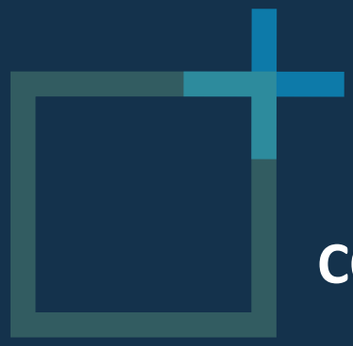
Picterra

La révolution du deep learning pour l'extraction de géo-information personnalisée

Journée romande de la géoinformation 2018



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WHAT IS DEEP LEARNING?

MACHINE LEARNING

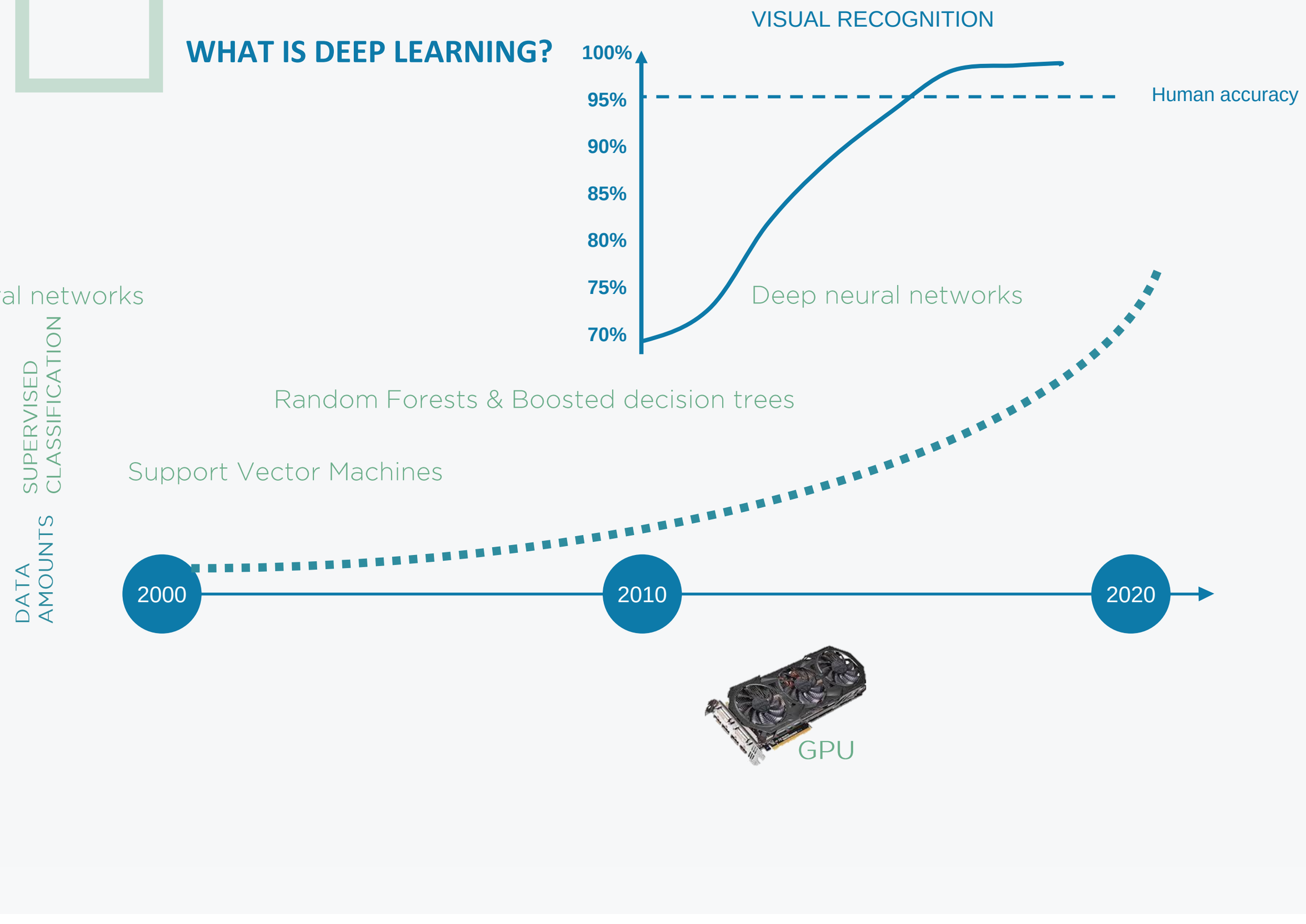
SUPERVISED

CLASSIFICATION

TRAINING DATASETS

COMPUTATIONAL POWER

WHAT IS DEEP LEARNING?



WHAT IS DEEP LEARNING?

TRADITIONAL COMPUTER VISION

Hand-crafted features

- Colour histograms, gray co-occurrences, morpholgy
- Histogram of Orientated Gradients (HOG)
- corners and edges detectors (SIFT, FREAK, BRIEF, etc.)
- Bag of Visual Words (BoVW)

