

Ethical questions in terrestrial environments research

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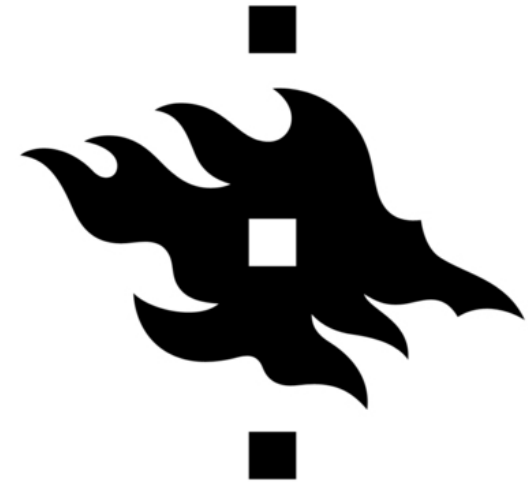
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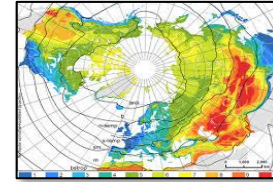


Institute for Atmospheric and Earth System Research

Examples of terrestrial environmental research challenges

Eutrophication and pollution

Water and soils Framework Directive, UNECE-CLRTAP



Climate change

European Green Deal, Strategy on adaptation to Climate Change, UNFCCC Paris Agreement

Biodiversity loss

EU Biodiversity Strategy, Water Framework Directive, Habitats Directive



Socio-ecology -

Environmental protection, sustainable management of natural resources, water, soils, biodiversity & ecosystems

CAP, Strategy on adaptation to Climate Change, Soils thematic strategy

Protecting the environment

Endangered / alien species

- Open georeferenced data?
- Collection and transport of specimen?
 - Convention on International Trade in Endangered Species (CITES)
 - Convention on Biodiversity (CBD)
 - Nagoya Protocol
- Dispersal of invasive species pollen, spores or seeds in the field?
- Spreading of infectious diseases?



Protecting the environment

Manipulations

- What can/should be manipulated?
 - Climate change, pollution, diseases and pests, management, GMO, ...
 - Selecting methods to ensure that no harm is done beyond the experiment
- Respecting the environment, other researchers and the public
- Biohazards!
- Open communication already in planning phase
- Engaging stakeholders and transparency in communicating



Working in a nature conservation area

- Respecting the conservation values
 - Proper permits and approvals from authorities (Metsähallitus, ELY-keskus, private conservation areas)
- Awareness of the danger of spreading infectious diseases, pests or alien species
- Appropriate acknowledgement to the inherent properties of the area in planning and executing the research
- Caution in generalising results from pristine to managed environments



Integrity in selecting the research topic

- Is research objective?
- Politically or socially 'hot' topics
 - extra caution and objectivity is needed in the research setting
- Reliability and impartiality
 - ensuring the design, methods and analysis are not biased
- OPEN DATA



