

MINDTITAN

Beyond human comprehension: XR

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Lead Data Scientist

Introduction

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Lead Data Scientist



BSc Computer Science

MSc Computer Science (Data Mining & ML)



MindTitan in few words

Full-stack team of data scientists,
ML engineers, software developers,
product managers.



MindTitan in few words

We work with industry leaders, taking ideas and turning them into full solutions.



MindTitan in few words

We deliver End-to-End services*,
from AI strategy and idea validation



AI model and product development



Scaling and maintenance



*Example of negotiating budget extension
with client

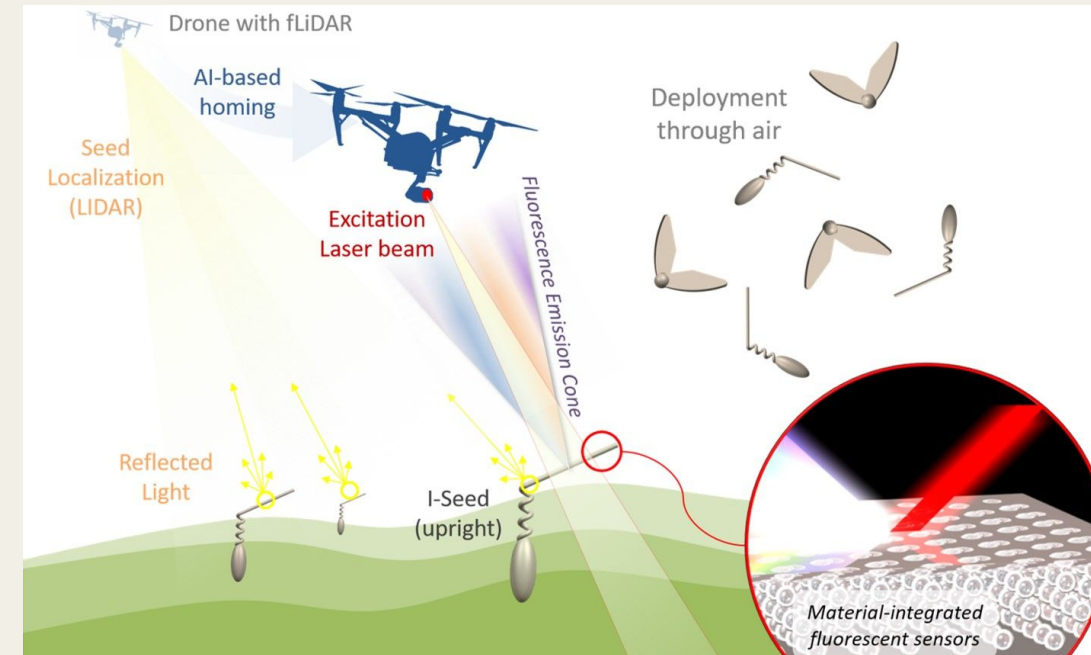
Source of inspiration

Eesti loodus - [article](#) and [article](#)

