



AI for Modern Cadastre Chances and Challenges

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The Netherlands

The Netherlands

~40.000 km²
~17,8 million inhabitants
342 Municipalities
21 Water Authorities

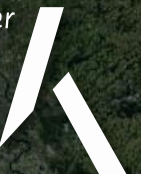
Country: e-Government spatial data infrastructure

Provinces: Spatial planning, environment and conservation

Municipalities: land management, zoning, local development
Key partner in e-Government and SDI



kadaster



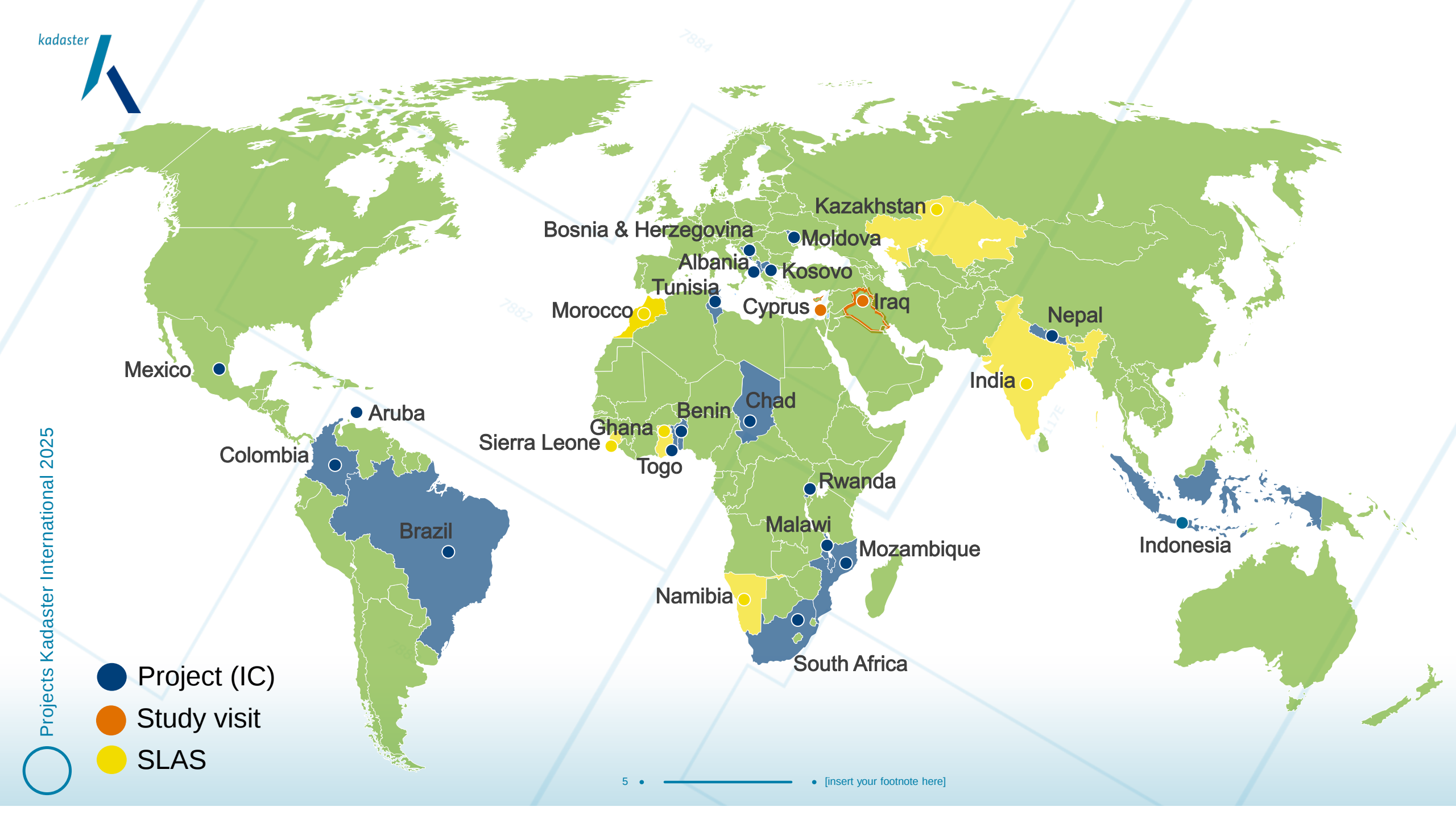




Vision Kadaster

Making reliable data through one digital geodata platform accessible to everyone. That's what we work on every day by connecting and providing certainty. When you combine data with that of others, valuable insights are formed into solving social issues. That's how we contribute to a sustainable and liveable society. And because geodata does not stop at the border we do that in the Netherlands and abroad.