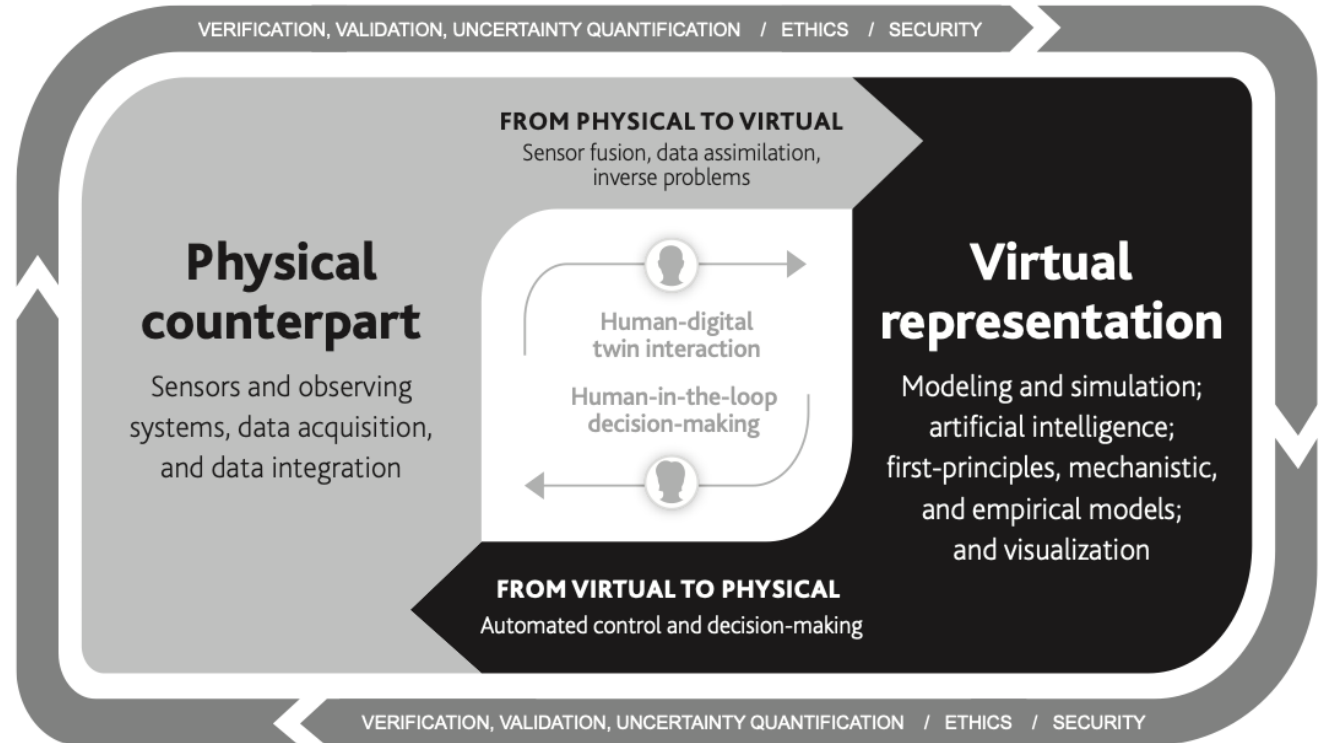
Research outcomes and publicity

- Ethics of publishing
- How to present?
 - *Climate change or climate catastrophe?*
 - *Biodiversity dynamics or nature crisis?*
- How/where to engage in public debate?
- What about negative results that are against the expectations?
- OPEN DATA

