



**ENTERPRISE
NEUROSYSTEM**

930000

98.7

1280

117000

Water

Food

Air

Climate

Community

Tools

What is AI?

Artificial Intelligence imitates cognitive functions and human decision making. In essence, it is possible for machines to learn from new tasks and experiences.

AI works with structured, semi-structured and unstructured data. And data is critical to AI functions, and why it is so valuable.

AI uses logic and decision trees to learn, reason and self-correct, just like humans.

Machine Learning

- Uses statistical algorithms to create predictive results and pattern identification.
- Can use simpler structured or semi-structured data sets, and more power efficient computing.
- These techniques are more easily interpreted - thus ML techniques like decision trees are widely used by industry for understanding the deterministic process, and for regulatory transparency.

Deep Learning

- Subset of machine learning, inspired by the functionality of human brain neurons, where multilayered artificial neural networks learn from large quantities of data.
- Can use unstructured data, and thus takes longer to train with more powerful energy-intensive chips.
- Interpretability is still an issue - it is possible to find which neuron was activated as part of a decision, but we still can't see what the neurons do collectively.
- DL is behind the most human-like capabilities, like Generative AI - represents deep learning models that generate new text, images or code when given large amounts of text or images to train on.

Where AI is already used extensively:

- Agriculture
- Automotive
- Financial Services
- Health Care
- Manufacturing
- Mobile Networks
- Oil and Gas
- Power and Energy
- Retail / Advertising
- Smart Cities
- Transportation and Shipping

AI for Developing Nations

Agricultural

- Digital twins for commercial farms
- Precision agriculture at scale - recommends topsoil for droughts, resilient seeds, irrigation optimization/weather patterns
- Drones for commercial farms - fertilizers, weeds
- Crop and soil sensors
- Genetic libraries - resilient seed hybrids

Biodiversity

- Risk management of different species
- Preservation and security analysis

AI for Developing Nations

Early Warning Systems

- Weather prediction
- Drought and flood management
- Deforestation and wildfire prediction and identification
- Disaster planning and mitigation for climate emergencies

Irrigation and Water Conservation

- Ground and surface water - analysis and recommendations
- Alert systems for farmers

AI for Developing Nations

Manufacturing

- Carbon-smart component supply chains
- Emission reduction in manufacturing processes
- Shipping and supply planning
- Waste and recycling analysis

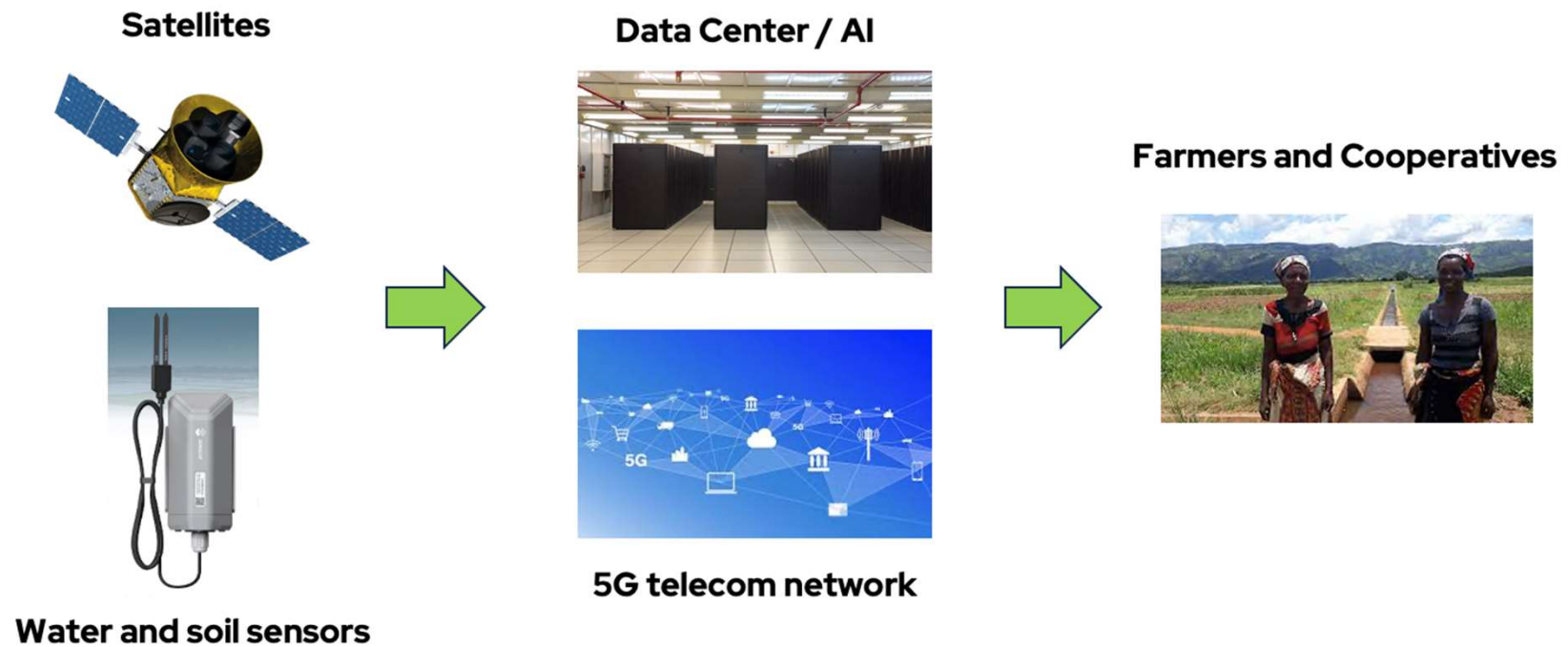
Energy

- Integration of renewable sources into energy grids
- Proactive management of power production and storage

