

MINDTITAN

# Beyond human comprehension: XR

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Lead Data Scientist

# Introduction

## Sander Tars

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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

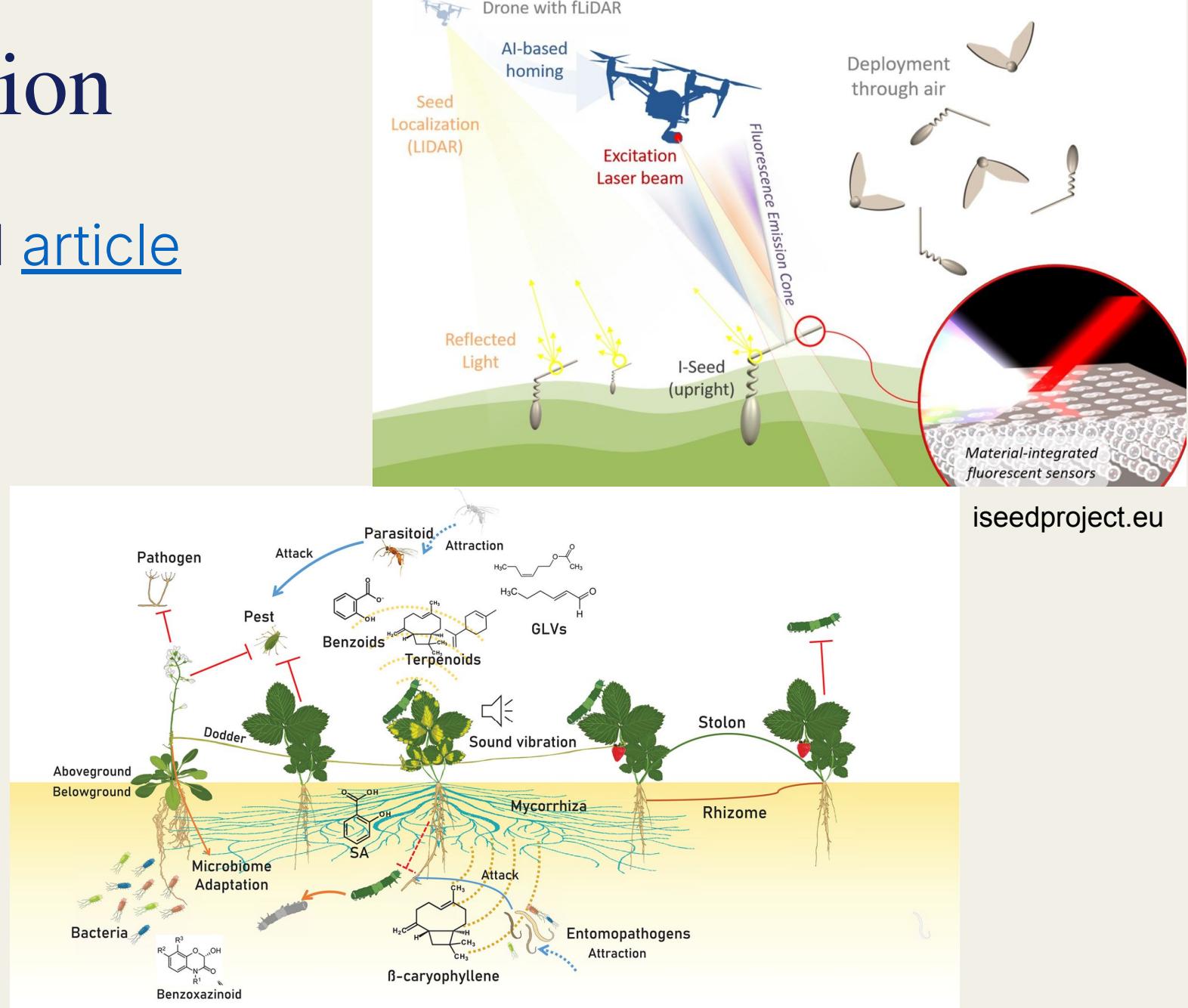
# Source of inspiration

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

