APPLICATION DOMAIN SPECIFIC HIGHLY RELIABLE IT SOLUTIONS:

RESULTS AND NEW PERSPECTIVES IN THEMATIC FIELD OF INDUSTRY AND DIGITALISATION

THEMATIC EXCELLENCE PROGRAM 2019

NATIONAL RESEARCH, DEVELOPMENT AND INNOVATION OFFICE
HUNGARY

PROJECT FINANCED FROM THE NRDI FUND

Future software-driven solutions and products
Main features

- Challenges
  - Large, complex (distributed) software systems
  - Reliability
  - Scalable operation
  - Cost-efficiency
  - Cloud-based
  - Security and safety
  - Explainable operation
  - Integration of AI and Big Data
  - Adaptability to different application fields

Unity of fundamental and applied research and innovation

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Research groups

- Artificial Intelligence
- Autonomous Systems
- Digital Services (Health and Business)
- Software Industry and Telecommunications Networks
- Agroinformatics
- Mathematics and Optimization

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Reliable and scalable software and networks

- Dependable software based on inductive type theory, formalisation of semantics, correct refactorings
- New cell-oriented paaradigm for self-adaptive and autonomic distributed systems
- Live migration of applications in Edge Computing Networks (5G)
- Mobile Edge Computing test technology for 5G applications

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Reliable and scalable software and networks

- Analysis of scalable and heterogenous congestion control of internet
- Programmable networking devices for real-time robot control and sensor data processing
- Security, novel cryprographic primitives

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Artificial intelligence and AI applications

- Explainable and Trustworthy AI
- Improvement the generalisation ability of neural networks by integration of domain knowledge
- Text classification tasks in business processes
- Accurate prediction of drug–target interactions
- Internal and external situation analysis for self-driving cars
- Detection of distance and speed of unknown objects,

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Image processing, computer vision and applicatons

- Content based image retrieval
- Automatic gamma correction of images
- New methods for vision systems of autonomous vehicles, segmentation of moving objects
- Automatic detection of defective flask labels on flat plastic bottles
- Medical image processing, e.g. melanoma diagnosis
- Non-contact video- based monitoring of the respiratory rate

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Digital manufacturing, acriculture

- Processing satellite and UAV images, aerial photographs for agriculture
- Erosion protection and soil monitoring with precision terrain modelling
- Identifying grape species,
- Mangalica monitoring
- A revised model of planning aluminium cutting

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Results and impact

- Scientific results to be published in 119 papers
- Resarch gruoup reaching critical mass - presentations at weekly seminars and at two project workshops
- Teams of PhD students involved, including EIT Digital industrial doctorate students
- Two new master programs: Digital Manufactoring and Fintech
- EU excellence applications granted: HumaneAINet and EIT Digital 2020 (1.2 mEUR)
- New industrial department on Artificial Intelligence

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THANK YOU VERY MUCH FOR YOUR ATTENTION!

Application domain specific highly reliable IT solutions
https://tinyurl.hu/fDuY/

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