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Foncier Innovant

DGFiP's AI-based Approach to Detect Real Estate Tax Fraud

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Real Estate Tax Challenges

Importance of Property Assessments
Accurate property assessments are critical for real estate tax calculations, including developments like extensions and swimming pools.

Voluntary Declarations Issue
Property changes often rely on voluntary declarations by owners, leading to potential non-declared improvements.

Tax Losses for Municipalities
Non-declared improvements result in significant tax losses for municipalities, affecting their revenue streams.

Detection Challenge
Detecting undeclared constructions at scale, reliably, and cost-effectively is a major challenge for municipalities.

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“Foncier Innovant” or “Innovative Real Property”:

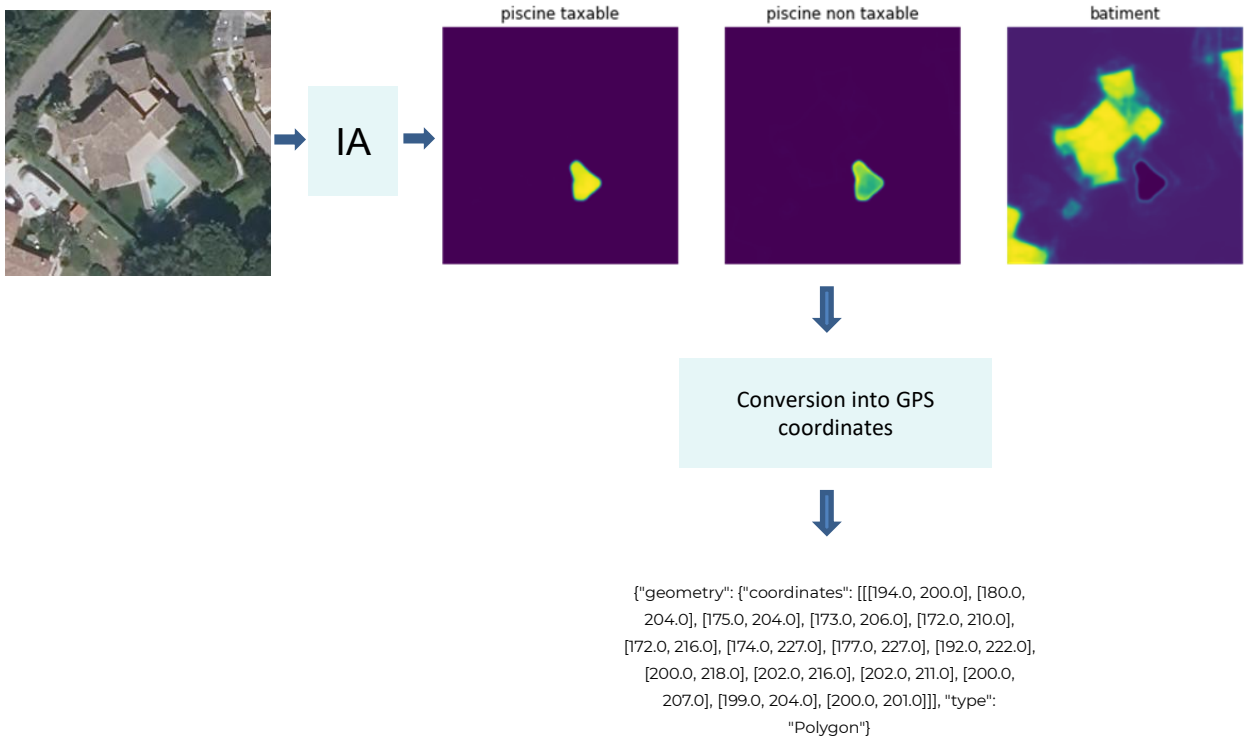
It combines data, aerial imagery and AI to fight real estate tax fraud, update cadastral records, and improve public revenues.

❶ Automated detection and correction of topographical and fiscal inconsistencies	Detect and correct all anomalies related to land assets declared by taxpayers + Automate the transfer of confirmed anomalies to the cadastral map + Enable effective taxation of the detected properties
❷ Fairness in the rental value of the property	Promote greater fairness for taxpayers regarding the rental value of properties, based on factual, up-to-date, and more accurate information
❸ Improving the daily work of agents and cadastral users	Improve working conditions for agents and all users (land surveyors, notaries, real estate services, etc.)
❹ Reliability and consistency of local taxation	Ensure the reliability and consistency of local tax bases, as requested by local authorities

The AI behind Foncier Innovant:

Semantic segmentation models are used to label each pixel with one of the following classes:
•Taxable pool
•Non-taxable pool
•Building

The contours for each class are extracted and converted into polygons with GPS coordinates.