Random Forests

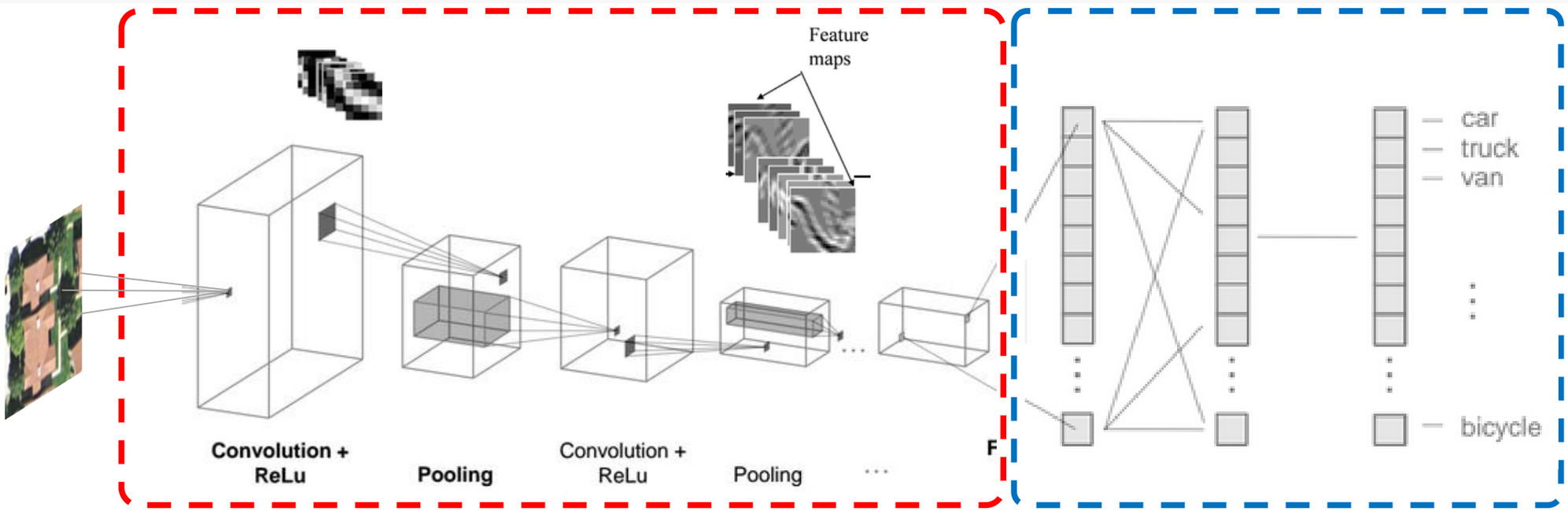
Boosted decision trees

Support Vector Machines

Feature extraction

Classification

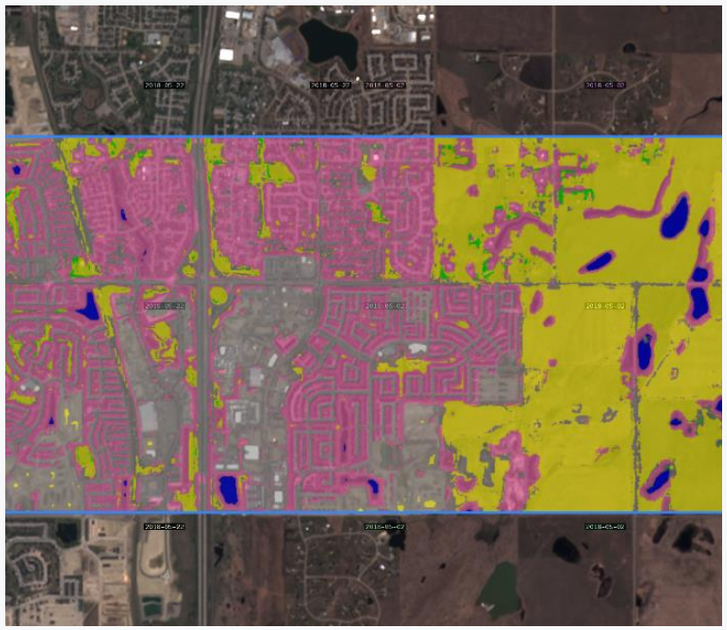
DEEP LEARNING CONVOLUTIONAL NEURAL NETWORKS



Deep learning == end-to-end learning

WHAT IS DEEP LEARNING?

Semantic segmentation



Every pixel get a thematic label

Object detection

Only coordinates of bounding boxes

Object mask detection

Every pixel in bounding boxes get a thematic label

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PICTERRA TEAM

FRANK DE MORSIER,PhD
CTO, Co-founder

PIERRICK POULENAS
CEO, Co-founder

VERONICA ALONSO
Product Manager

ROGER FONG
Computer Vision & Data Science

JULIEN REBETEZ
Lead Software & Machine Learning

LÉO ROCHER
Full stack engineer

EPFL ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

ALTRAN

PIX4D

EPFL ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

mindmaze

MDA

NOVELTIS

NOVELTIS

Unified Streaming Platform

Apple

Google

THALES

PICTERRA
DATA SOURCES

DATA INPUT

Access world's leading satellites

urthecast · planet. · AIRBUS · DigitalGlobe · NASA · esa · 航天世景 SPACE VIEW

Upload your own data, link to WMS or cloud storage

Get support for annotating, auxiliary data or other data sources meaningful

PICTERRA SOLUTION

SELF-SERVE TOOL OFFERING USERS ACCESS AND CONTROL

Annotate faster by using AI powered tools, which automatically detects similar objects

Draw and categorize annotations into different classes

Highlight, measure, count objects and share your projects with others

ANNOTATION TOOLKIT

DETECTOR LIBRARY

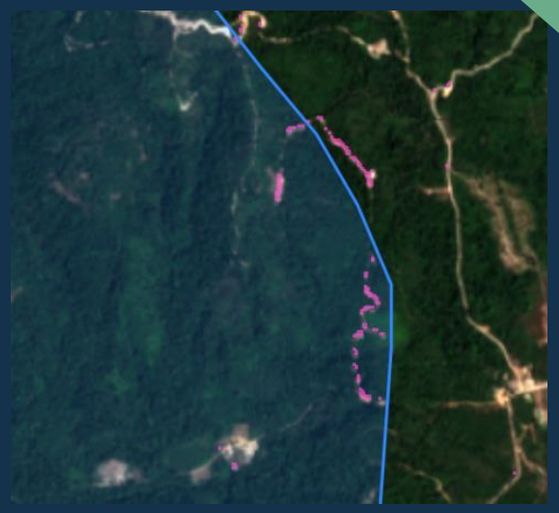
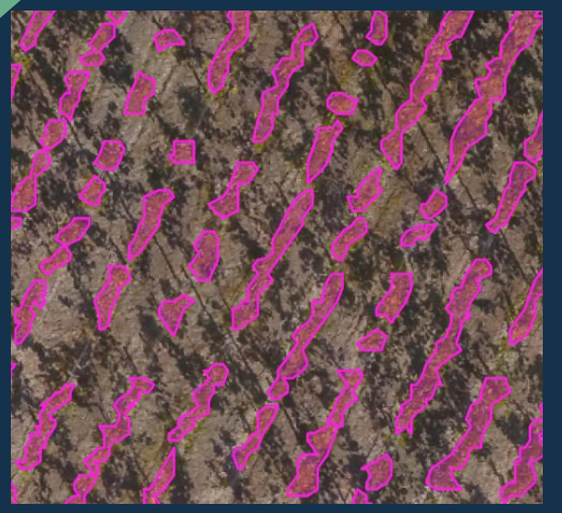
CUSTOM DETECTION

FROM DEEP LEARNING TO CUSTOM GEO-INFORMATION

What does this people have in common?