- Project (IC)
- Study visit
- SLAS





World's challenge

SUSTAINABLE
DEVELOPMENT
GOALS

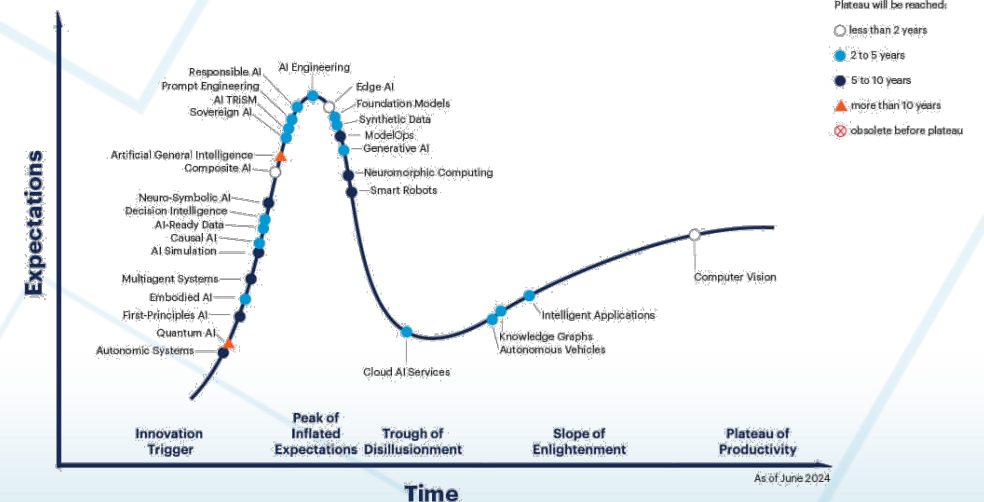


What brings AI?

- Replication of human intelligence
- Process complex tasks: language processing, image recognition, autonomous decision-making
- Analyse large datasets, processing and automated detection

Responsible AI

Hype Cycle for Artificial Intelligence, 2024



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Why Kadaster innovates in AI?



Replace repetitive manual work



Anticipates on smaller workforce (increasing retirements)