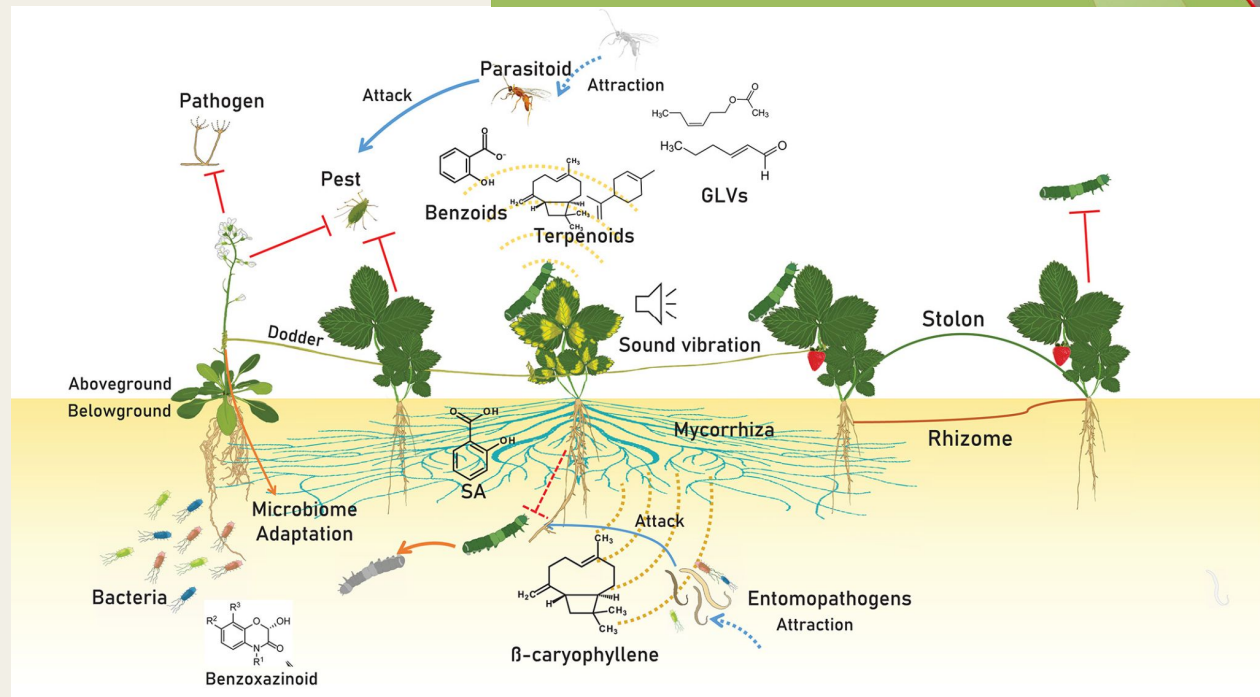
Woodwideweb

Plant communications

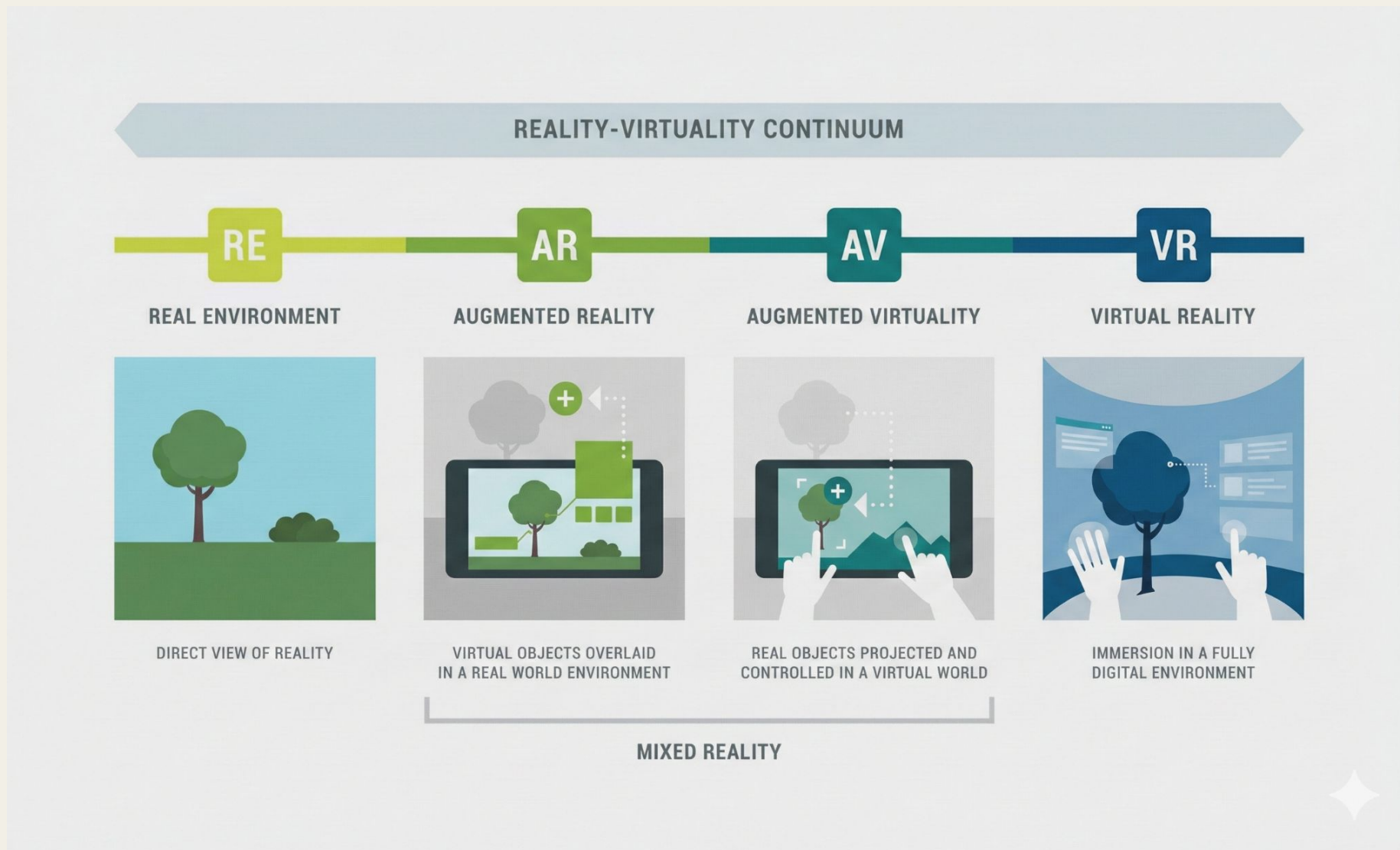
doi.org/10.1111/pce.13966



iseedproject.eu



XR - term explanation



Models and uses

PERCEPTION & TRACKING (The 'Senses')

Vision Transformers (ViT) & Hybrid Architectures



Graph Neural Networks (GNNs)

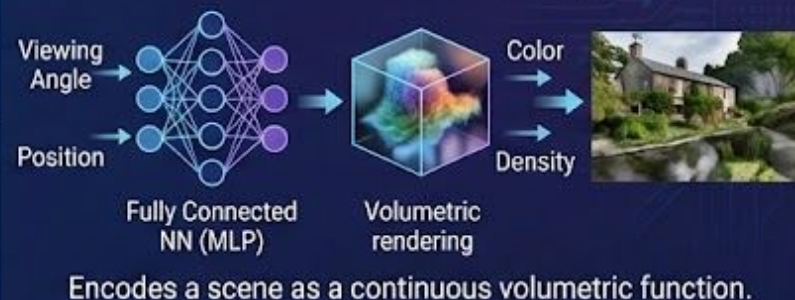