Detect and outline “objects” in imagery

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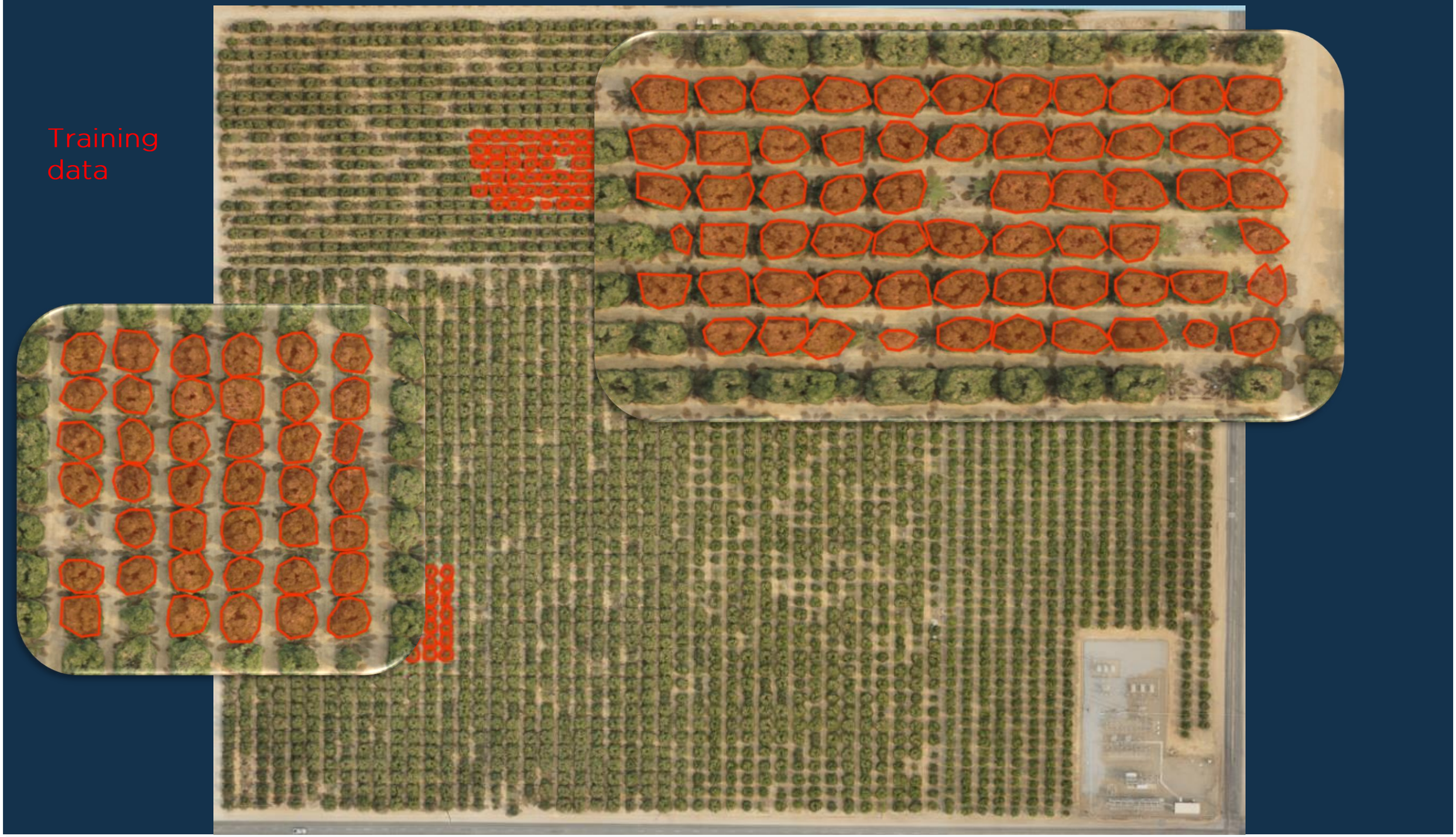
USE CASES

PRECISION AGRICULTURE

USE CASES

PRECISION AGRICULTURE

Training data



USE CASES

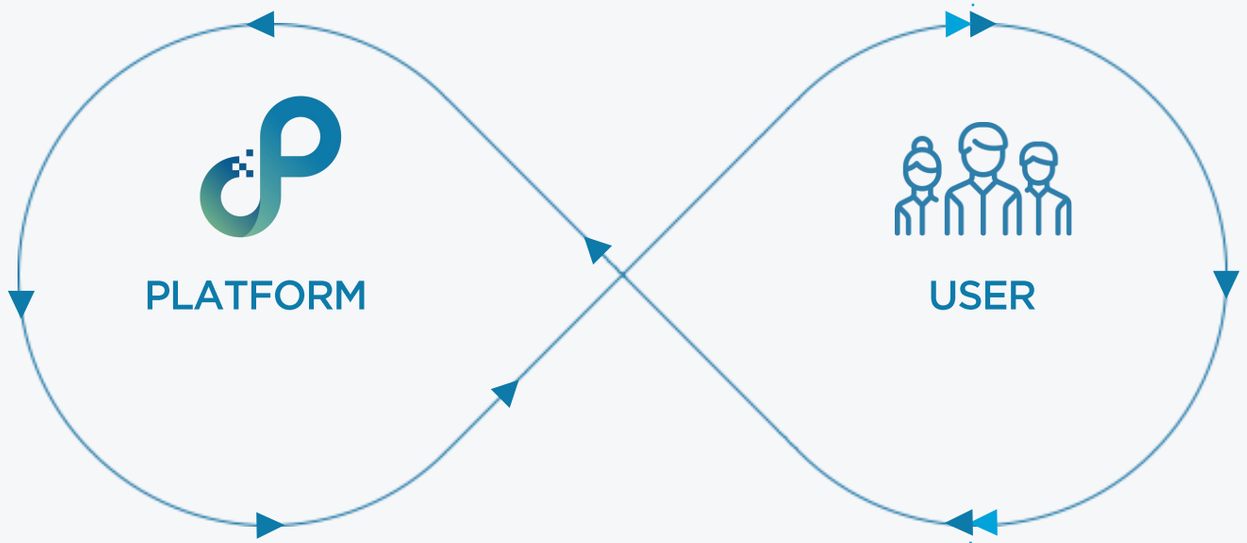
PRECISION AGRICULTURE

Detections

INTERACTIVE LEARNING

+ Users can leverage their proprietary data or tap into Picterra's network of trusted data providers

+ Satellite imagery available from 30m to 30cm resolution



+ Pre-trained generic AI models

+ Customizable, easy- to-use and shareable dashboard

INSIGHTS

Actionable insights from self-customized models

MODEL INPUT

+ Train and control your own AI models

GENERATE CUSTOMIZED **GEO-SPATIAL INFORMATION**

USE CASES

PRECISION AGRICULTURE

USE CASES

PRECISION AGRICULTURE

USE CASES

PRECISION AGRICULTURE

Picterra

Smart data analytics for geospatial insights.