Achieve more in less time or at a lower cost



Increase the quality of our registries



Prepares us for the future



Facilitate the processing of large datasets



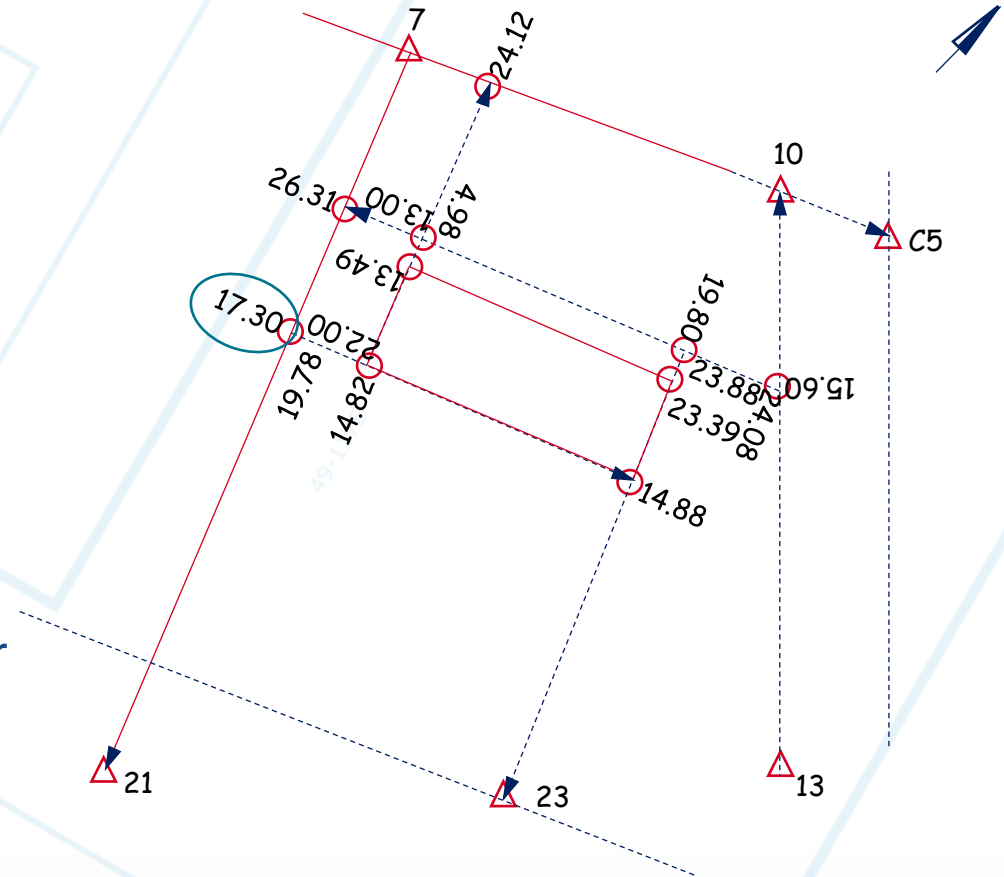
AI applications – Processing digitally archived Cadastral Field Sketches(1)



Multiple AI Models:



1. Segmentation
detecting lines
2. Object detection
finding numbers
3. Optical Character
Recognition
reading numbers





AI applications – Processing digitally archived Cadastral Field Sketches(2)



Field sketch

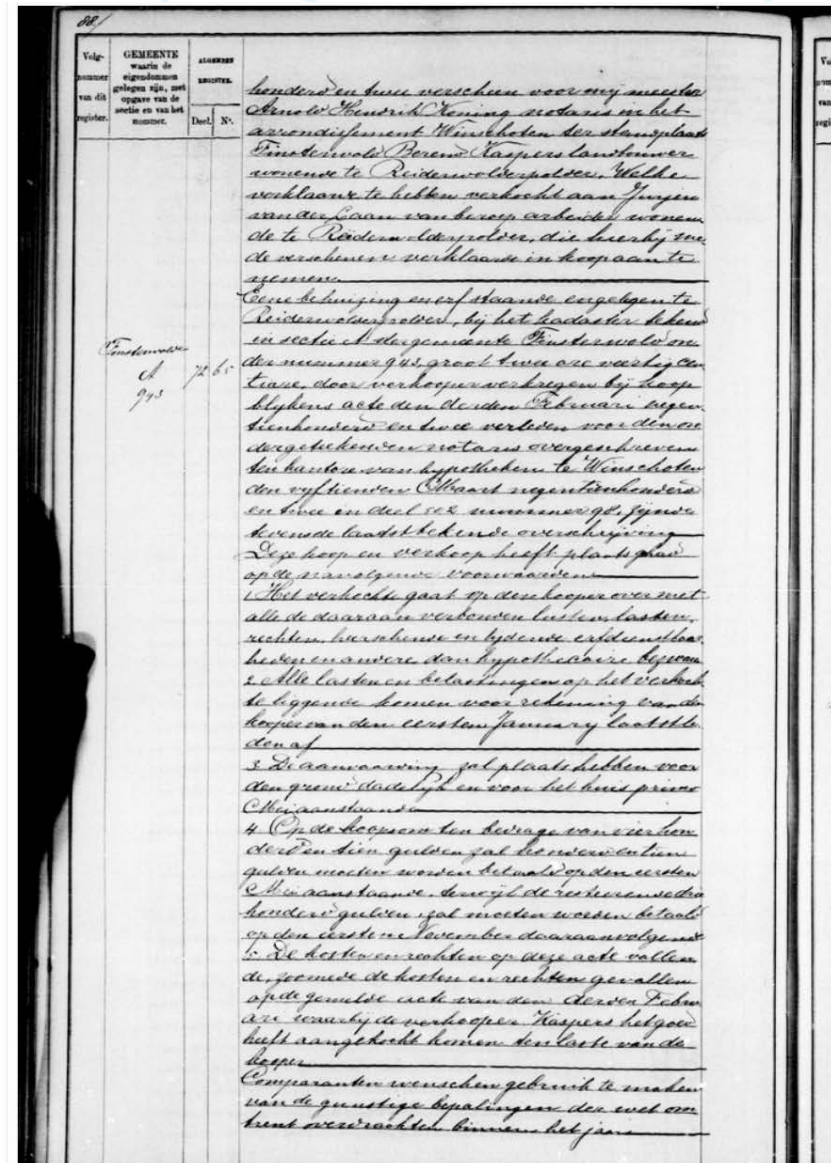
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Cadastral map