Project processes

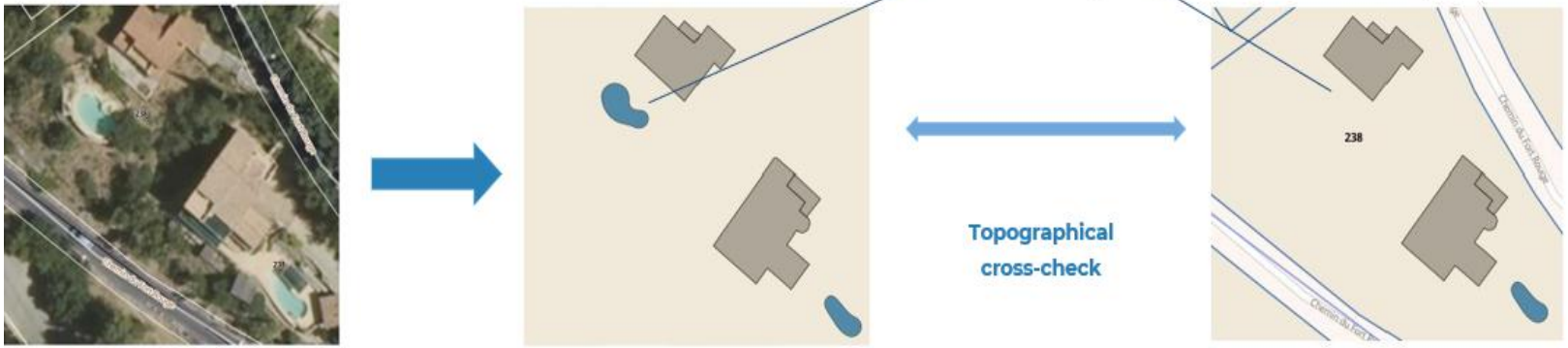
Automatic process

Manual process

IA model → Topographic cross-check → Fiscal cross-check →

- Fiscal inconsistencies
- Topographic and fiscal inconsistencies
- Topographic inconsistencies

→ Transfer to agents for manual verification → Information request sent to individuals



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Initial Results Overview

Revenue Generation
System detected taxable swimming pools generating over 10 million euros in total revenue from 2022 and back taxes.

Detection Accuracy
The system had an accuracy rate of 65%, with 52,000 confirmed cases out of the detected taxable pools.

Owner Confirmation
94% of contacted pool owners confirmed the taxability of their pools, indicating high compliance.

Trial Phase Departments
This significant achievement was accomplished during the trial phase in only 9 departments.

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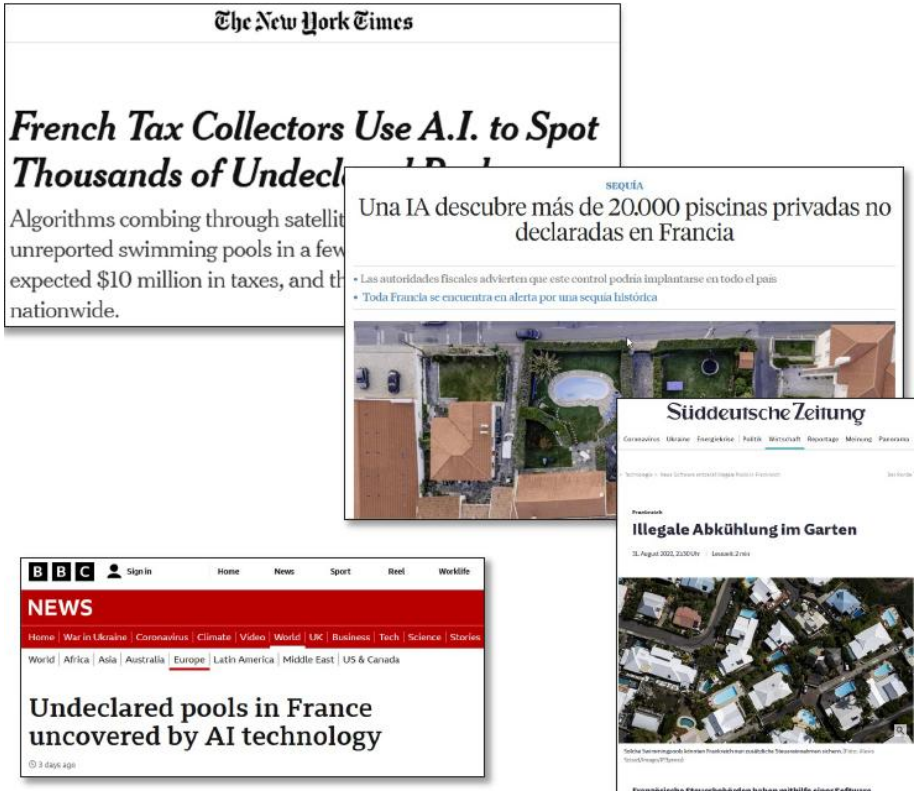
2024 Tax Revenue