General information

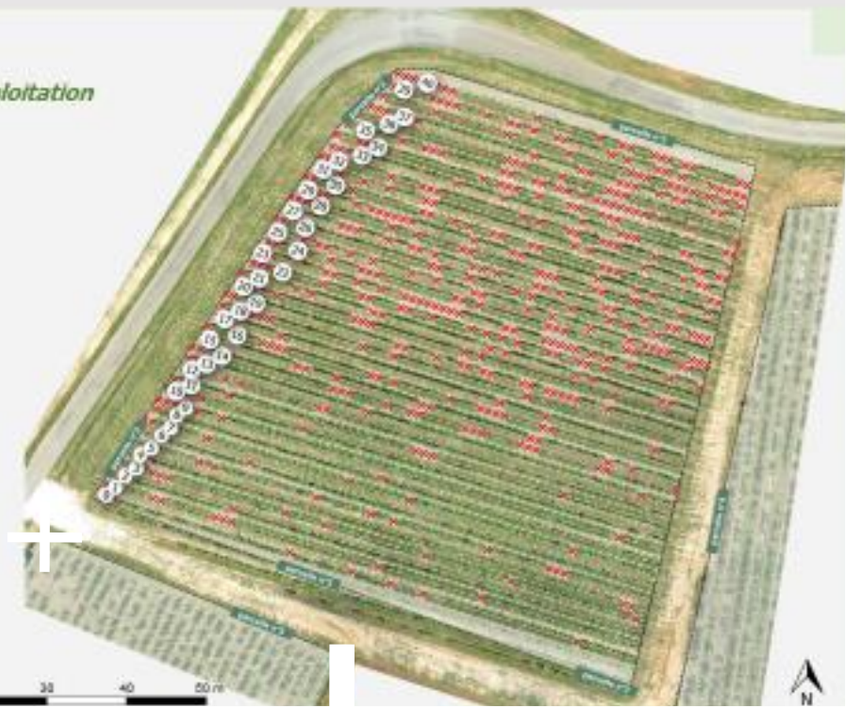
- Prepared for : Mr X & Mrs Y.
- Municipality: Champignac
- Parcel: All
- Grape type : Cabernet-Sauvignon
- Exposure : S-SO
- Surface : 4.5 ha
- Acquisition date : 15 June 2015
- Spectral bands R, G, B, NIR, Red-Edge
- Spatial resolution: 10 cm
- Images acquired by: Precision Vine
- Images analysed by: Picterra Sàrl

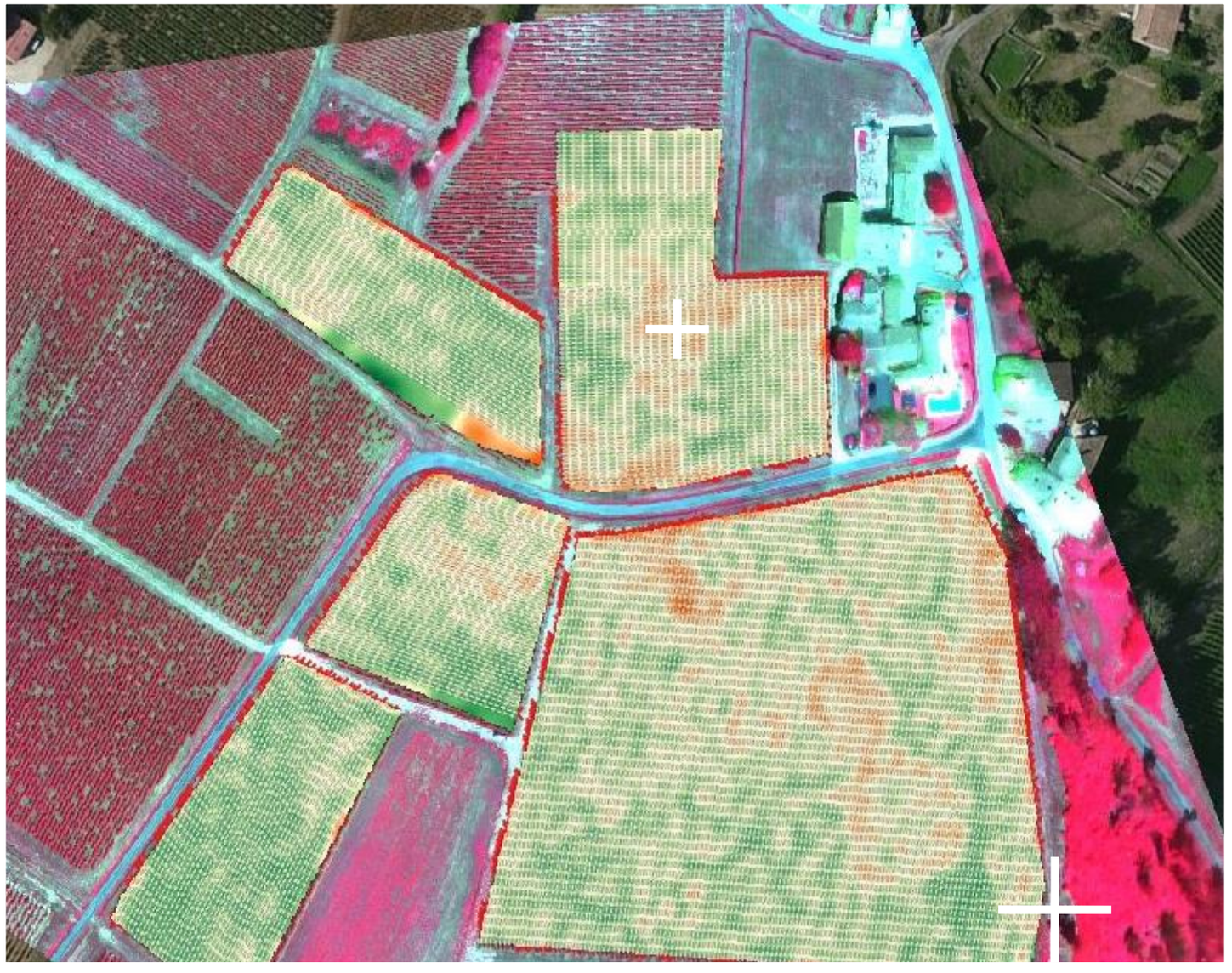
Overview

Structure & exploitation of the parcel

Legend:

- Missing vines
- rows
- N° Row number





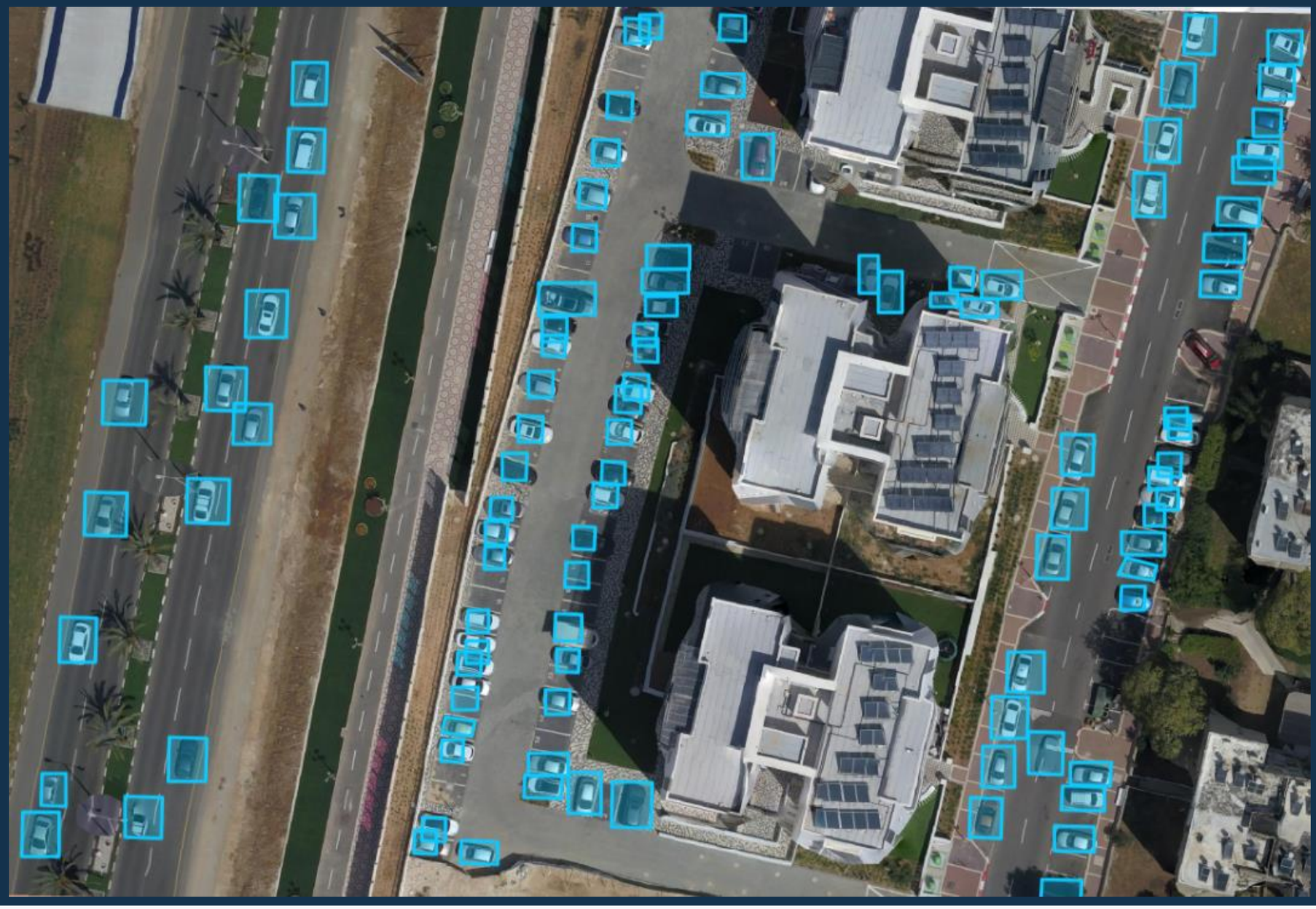
Parcel statistics

- Number of rows: 40
- Orientation of rows: East (107°)
- Number of vines: 1924
- Number of missing vines: 493
- Vine density: 5100 vines/ ha

USE CASES

URBAN & BUILDING FOOTPRINT

Detecting vehicles in urban environment: parking usages, mobility planning



USE CASES

URBAN & BUILDING FOOTPRINT

Building footprints are extremely valuable for planning distribution networks, understanding the population density, assessing damages, etc.

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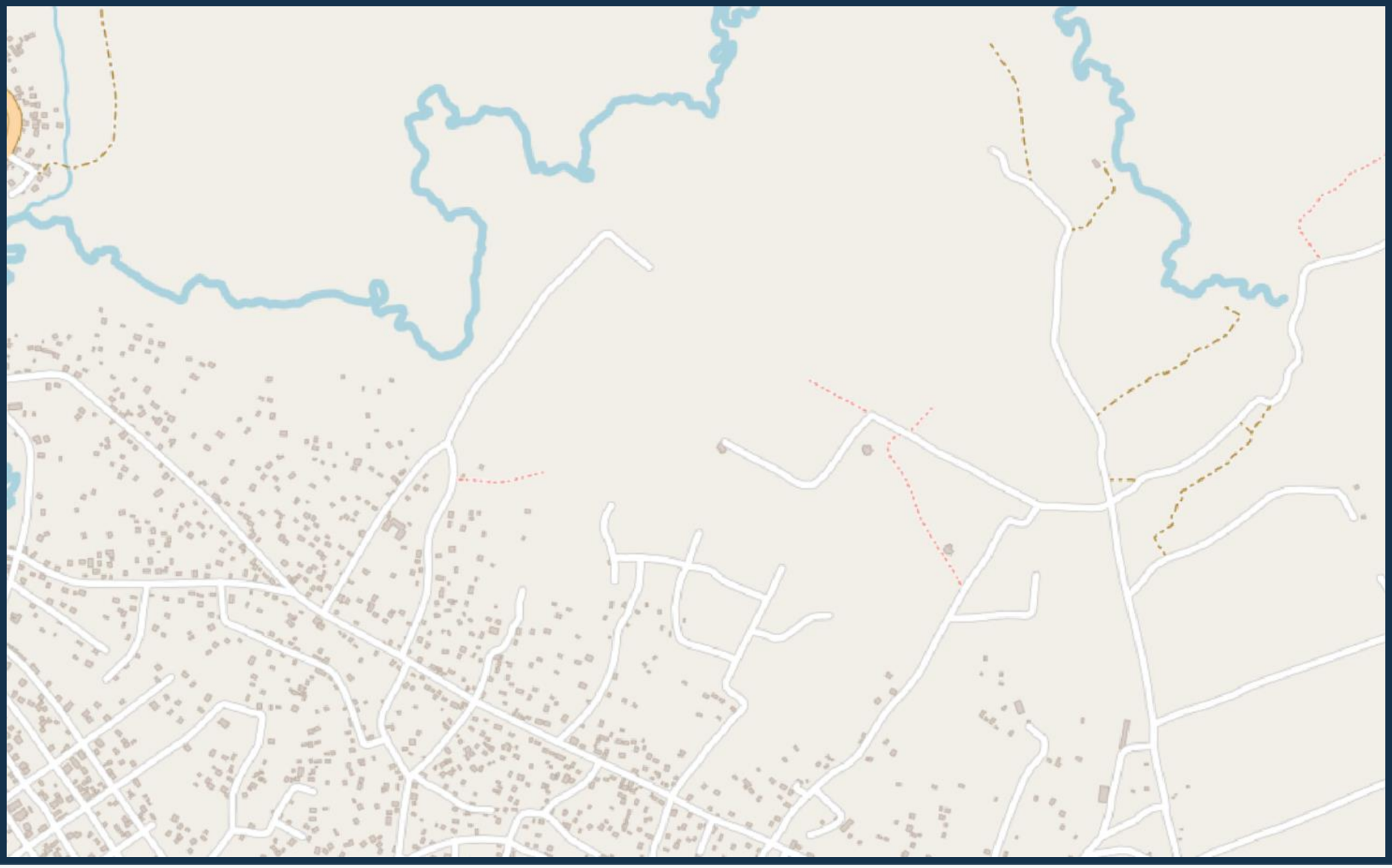
USE CASES

URBAN & BUILDING FOOTPRINT

Building footprints are extremely valuable for planning distribution networks, understanding the population density, assessing damages, etc.