=

Improved map

AI applications: Scans of *handwritten deeds* → searchable text



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 proitee en van het

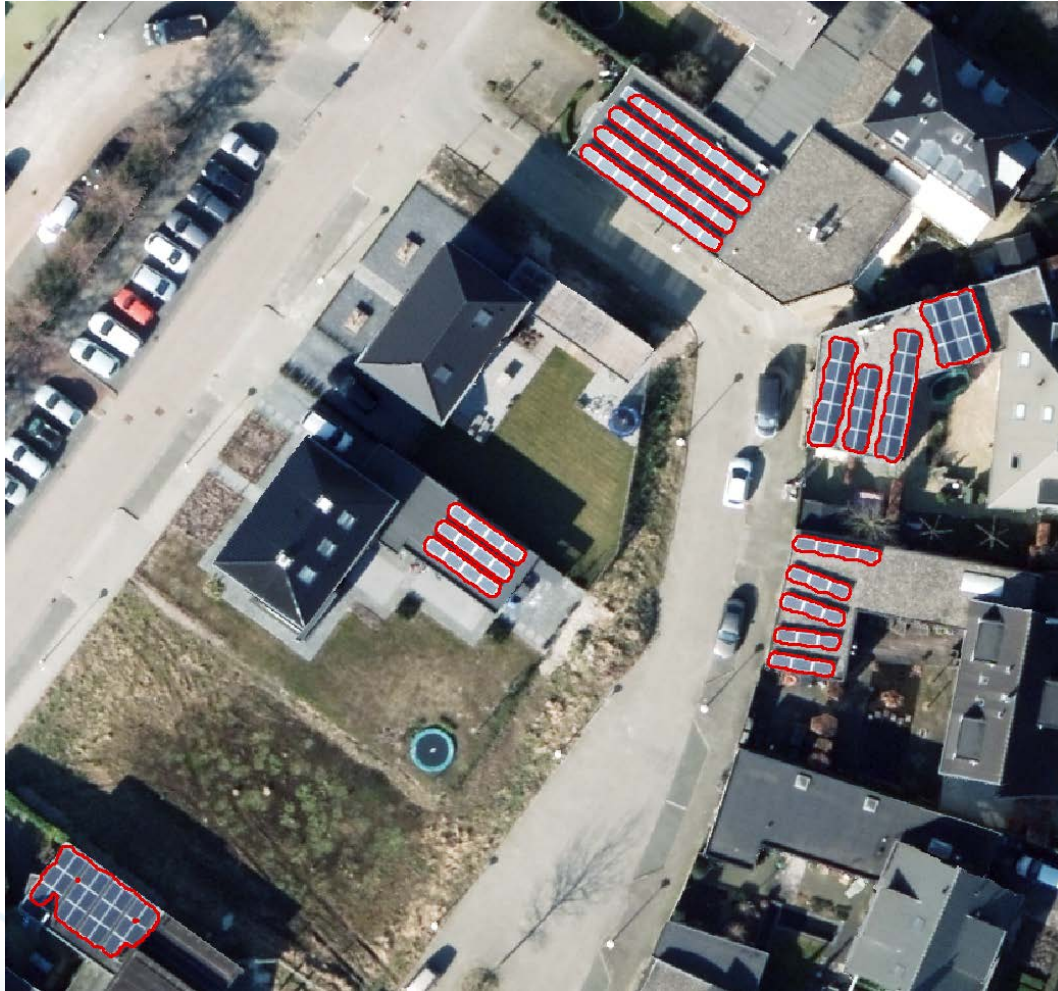
naam
 rom
 woel &.

