TTTech

Industry Perspective on Complexity-driven Challenges

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Industry Perspective on Complexity-driven Challenges

Complexity Driver 1: New Use Cases

Emerging and future use cases of dependable and secure cyber-physical systems:

- Autonomous individual traffic (e.g., self-driving cars)
- Autonomous air transportation (e.g., UAVs)
- Autonomous mobile machines (e.g., autonomous and precision farming)
- Blue-collar worker assistance and substitution (e.g., collaborative robots)
- Service worker assistance and substitution (e.g., elderly care and other service robots)

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Complexity Driver 2: New Technologies

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- Service worker assistance and substitution (e.g., elderly care and other service robots)

New technologies, some are required, some are only hyped:

- Machine Learning
- Cloud/Edge computing, elastic compute, digital twin
- Containers, serverless
- Software-defined vehicle
- Over-the-air (OTA) updates
- Swarm intelligence (e.g., cooperative perception)
- Blockchain
- Quantum Computing

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Challenges

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Old and new challenges:

- Decomposing systems into hierarchical sets of subsystems down to atomic components
- World model subsystems
- Mandatory use of "black-box" components, e.g., Machine Learning components but also other non-certified COTS
- Limited availability of diverse component implementations (argue diverse usage patterns?)