SLAM (Simultaneous Localization and Mapping) Models

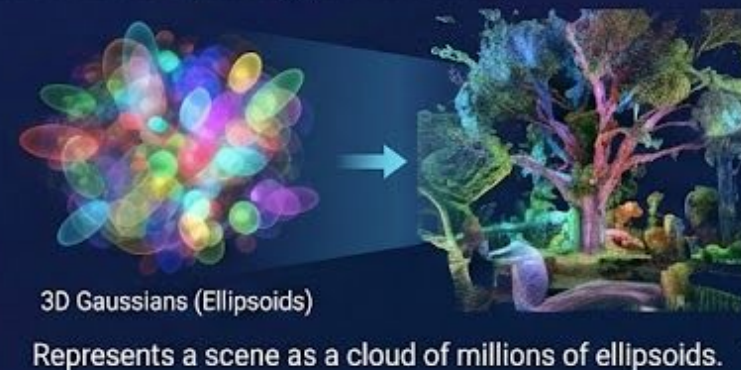


NEURAL RENDERING & RECONSTRUCTION (The 'Eyes')

NeRFs (Neural Radiance Fields)



3D Gaussian Splatting (Current SOTA)



XR - classic applications

1. Pokémon GO

- Location-based AR app. Concept of overlaying digital characters onto the real world using GPS and camera feeds.

