COMET Center “INTEGRATE”

Competence Center for Integrated Software and AI Systems

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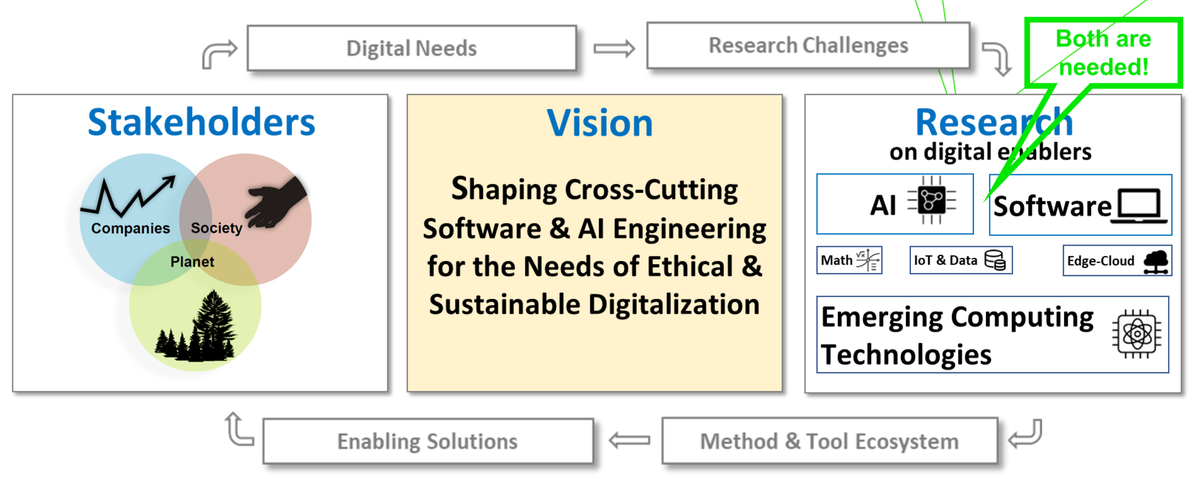
scch { software competence center hagenberg }

Abstract

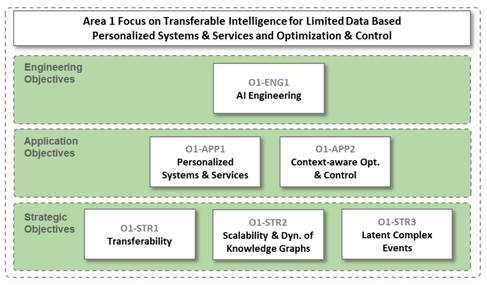
Artificial intelligence is on everyone's lips and indeed offers fantastic possibilities; but it is not the solution to all problems. Classic software is still the basis of today's digitization; but also often reaches its limits. At the same time, new technologies such as quantum or neuromorphic computing are establishing themselves. Which technology should we choose in the future to solve the big questions of our time? We say: all of them! The new COMET Center "INTEGRATE" aims at realizing a holistic approach in which the best of *all* approaches are utilized in an integrated form. In addition to that, we also place the society as well as planet Earth as explicit stakeholders at the center of all our research activities.

