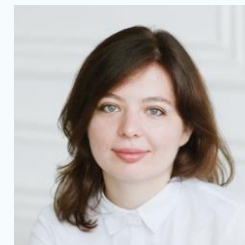
Dr. Amir NAKIB
Head of AI et CTO

- Habilitation to manage research (HDR)
- Associate Professor in Computer Vision at LISSI Lab
- PhD in Artificial Intelligence and Computer Vision
- Over 160 research papers and 5 books on AI



Emmanuel DAUBRICOURT
Head of Sales - Traffic solutions

- Strategy and product management positions in digital media and commerce, in NY and London
- 3-year consulting at AT Kearney on industries such as urban transport, ITS and smart lighting



Dr. Nadiya SHVAI
Research Data Scientist Lead

- Assistant Professor at the National University of Kyiv-mohyla Academy, Ukraine
- PhD in Mathematics (linear algebra, matrix transfo.)
- Professional diploma in Applied Data Science

THANK YOU !

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