Arnold Hendrik Kening notaris in het
 arrondissement Winschoten ter standplaats
 Tinstenwold Berend Raspers landbouwer
 wonende te Reiderwolderpolder, Welke
 verklaare te hebben verkocht aan Jui
 van der Laan van beroep arbeider wonen
 de te Reiderwolderpolder, die hierbij me
 de verschenen verklaarde in koop aan te
 nemen.
 Eene behuizing en erf staande engelegen te
 Reiderwolderpolder, bij het kadaster bekend
 in sectie A der gemeente Onsterwold on-
 der nummer 943, groot twee are veertig cen-
 tiare, door verkooper verkregen bij koop
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 tienhonderd en twee verleden voor den on-
 dergeteekenden notaris overgeschreven
 ten kantore van hypotheek te Winschoten
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 en twee in deel 502 nummer 98, zijnde
 tevens de laatstbekende overschrijving
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 op de navolgende voorwaarden
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 alle de daaraan verbonden lasten, lasten,
 rechten, heerschense en lijdende erfijndstbaar
 heden en andere dan hypothecaire bezwar
 2 Alle lasten en belastingen op het verzoek
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 kooper van den eersten J anuarij laatstle-
 den af
 3 De aanvaarding zal plaats hebben voor
 den grond dadelijk en voor het huis primo
 Mei aanstaande
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 derd en tien gulden zal honderd en tien
 gulden moeten worden betaald op den eersten
 Mei aanstaande, terwijl de resteerende dra
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 op den eersten November daaraanvolgende
 1= De kosten en rechten op deze acte vallen
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 van de gunstige bepalingen der wet om
 trent overdrachten binnen het jaars