Our Vision

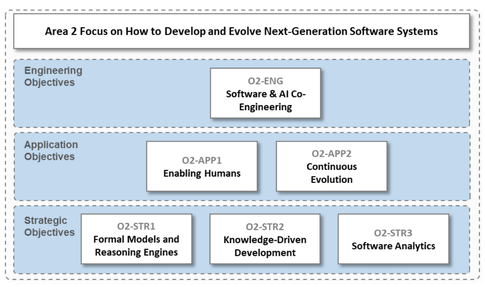


Area 1: Data and AI Modelling

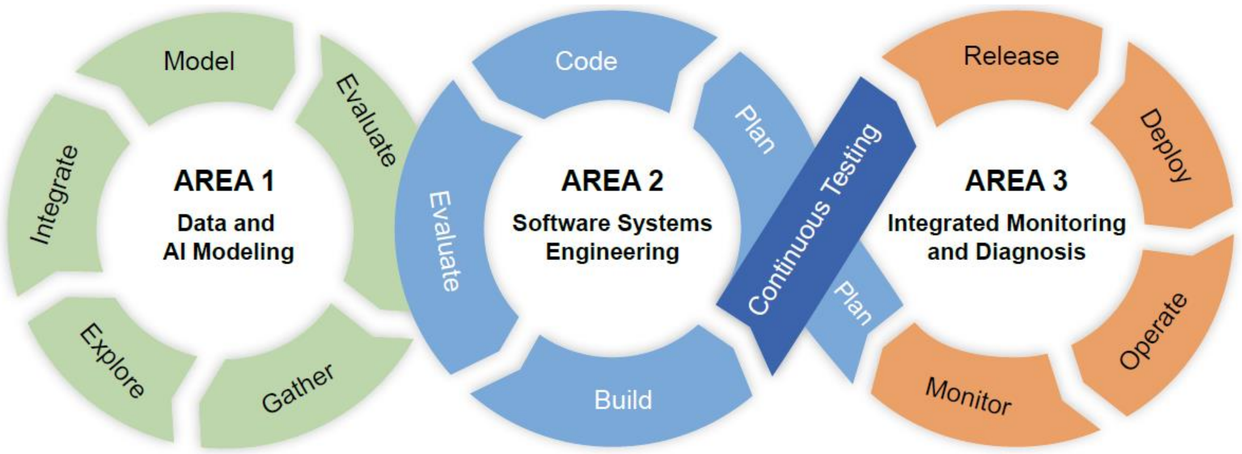
- Data Centric AI Engineering
- AI-Assisted Prescriptive Analytics
- Sustainable Process Cognition
- Scalable Optimization and Control
- Computer Vision and Representation Learning
- Transferable Intelligence



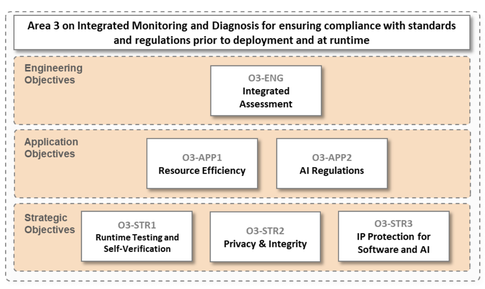
Area 2: Software Systems Engineering



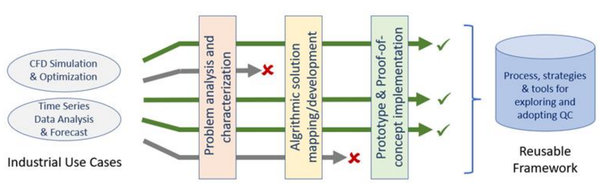
- AI-based Engineering of Sustainable Systems
- Human-Centered System Design
- Complex Software Systems Analysis
- Software Engineering Approaches for Evolving Systems



- Runtime Monitoring and Self-Testing
- AI Regulations & Security
- Protection of IP in Industry Software and AI
- Integrated Tool Ecosystem for Ensuring Standards and Regulations



Area 3: Integrated Monitoring & Diagnosis

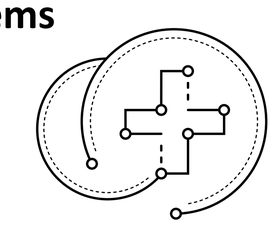


Area 0: Emerging Computing Technologies

- Quantum Computing
- Neuromorphic Computing
- Identification and Evaluation of their Potential
- Software and Design Tools
- Early-stage Research With High Potential in the Long Term

Use Cases

Personalized Medical Systems

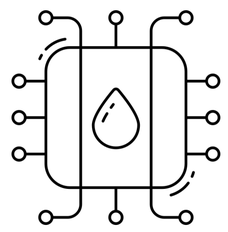


- **Stakeholder:** Society
- **Problem:** Creating personalized medical systems coping with inherent domain specific problems like data bias, data shift and data privacy
- **Approach:** Tackling limited data, data shift with novel Transfer and Federated Learning approaches, preserving data privacy (privacy preserving ML) and AI Regulations

Heterogeneous System-of-Systems

- **Stakeholder:** Companies
- **Problem:** Real-time embedded system, AI-based sensors, human-machine interface, and cloud-based service for predictive maintenance with data collected from the field
- **Approach:** Developing and evolving complex heterogeneous systems and systems-of-systems combining software, AI and emerging technologies

Smart Water-Systems



- **Stakeholder:** Planet
- **Problem:** Smart control and optimization of water pumps for managing the water supply of large cities utilizing multiple data sources (e.g., GIS, RD, …)
- **Approach:** Tackling non-identically independently distributed and personalization problems in federated learning, and human-AI teaming setups to enable solutions for optimization and control problems

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This poster has been designed using resources from Flaticon.com and thenounproject.com