CoE RAISE : AI- and Simulation-Based Engineering at Exascale

Description

Compute- and data-driven research encompasses a broad spectrum of disciplines and is the key to Europe s global success in various scientificand economic fields. The massive amount of data produced by such technologies demands novel methods to post-process, analyze, and to reveal valuable mechanisms. The development of artificial intelligence (AI) methods is rapidly proceeding and they are progressively applied to many stages of workflows to solve complex problems. Analyzing and processing big data require high computational power and scalable AI solutions. Therefore, it becomes mandatory to develop entirely new workflows from current applications that efficiently run on future high-performance computing architectures at Exascale. The Center of Excellence for AI- and Simulation-based Engineering at Exascale (AISee) will be the excellent enabler for the advancement of such technologies in Europe on industrial and academic levels, and a driver for novel intertwined AI and HPC methods. These technologies will be advanced along representative use-cases, covering a wide spectrum of academic and industrial applications, e.g., coming from wind energy harvesting, wetting hydrodynamics, manufacturing, physics, turbomachinery, and aerospace. It aims at closing the gap in full loops using forward simulation models and AI-based inverse inference models, in conjunction with statistical methods to learn from current and historical data. In this context, novel hardware technologies, i.e., Modular Supercomputing Architectures, Quantum Annealing, and prototypes from the DEEP project series will used for exploring unseen performance in data processing. Best practices, support, and education for industry, SMEs, academia, and HPC centers on Tier-2 level and below will be developed and provided in AISee's European network attracting new user communities. This goes along with the development of a business providing new services to various user communities.

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