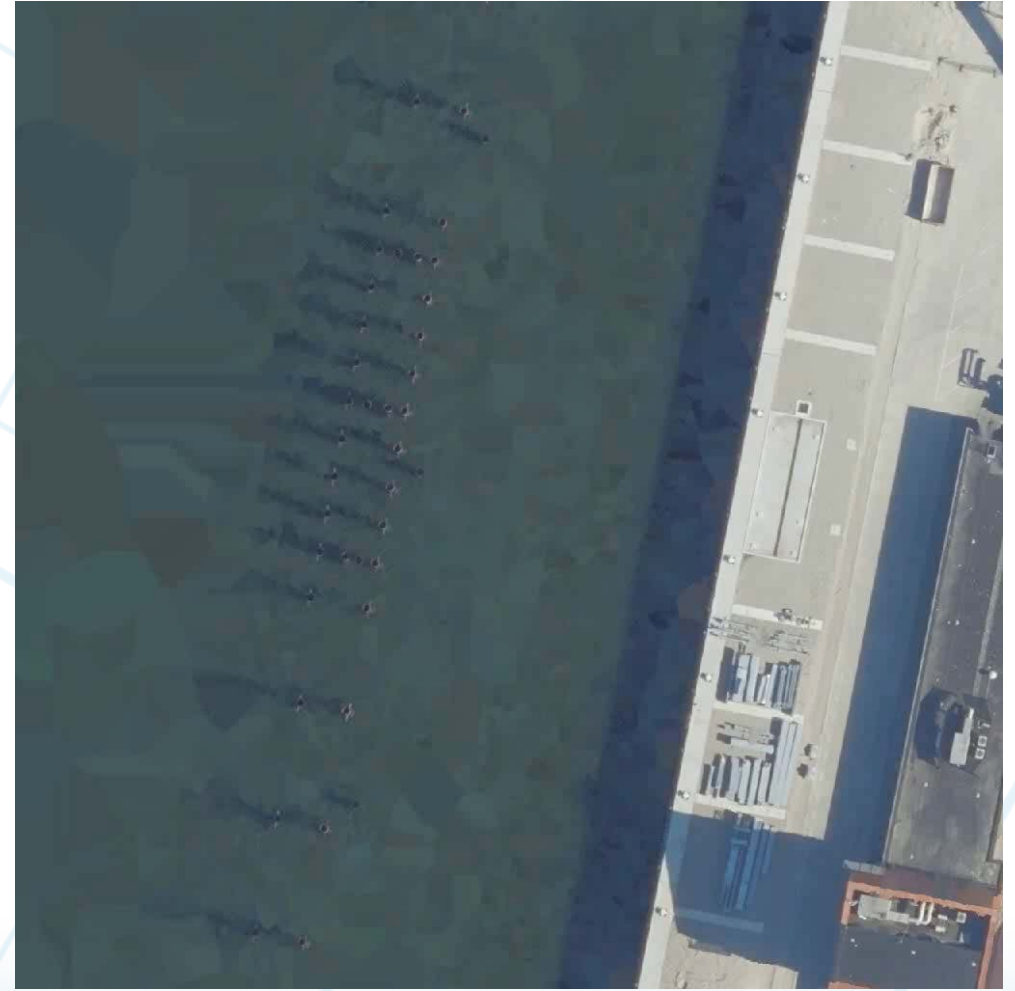
Eonstenvolde
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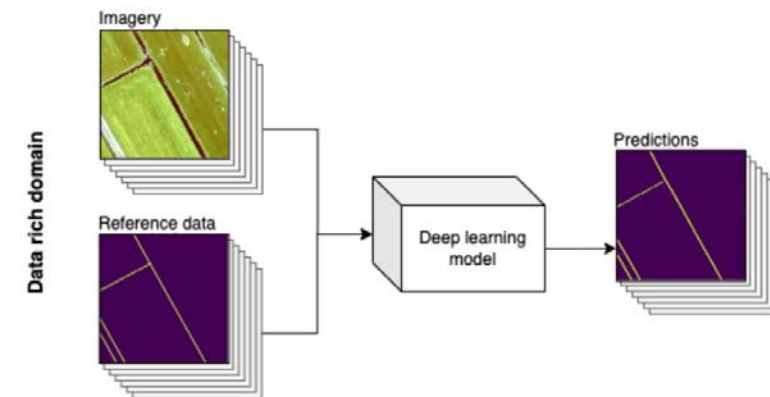
AI applications – Automatic object recognition



Solar panels



Detection of storage tanks



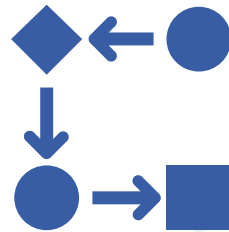
CADASTRAL BOUNDARY DELINEATION USING DEEP LEARNING AND REMOTE SENSING DATA

Jeroen Grift

Challenges and Lessons Learned



High-quality Data



Workflow Integration



Ethical Considerations

Core innovation team for exploring and implementing



Ensuring Responsible AI

Potential



Risks

Privacy

Security

Ethics

Dependency

Ensuring Responsible AI: Governance

Four pillars of AI Governance:



AI Vision

Establish a clear AI strategy that aligns with organizational goals and emphasizes human-centric AI applications



AI Literacy

Promote AI awareness and education across the organization to ensure responsible use and understanding of AI technologies