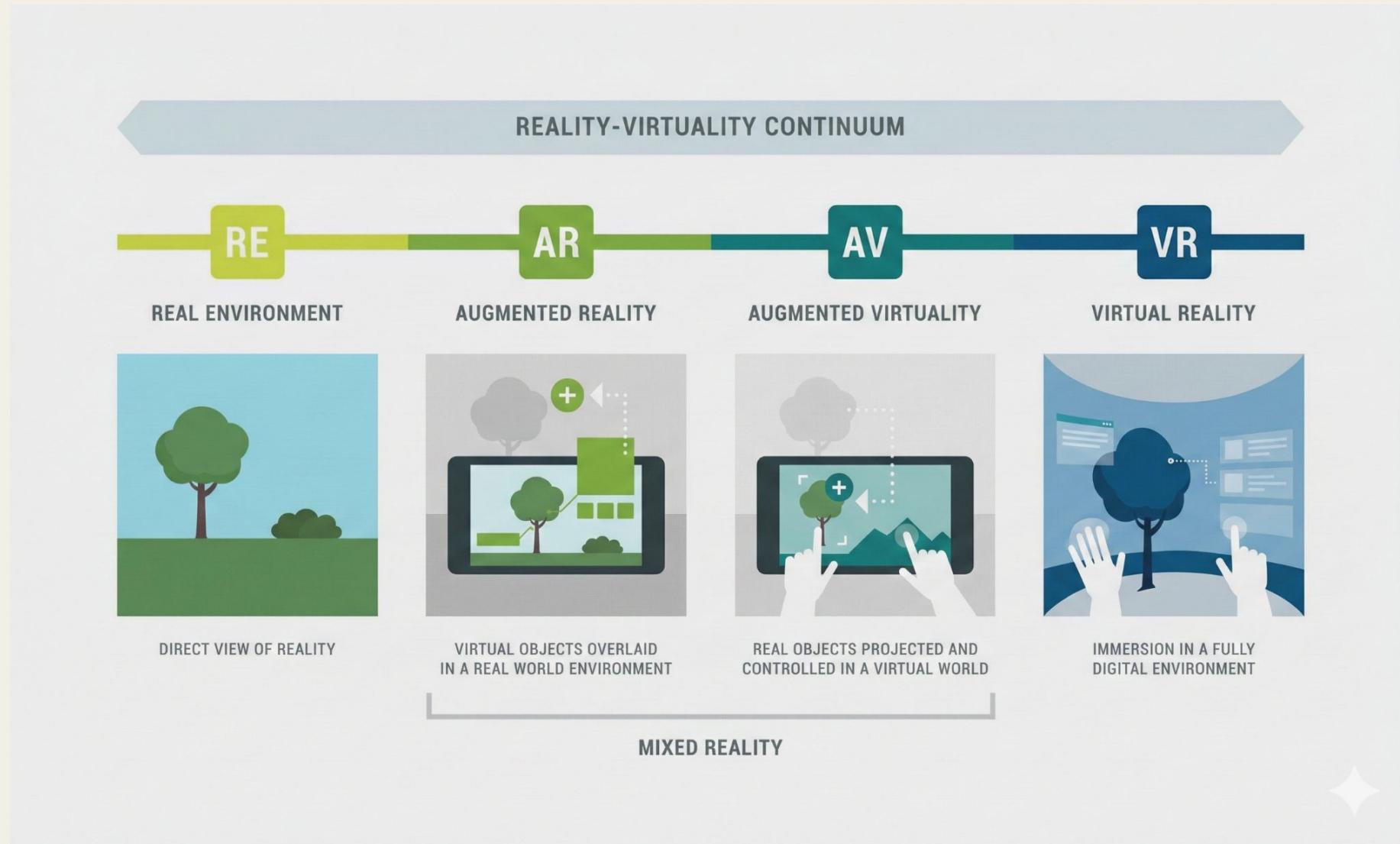
Woodwideweb

Plant communications

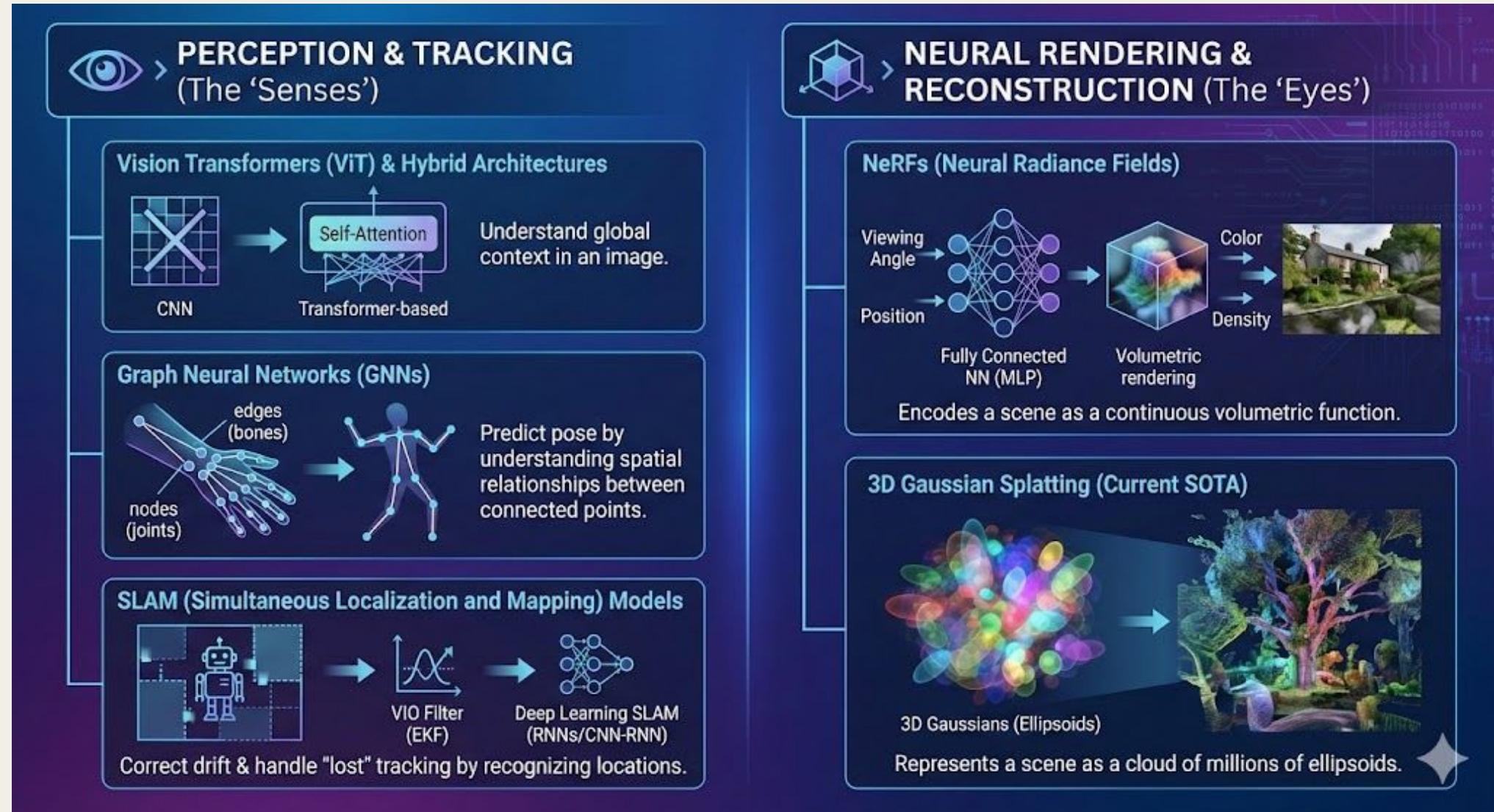
[doi.org/10.1111/pce.13966](https://doi.org/10.1111/pce.13966)