2. Retail: "Try Before You Buy"

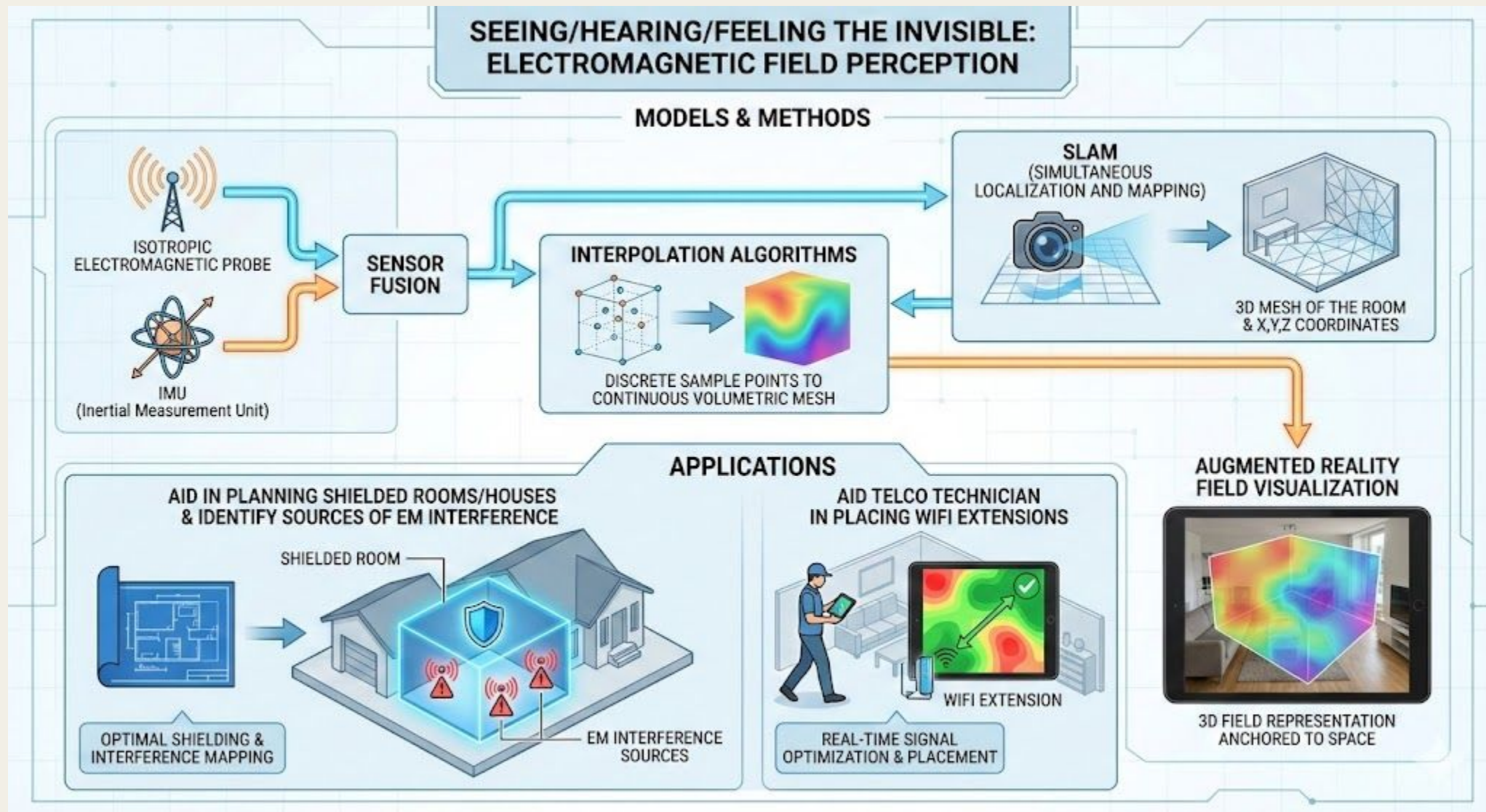
- **IKEA Place.** Launched in 2017 it creates virtually 98% accurate scale models of sofas and tables, handling lighting and shadows so the object looks like it is physically in the room.

3. Corporate Training: Mass Upskilling

- **Walmart & Strivr.** Walmart used VR headsets to train over 1 million employees. 8 hours of in-person training, was reduced to just 15 minutes using VR, with higher retention rates.



XR - enhanced human perception



XR - enhanced human perception

Scaling Perception: Small object production

- **Specific Example:** A production specialist steps inside carbon tube to check its integrity, imperfections and gather ideas for improvements in production quality, predictive maintenance, etc.
- **Models & Methods:**
 - **Entry & Calibration:** The inspector puts on an XR glove and headset. The device scans the tube's exterior using LiDAR/Depth/Ultrasound sensors to align the physical tube with its "Digital Twin". In parallel the headset is visualising the surface and known defects.
 - **Automated Scanning:** As the inspector virtually feels the tube, the gloves sensors continuously respond to the actual carbon surface.
 - **Predictive Overlay:** The system highlights areas that have historically failed in similar batches, prompting the user to "Check this area closely."