Organizational Structure

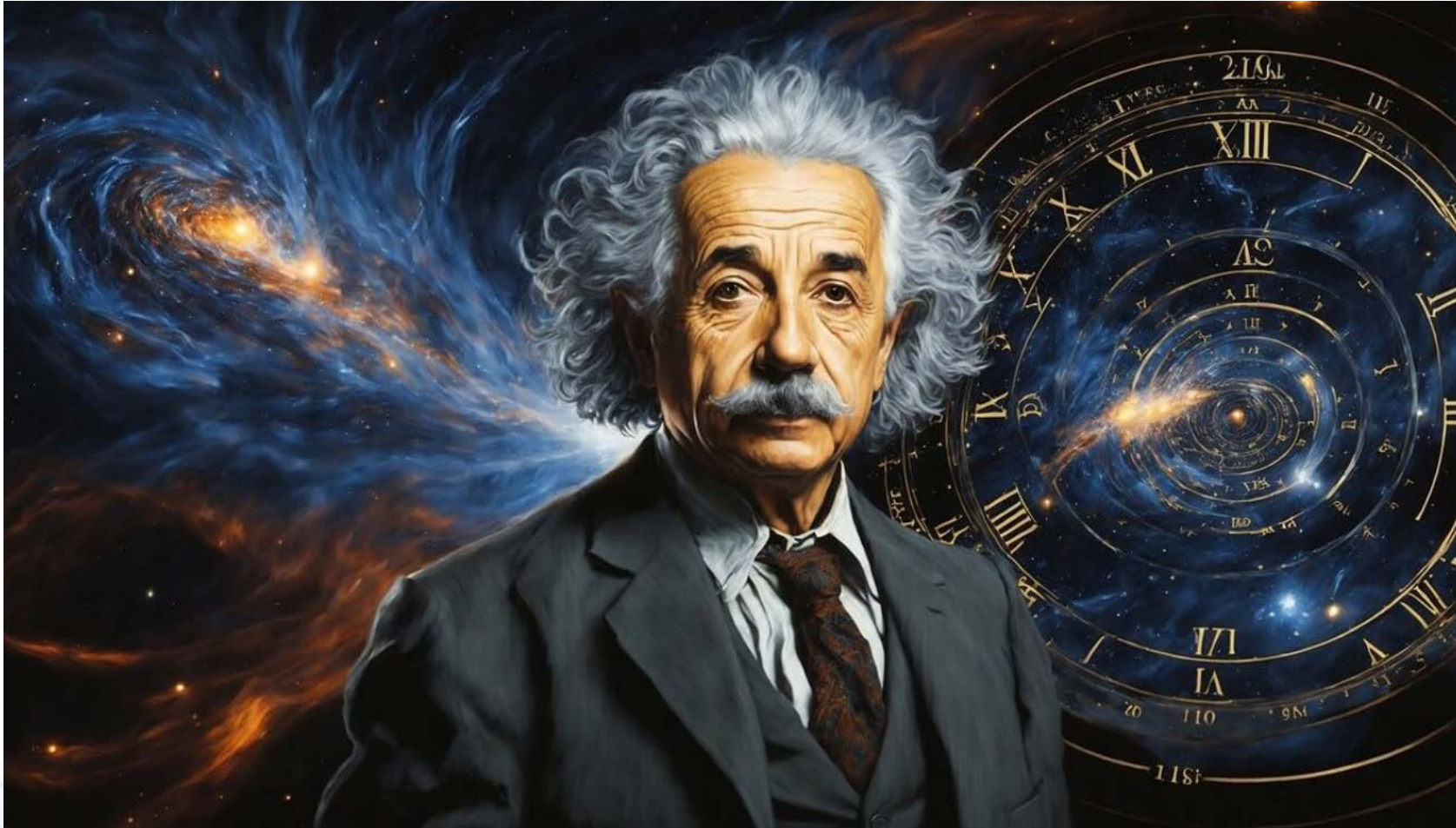
Implement roles and governance bodies (e.g, AI Board) to oversee AI initiatives and ensure accountability



AI Process

Develop and integrate processes for AI development, deployment, and management, ensuring scalability and compliance

'We cannot solve our problems with the same thinking we used when we created them.'



Albert Einstein



World's challenges:

SUSTAINABLE
DEVELOPMENT
GOALS

NO
POVERTY



ZERO
HUNGER



GOOD HEALTH
AND WELL-BEING



QUALITY
EDUCATION



GENDER
EQUALITY



CLEAN WATER
AND SANITATION



AFFORDABLE AND
CLEAN ENERGY



DECENT WORK AND
ECONOMIC GROWTH



INDUSTRY, INNOVATION
AND INFRASTRUCTURE



REDUCED
INEQUALITIES



SUSTAINABLE CITIES
AND COMMUNITIES



RESPONSIBLE
CONSUMPTION
AND PRODUCTION



CLIMATE
ACTION



LIFE
BELOW WATER



LIFE
ON LAND



PEACE, JUSTICE
AND STRONG
INSTITUTIONS



PARTNERSHIPS
FOR THE GOALS



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Thank you!