Significant Tax Revenue Increase
The DGFiP reports a notable increase in tax revenue for 2024, totaling 43 million euros from the project.

Swimming Pool Taxation
The increase results are from taxing 122,500 swimming pools, newly detected and included in property tax calculations.



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Financial Impact

Project Cost
The project is self-financing with a total cost of 24 million euros, ensuring initial financial viability.

Revenue for 2023
Projected additional revenue for 2023 is 42 million euros, indicating a strong financial start (more departments added).

Sustained Revenue from 2024
Annual revenue of around 20 million euros is projected from 2024 onward, demonstrating long-term financial sustainability.

Profitability and Scalability
Foncier Innovant is a profitable and scalable model for public finance, showing its viability in the long term.

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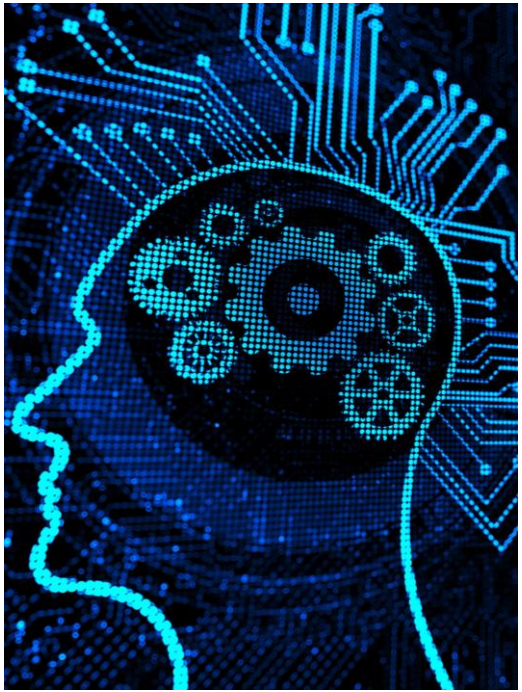
Strategic Benefits



Enhanced Digital Capacity
The project significantly boosted the administration's digital and technical capacity, enabling more efficient operations.

AI Ownership and Control
AI algorithms are fully owned and controlled by DGFiP, providing greater security and customisation options.

Open-Source Models
The project utilised open-source components, ensuring transparency and flexibility in the development process.

Improved Institutional Know-How
In-house teams received training, enhancing institutional knowledge and skills for long-term benefits.

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Operational Deployment in 2024

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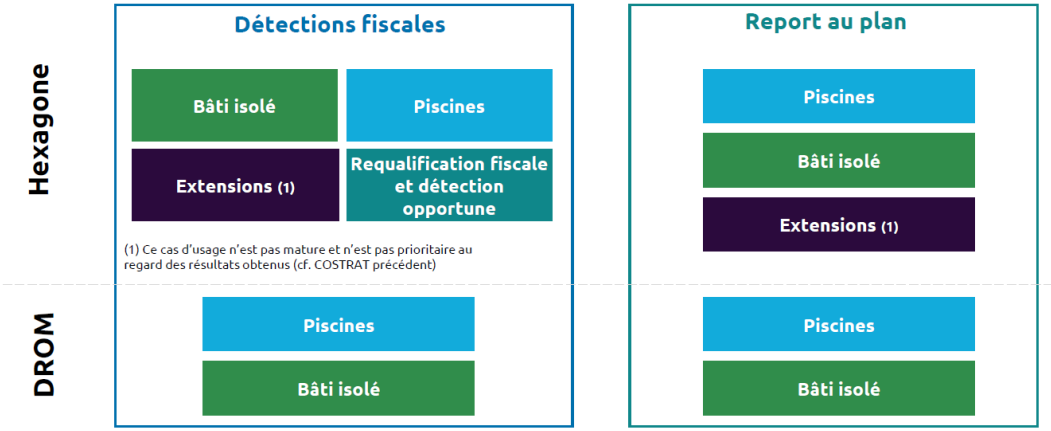
Key Detection Cases Finalised
By Q2 2024, detection of undeclared pools, isolated buildings, and requalifications were finalised with reporting to the cadastral map.