USE CASES

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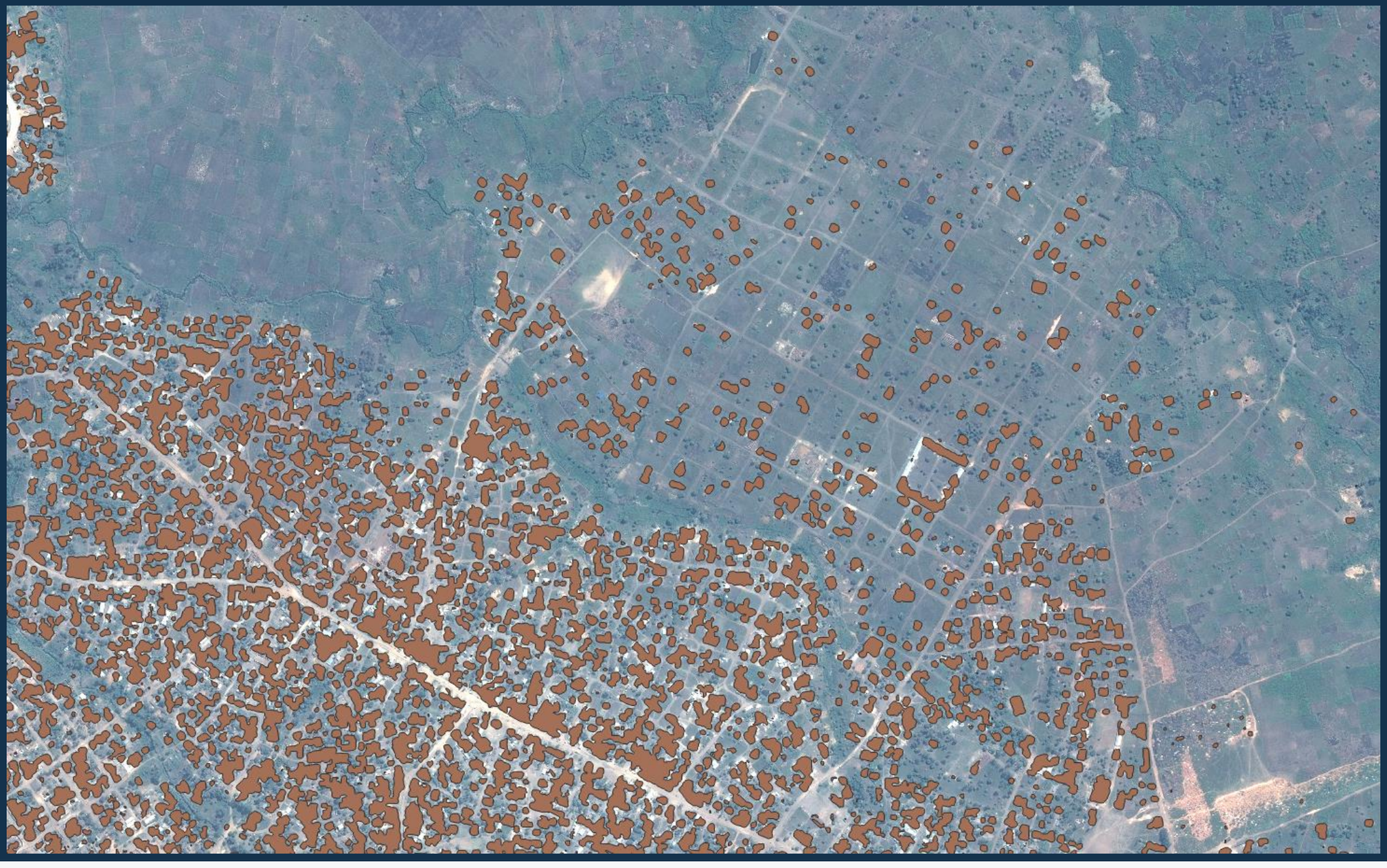

USE CASES

URBAN & BUILDING FOOTPRINT

Building footprints are extremely valuable for planning distribution networks, understanding the population density, assessing damages, etc.

USE CASES

URBAN & BUILDING FOOTPRINT

Solar panels detection over building roofs

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USE CASES

LIVESTOCK MANAGEMENT

Fast livestock management for counting populations of animals

USE CASES

LIVESTOCK MANAGEMENT

Fast livestock management for counting populations of animals

Picterra

USE CASES

LIVESTOCK MANAGEMENT

Fast livestock management for counting populations of animals

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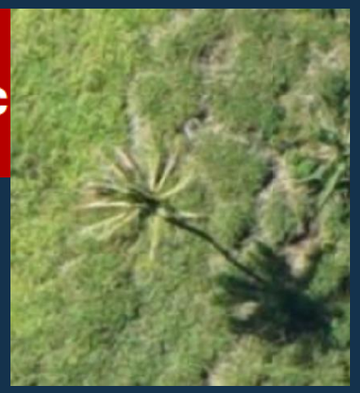
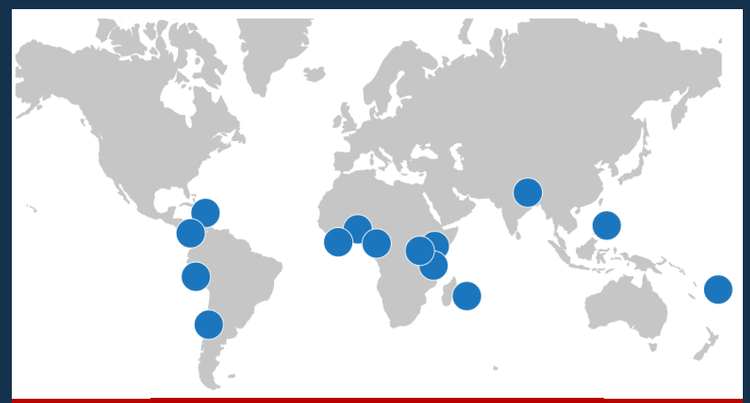
BRIDGING THE GAP