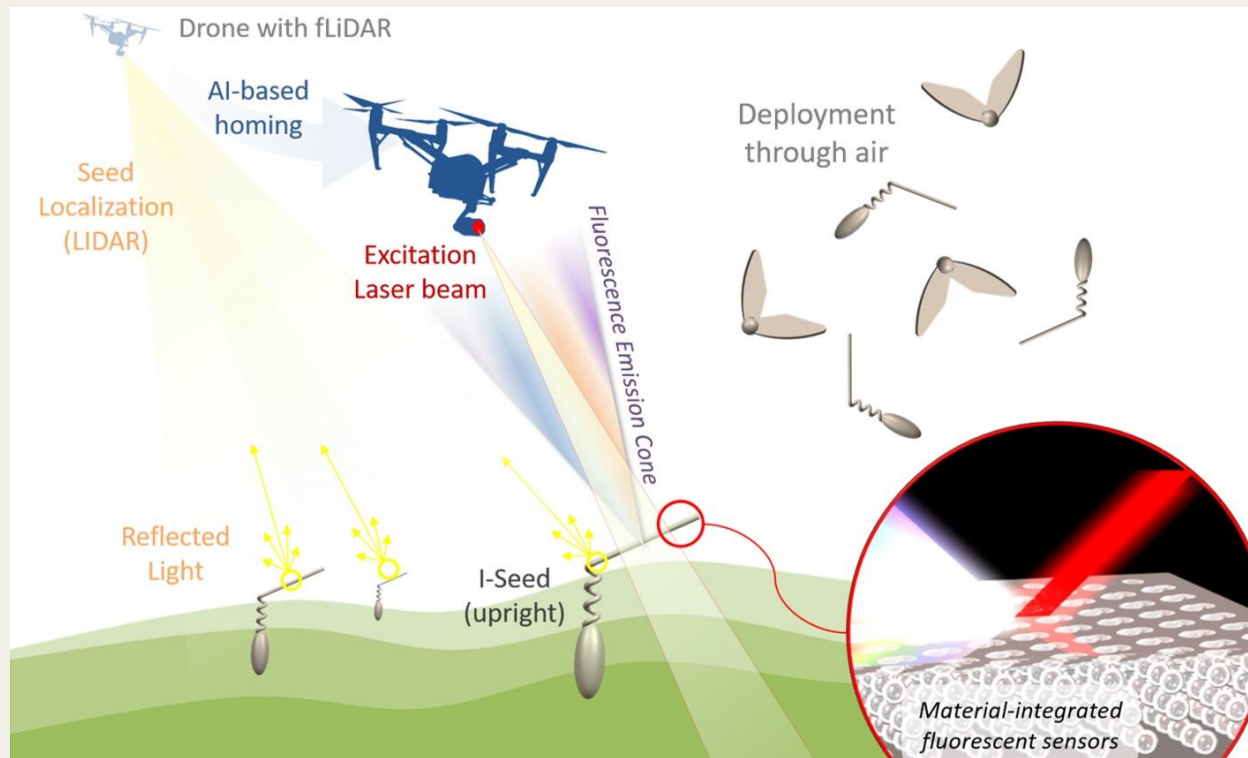


[Nanome.ai](#) - similar usecase for molecular structure review.

XR - beyond human comprehension

- **Plantation irrigation:** Monitoring environmental parameters in air and top-soil by using a novel system of self-deployable and biodegradable soft miniaturized robots (I-Seed)
- **Herbicide/pesticide precision application** - chemical footprint detection and visualisation
- **Reverse engineering animal cognition** - Research how animals respond to reality manipulations. Well-being of zoo animals.

I-Seed project



XR - machine to machine

Machines live in a different reality. Is it even reality?