Expansion to Overseas Territories
System expansion includes overseas territories like La Réunion, utilising AI updates tested for tropical imagery.

Dedicated Monitoring Dashboard
A dashboard is being finalised to monitor cadastral updates, detection progress, and performance indicators.



New Target for 2024

Detection of Commercial Properties
The new use case focused on detecting large commercial properties (>200m²) that are not declared or misdeclared.

Pilot Phase in Department 83
A pilot phase was initiated in Department 83 (Var) to test the new detection process for commercial properties.

Validation and Record Updates
The process includes AI detection, human validation, contacting owners, updating records, and adjusting taxation in a similar way to pool detection.

Scalability of the Approach
This approach demonstrates the scalability for detecting other types of property fraud beyond just commercial properties.

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Scaling the System 2024-2025

Upgrading PCI-Vecteur
The PCI-Vecteur cadastral system needed upgrades to support the integration of new AI technologies.

Elyx Platform Migration
The Elyx platform migration was launched to facilitate the integration process and enhance system capabilities.

Local Agents' Involvement
Local agents are now involved in pre-figuring processes, ensuring that tools and workflows align with operational requirements.

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Active Use of the Model in 2025 by GF office at DGFiP

Correcting Cadastral Maps

The model helps update cadastral maps by identifying currently undeclared verandas or terraces, ensuring accurate property records.

Detecting New Buildings

It detects newly constructed or modified buildings, assisting in maintaining current property information.

Improving CALC System

The model enhances the Classification of Local Constructions system, aiding in better urban planning and tax assessment.

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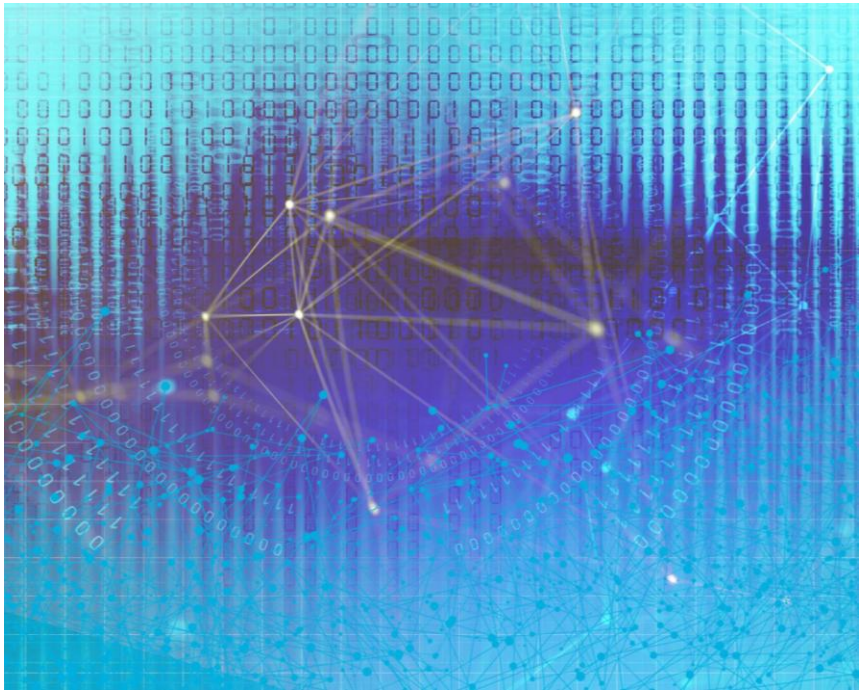
Scientific foundation

Frame-Field Learning for 3D Mesh Parameterisation

Available on arXiv: https://arxiv.org/pdf/2004.14875

- Theoretical and technical underpinnings of the FrameField model, which was adapted by the DGFiP to analyse aerial imagery, segment and classify building features, and contribute to tax anomaly detection.
- Although the core model dates from 2023 and has not been updated since, it remains a central element of the system's performance and success.



Thank you!