We Robotics
Robotics for the Benefit of All

Open AI Challenge for the South Pacific





Flying Labs

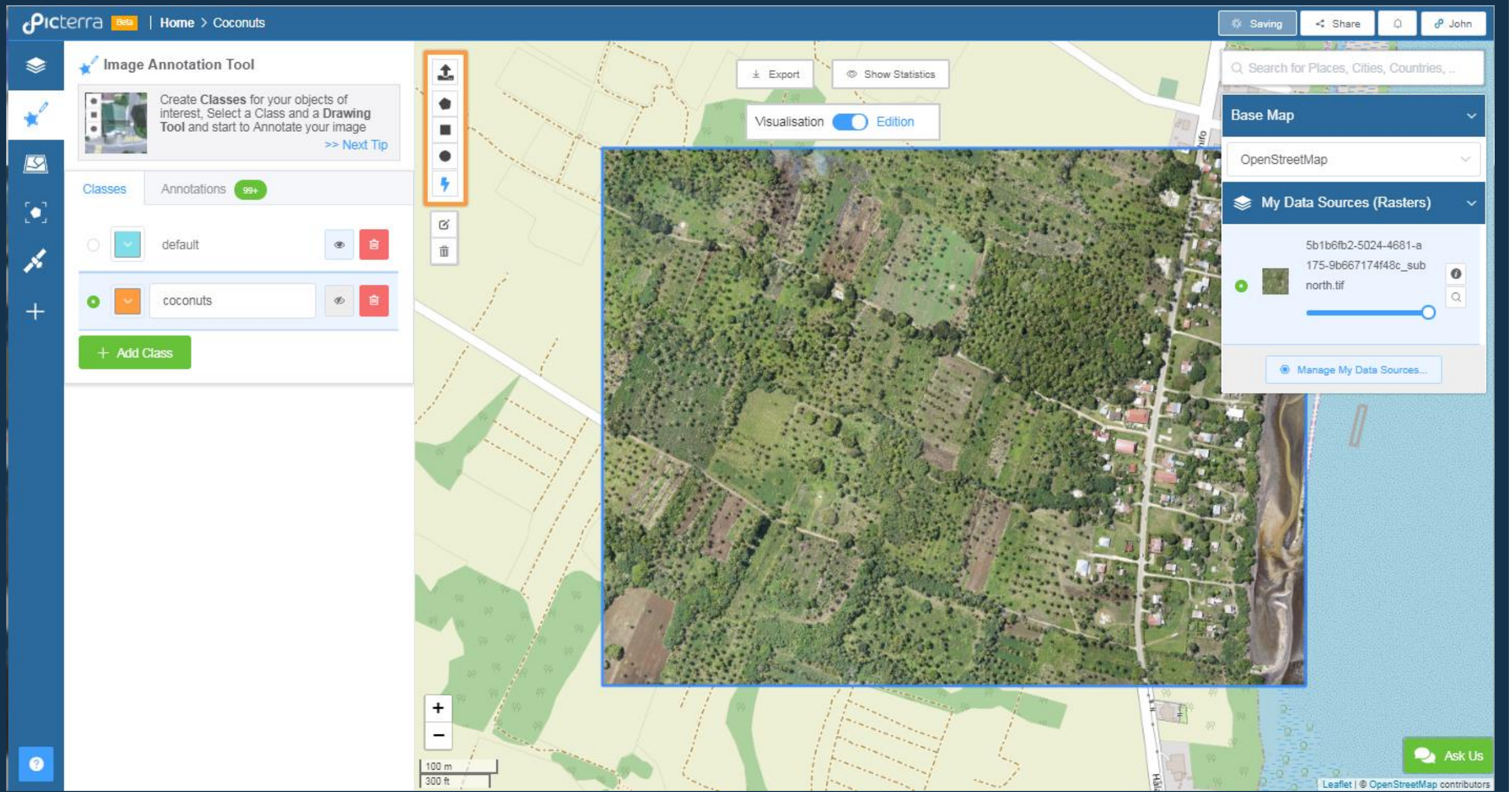
ETH zürich

Winning team: Karla Saldaña and Guo Zifeng

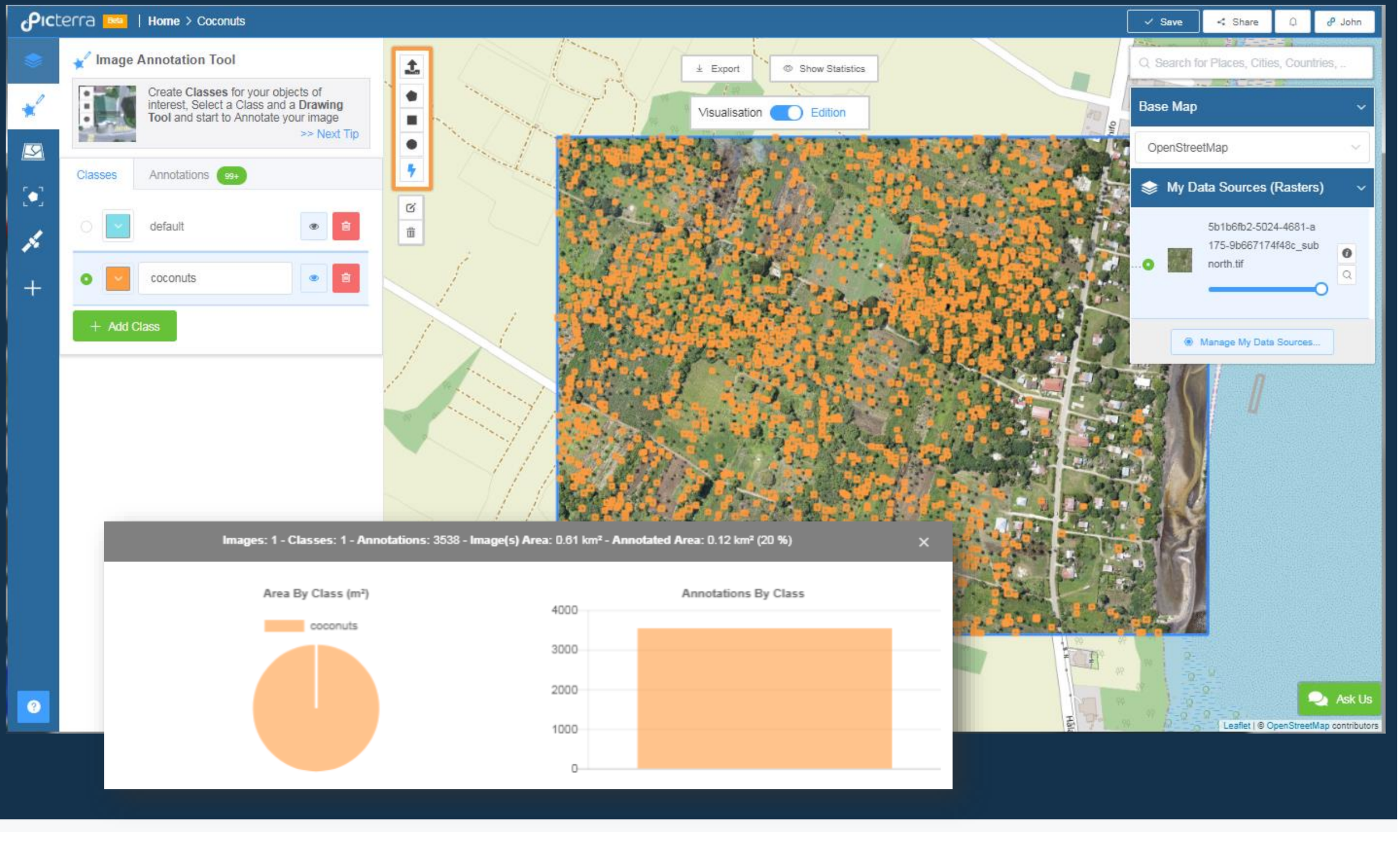
GitHub

Integrated

BRIDGING THE GAP



BRIDGING THE GAP



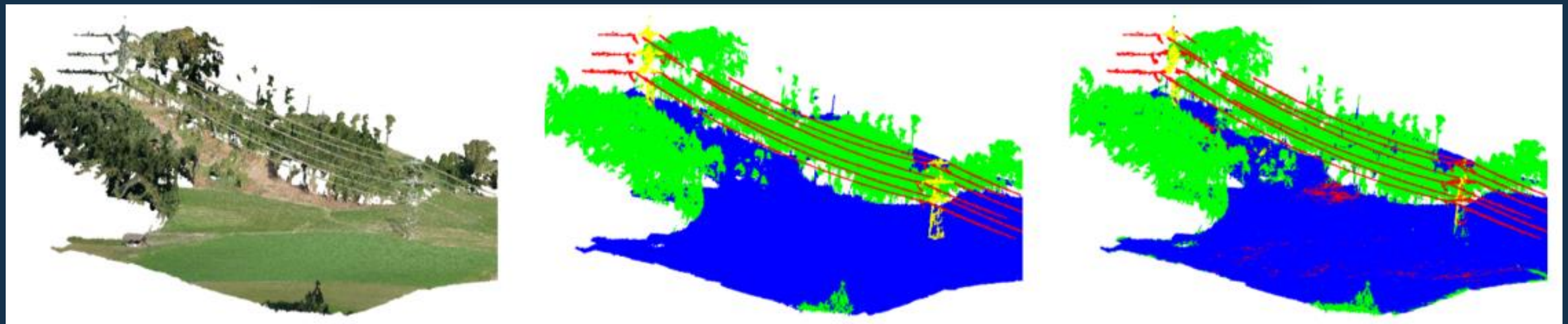
OUTLOOK

WHAT ABOUT DEEP LEARNING ON 3D POINTCLOUDS?

OUTLOOK

Deep learning on 3D pointclouds – Learning on data graphs

Performances	Overall accuracy (in %)	Mean accuracy (in %)
Random Forest	71.32	43.57
XGBoost	75.34	52.86
