Mapping a Million Rooftop Solar Installations in France: The OpenPVMapper Database

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Motivation

Rooftop PV is a category of its own in the energy system

Public registries largely overlook these installations: 36 kWp cutoff (France), 30 kWp location mask (Germany).

Any single detection method is bound by its own scope and biases.

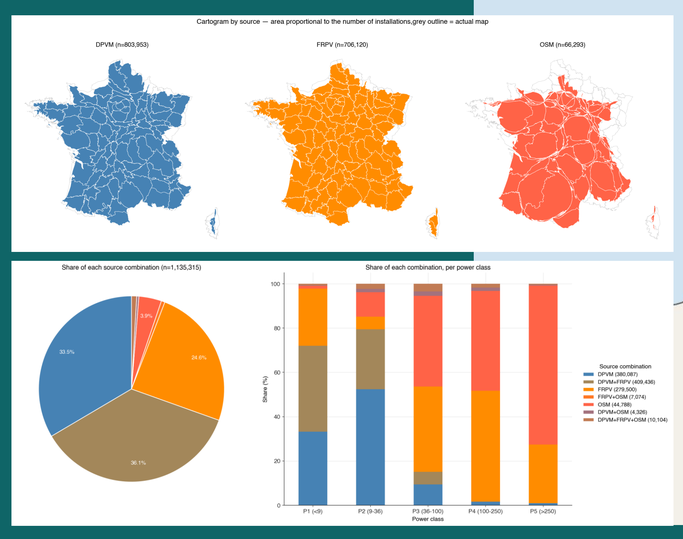
Crowdsourced data (OSM) is reliable but scarce and geographically uneven.

Core idea: aggregate independent, noisy sources — same principle as BDAPPV, iNaturalist, Galaxy Zoo.

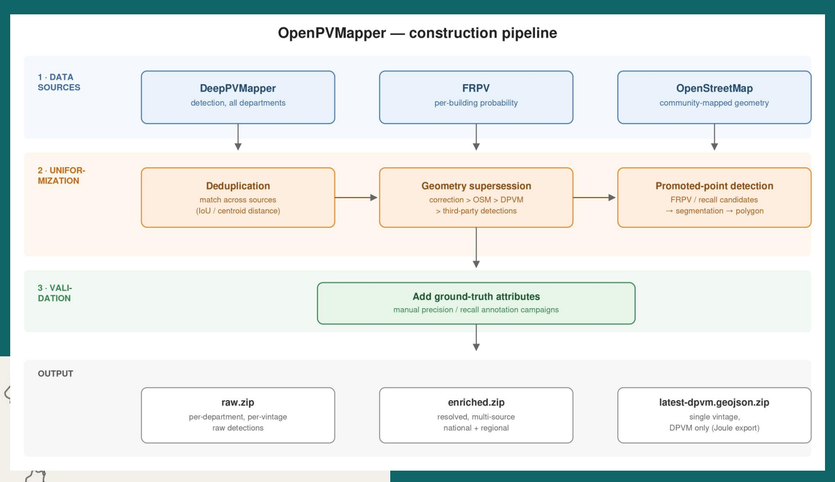
Figures

Top : cartogram of the sources aggregated in OpenPVMapper

Bottom : breakdown of the contributions of the sources in total (pie chart) and by installed capacity (histogram)



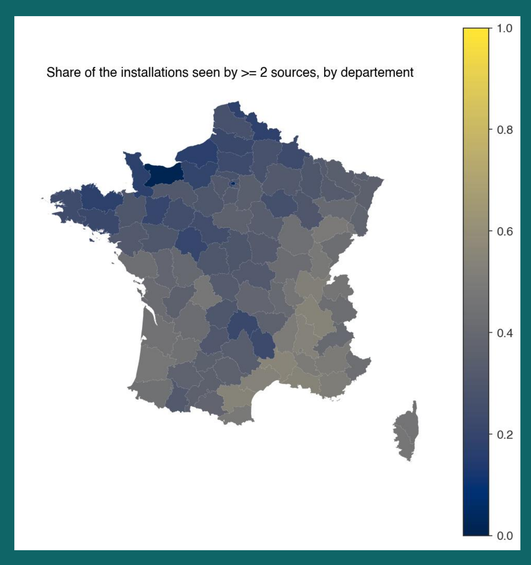
Methods



Figures

Top : Flowchart of the methodology used to create OpenPVMapper

Bottom : share within each departement of the assets that have been identified by 2 or more sources



Sources

DeepPVMapper: deep learning detection, 96/96 departments, F1=0.84, IoU=0.86, ≤36 kWp.

FRPV: building-wise probability, 95/96 departments, Threshold calibrated at 0.5.

OpenStreetMap: community-verified geometry, reference source when available, uneven coverage.

Manual samples: 18,337-point precision + 13,366-point recall (31,703 total)

Validation

1,862 manually annotated installations, two independent stratified samples.

Weighted precision ≈ 74–75%, cross-checked across two axes (1.2-pt gap).

Precision by corroboration: 71.5% (1 source) → 96.9% (2) → 98.2% (3).

Recall checked indirectly against Enedis grid registry: 60–90%+ coverage, timing-dependent.

Limitations documented: roof/ground boundary, installation/polygon ambiguity, OSM's role.

Automated detection covers the rooftops the community can't reach alone, feeding validated installations back into the map. Explore the data, or help complete it !

Data

Contribute

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