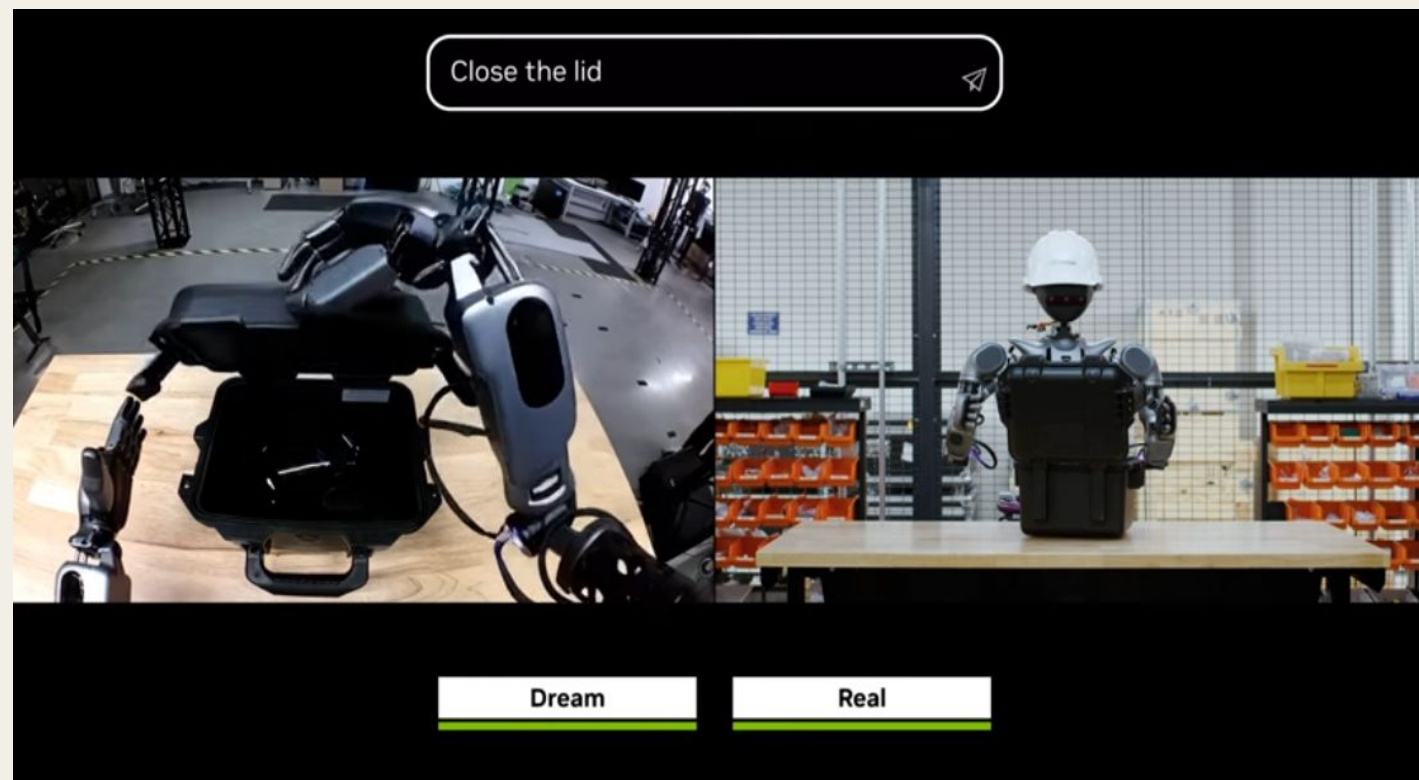
- Digital twins and simulation environments allow complex systems to be modeled and tested virtually, separate from the physical world.
 - **Complexity Reduction:** Reduce all complexity that is due to requirement of human comprehensibility
 - **Giving up Control:** Adopting AI-driven scheduling or process optimization where the AI makes non-deterministic decisions that humans might not fully trace. Allow system to forge its own data flows and representations.

XR - machine to machine

Swarm mapping -
Collaborative slam

"Visual" depiction and
traversal of N dimensional
spaces - e.g money
laundering networks

XR training for robots -
[Omniverse robot training.](#)



AI strategy

Buyers

- XR still quite niche and expensive today - cheap interfaces!
- Develop holistic AI strategy - as-is and to-be, human and machine perspective
- Prepare your data (pipelines)
- Prepare your (managerial) staff

Suppliers

- Visual scene will get crowded - aim for including other sensory output
- Modular and universal data setup - Stable Good beats SOTA
- Keep an eye on frameworks - e.g. [Omniverse](#)

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WE ARE HIRING!



- Data Engineer
- Machine Learning Engineer
- Software Engineer

Contact us team@mindtitan.com

this could be you
at the our next
project retro



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Thank you!

Questions?

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