# XR - term explanation



# Models and uses



# 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.

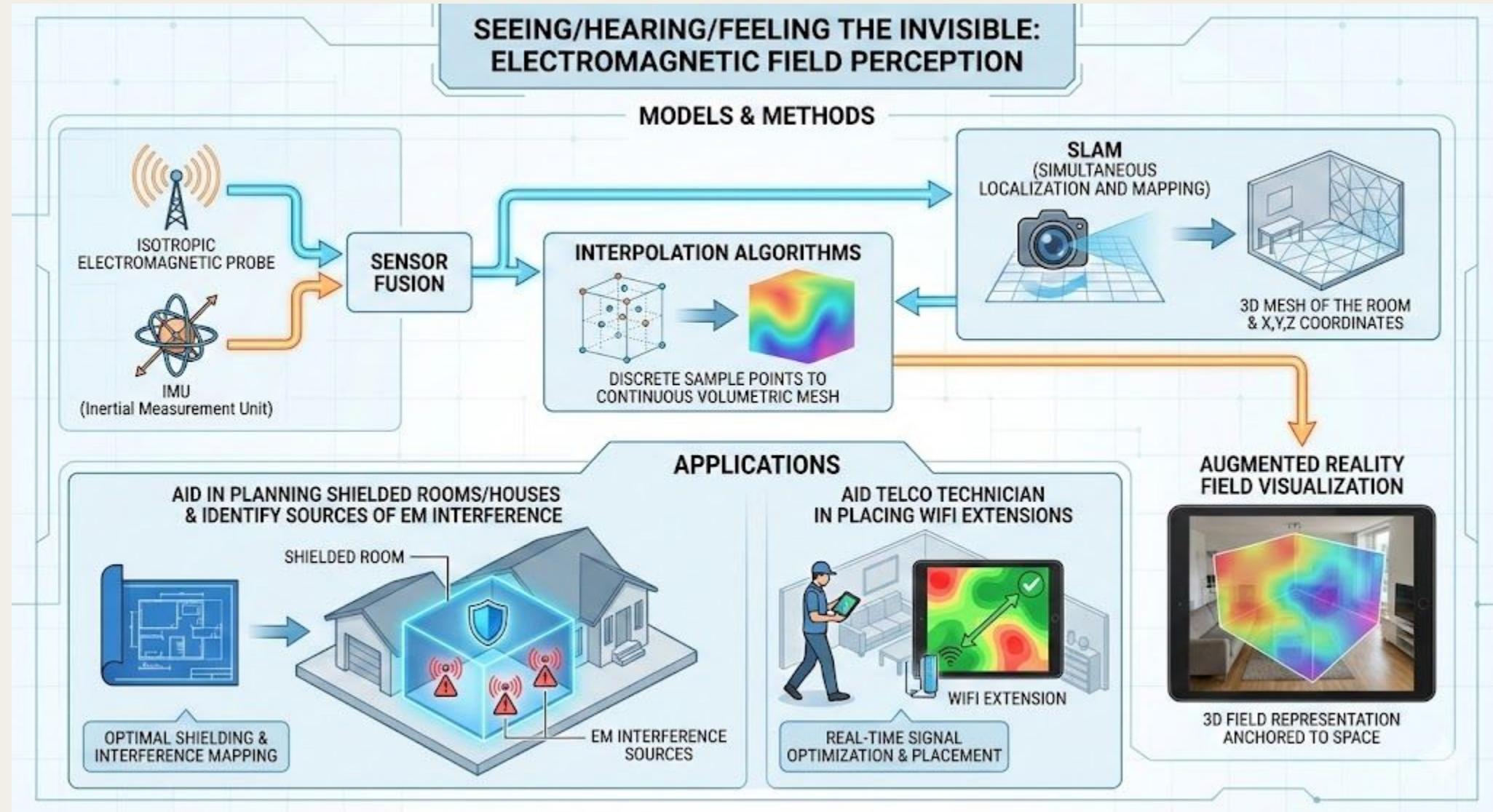


## 3. Corporate Training: Mass Upskilling

- **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."