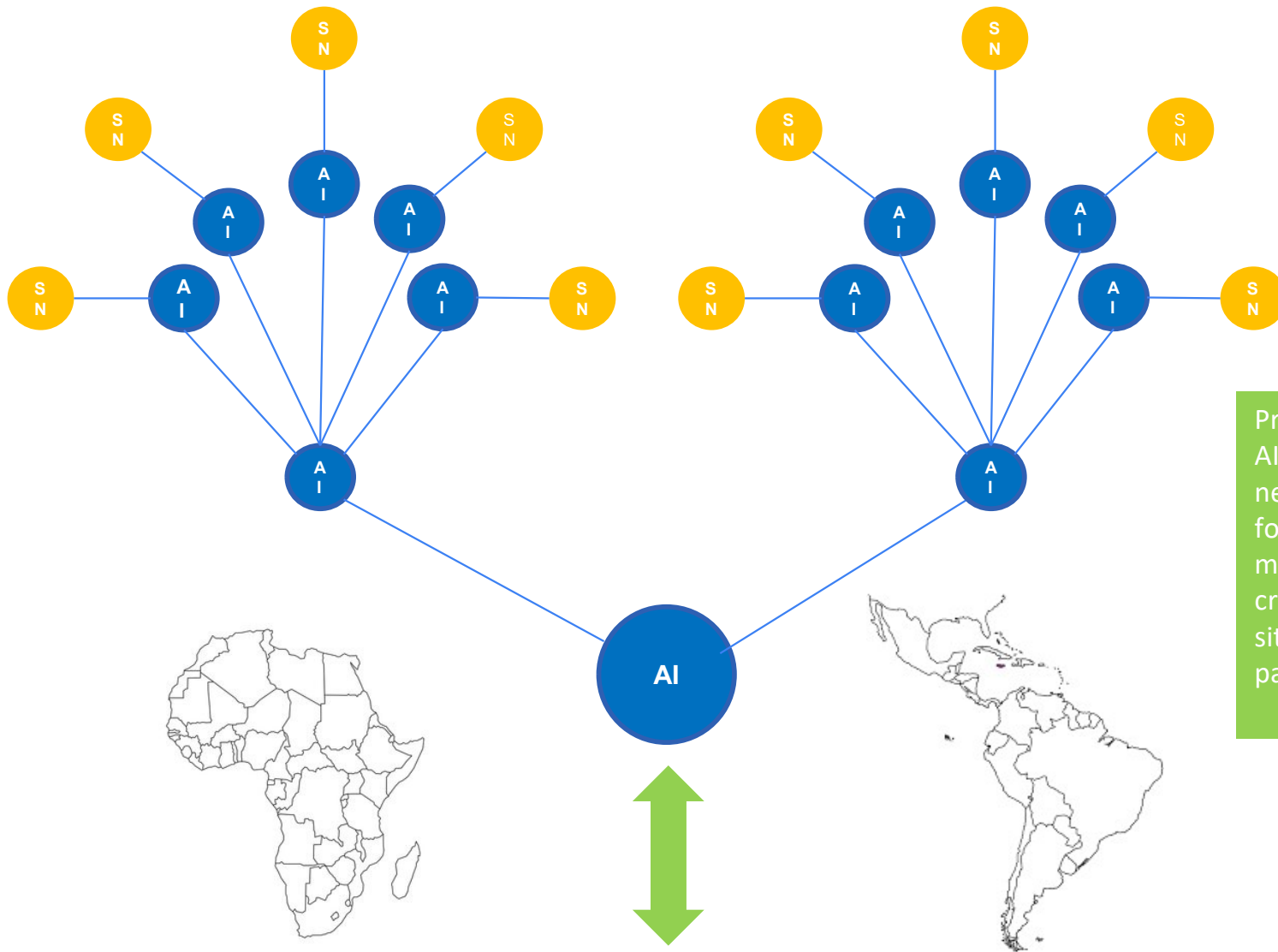
AI Challenges for Developing Nations

- Carbon footprint of AI itself - uses energy intensive computing and requires significant power and cooling, but this is being addressed.
- Local resources (programmers, data scientists) need to be identified and cultivated.
- Data policies need to be established and navigated with Federated AI.
- Elements like cobalt, germanium and tantalum are required for computer components, and extraction comes at a cost to local communities.
- AI data center infrastructure is needed.
- Data needs to be stored and maintained, and historical data may be limited.

Tanzania Irrigation AI Use Case



- **Satellite gravimetrics indicate ground water, while other satellites track surface water and weather**
- **Local sensors act as ground truth, and can be compared against satellite data for accuracy**
- **AI compares and contrasts this information, then sends water use recommendations and flood/drought alerts via SMS**
- **Just one example - there are many data sources for deeper AI analysis of the region**



Preliminary regional AI analysis of sensor networks (SN) is forwarded to multinational AI cross-correlation sites for deeper pattern discovery



Thank you