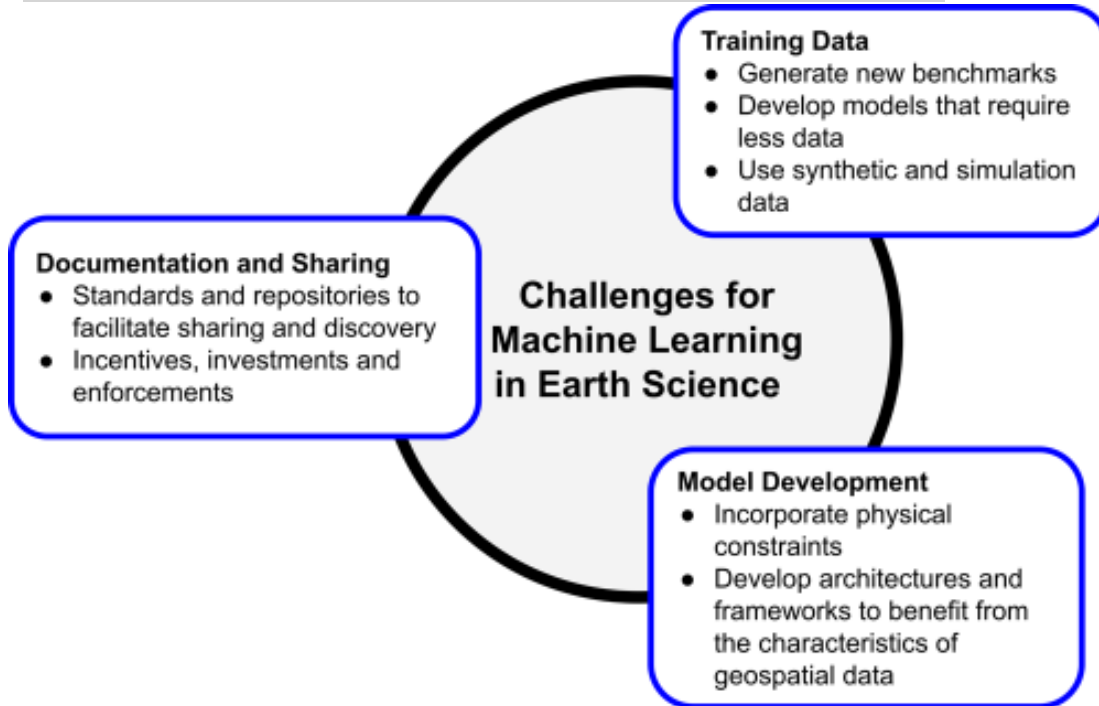


Digital twins

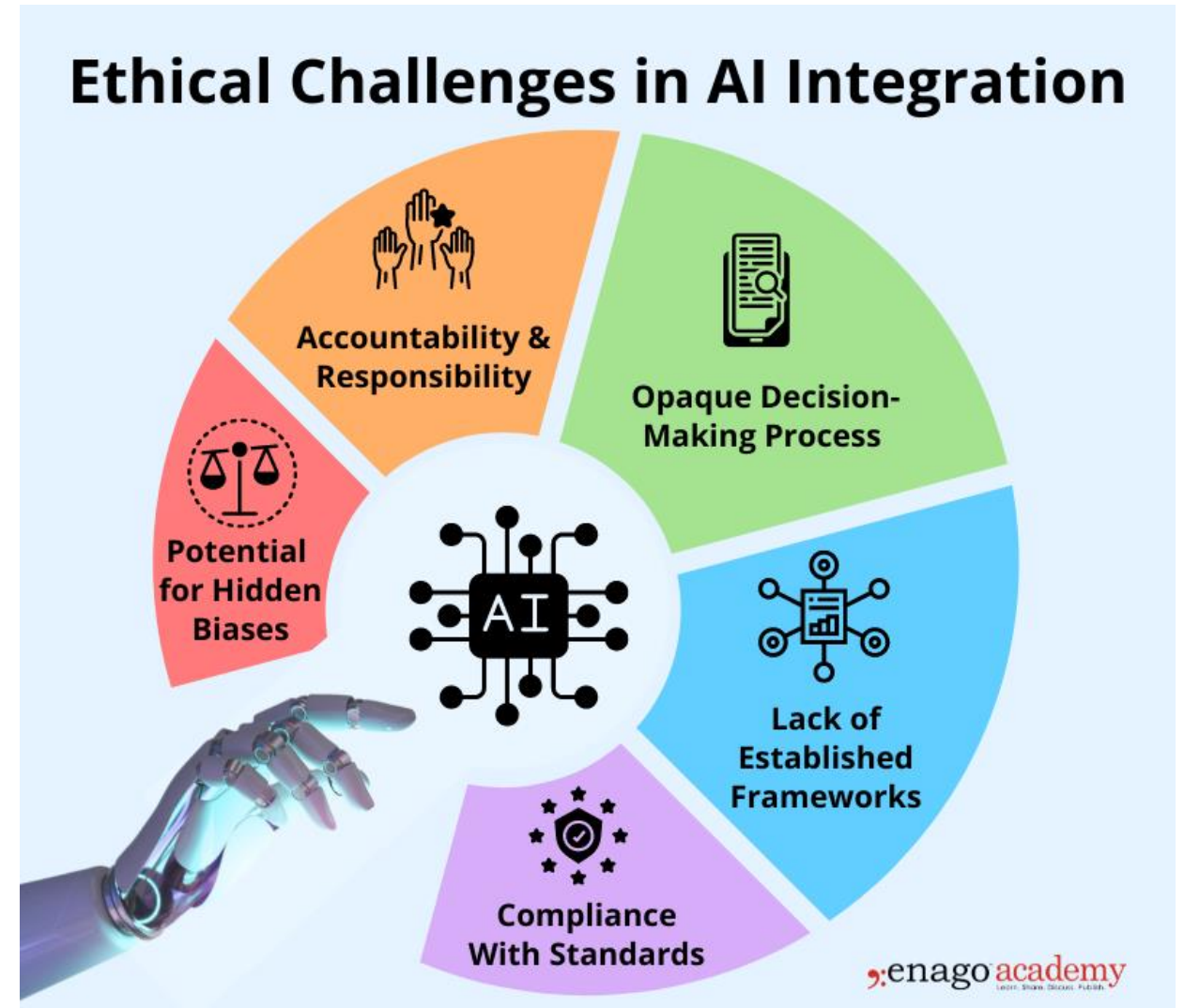
- Purpose is to develop a digital copy of the real world and use that as a testbed for simulations of potential future conditions
- Security issues in Big Data
- Quality control and verification methods
- Human-machine interface



Artificial Intelligence and research ethics



<https://eos.org/science-updates/advancing-ai-for-earth-science-a-data-systems-perspective>



<https://www.enago.com/academy/accountability-with-ai-integration/>