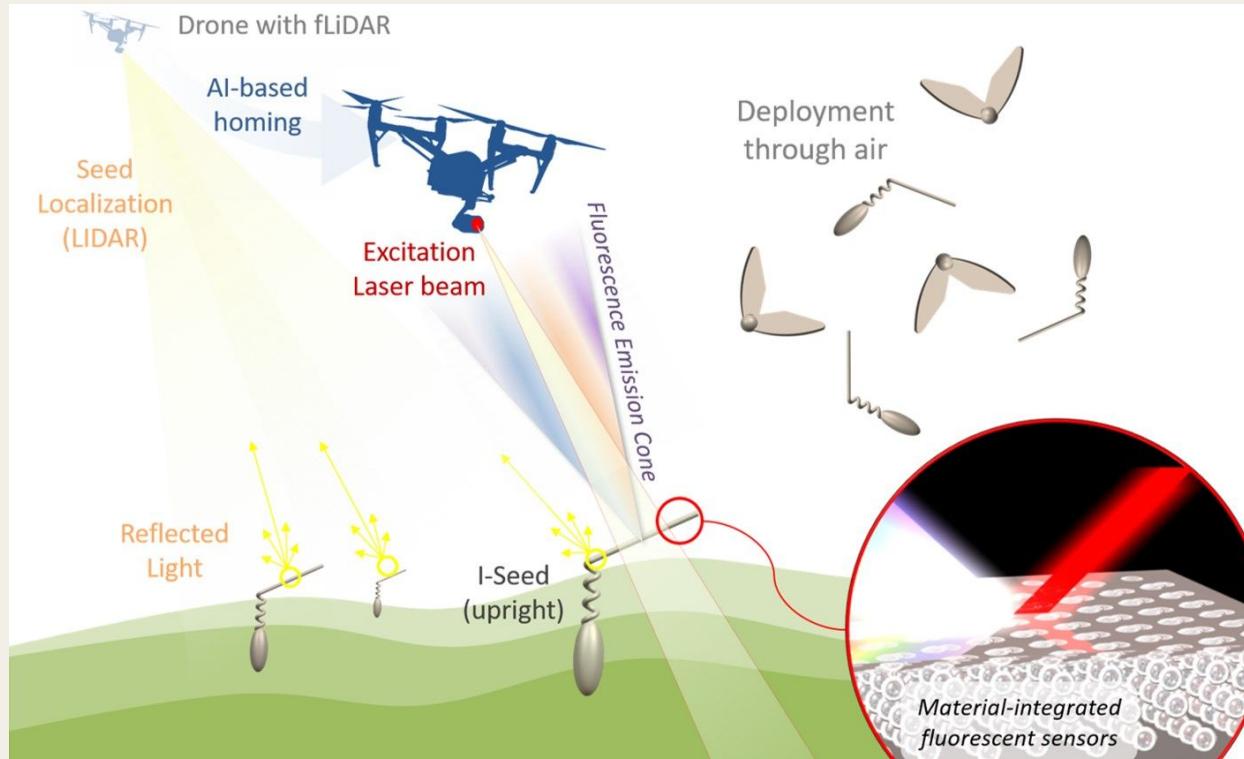


[Nanome.ai](https://nanome.ai) - similar usecase for molecular structure review.

