TURING

A pioneering European project that advances trustworthy and robust AI to model complex physical systems. It bridges artificial intelligence, physics, and engineering to create foundation models capable of simulating real-world dynamics across domains such as nuclear energy, particle physics, and meteorology. Through international collaboration and compliance with EU AI regulations, it promotes safe and impactful AI innovation.

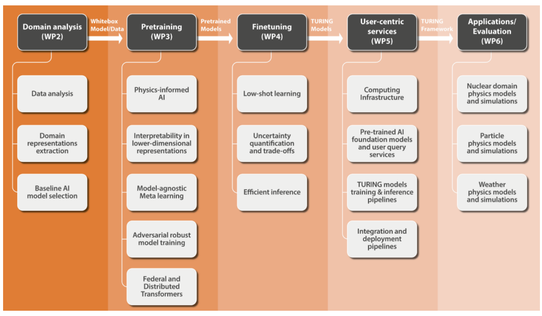
Scientific Approach

TURING combines **data-driven and physics-informed modelling** to pre-train generative, multimodal foundation models that integrate physical laws with experimental data. These models generalize across multiple domains and once fine-tuned, deliver **high accuracy, robustness, and interpretability** for scientific and engineering applications.

Objectives

- Leverage numerical methods and AI to create physically consistent models of complex phenomena.
- Advance generalization capabilities while maintaining robustness and reliability.
- Develop a Unified Physics-Aware Generative AI Framework.
- Validate and refine TURING models through high-impact experiments.
- Maximize impact and alignment with EU innovation and regulatory frameworks.

Methodology



Use Cases

1: Foundation models for particle physics detector simulation:

AI-driven particle detection and simulation combining deep learning, HPC, and experimental physics.

2: Nuclear reactor operational safety and efficiency using generative AI:

AI-based optimization of reactor design, operation, and safety through advanced modeling and simulation.

3: AI-Enhanced Criticality Safety Analysis for Nuclear Systems:

AI methods to improve safety limits estimation and reduce computational bias in nuclear criticality analysis calculations.

4: Debris Bed Formation during Severe Accidents:

Accelerated and accurate debris bed cooling simulations for enhanced nuclear accident analysis.

5: Robust data-driven Models for Weather Forecasting:

Developing robust and transparent AI models for accurate, resource-efficient weather predictions.

Connect with us

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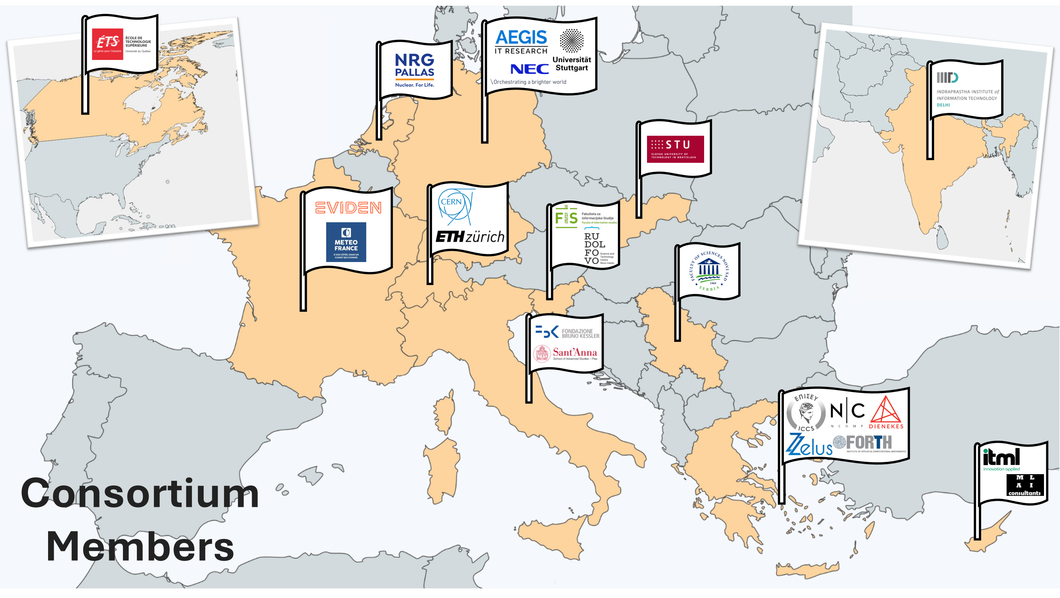

Consortium Members

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