Our model	95.15	84.07
Majority class	54.66	25.00



(a) Test set (b) Ground truth (c) Predictions

Master thesis of Alexandre Cherki, jointly directed with EPFL LTS 2

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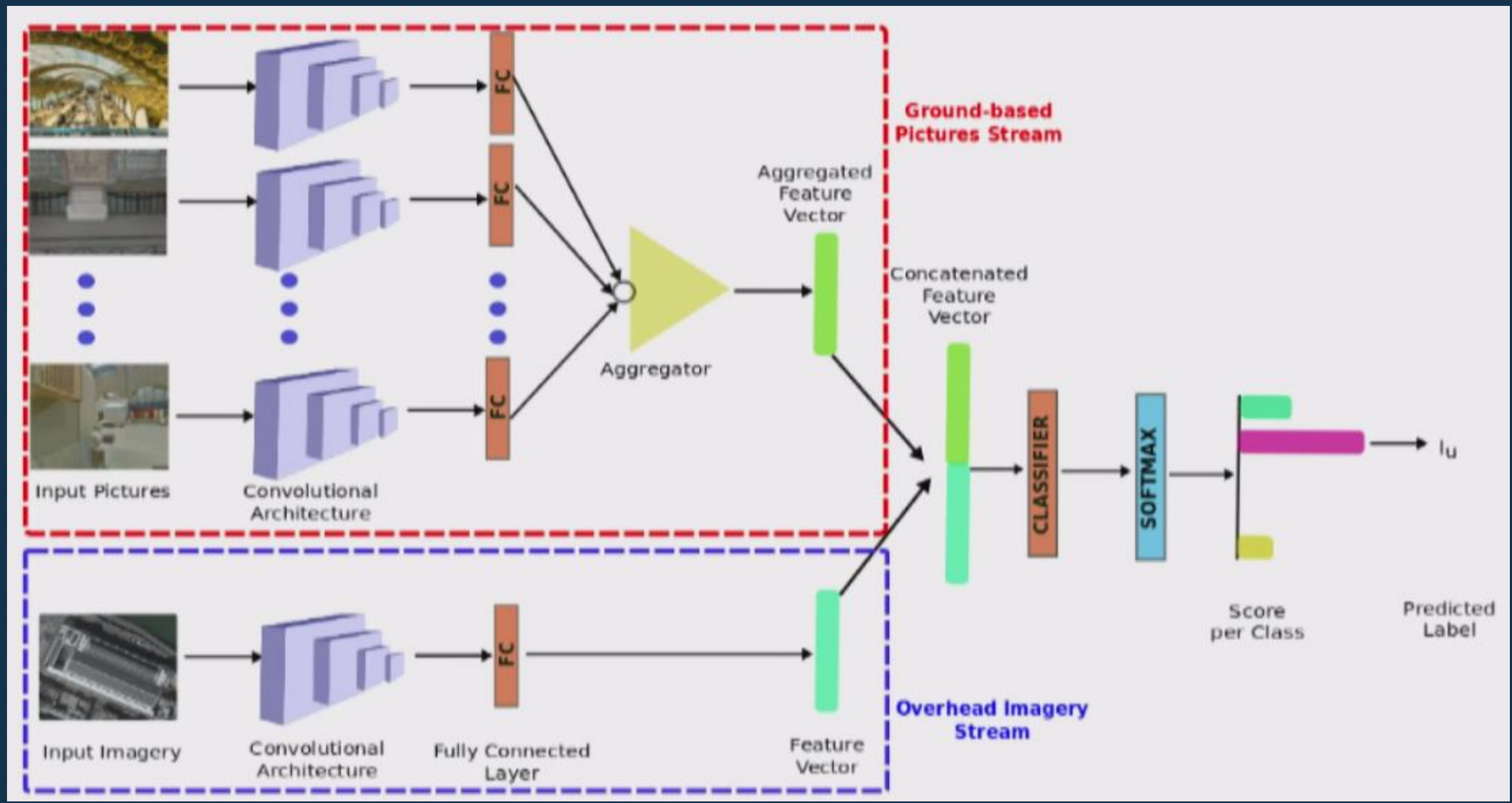
USE CASES

LAND COVER & USE CLASSIFICATION

Land cover and land use statistics can benefit from several data streams



Understanding urban landuse from above and ground perspectives: a deep learning, multimodal solution, Shivangi Srivastava, John Edgar Vargas Munoz, Devis Tuia, Remote Sensing of Environment, 2019