# 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?

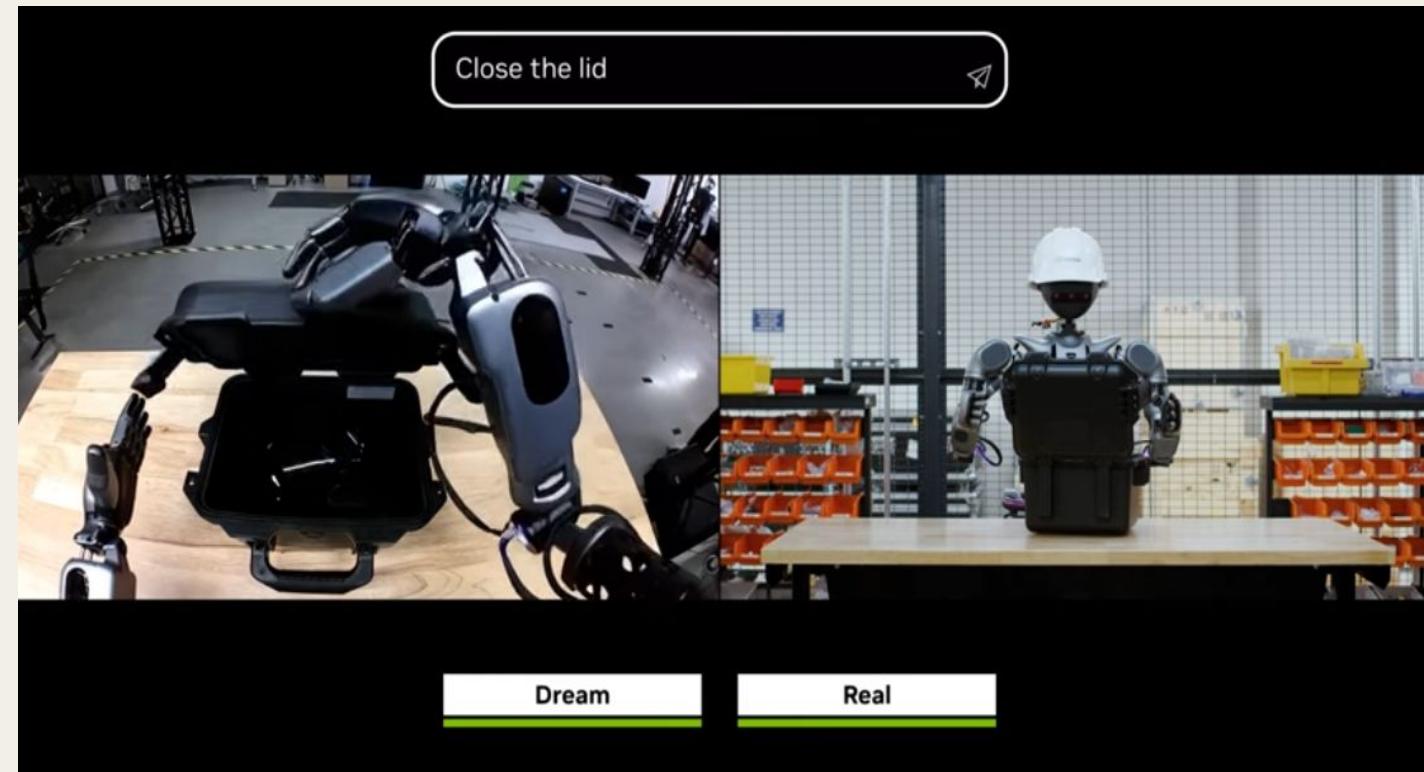
- Digital twins and simulation environments allow complex systems to be modeled and tested virtually, separate from the physical world.
  - **Complexity Reduction:** Reduce all complexity that is due to requirement of human comprehensibility
  - **Giving up Control:** Adopting AI-driven scheduling or 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](mailto:team@mindtitan.com)

this could be you  
at the our next  
project retro



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# Thank you!

# Questions?

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