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‘Putting Science Into Standards’ workshop

Welcome!
We will start soon

AI for Industrial Automation and Robotics

9 June, 10:45-12:00

Panel discussion
AI for Industrial Automation and Robotics

Roundtable speakers

Adil Amjad
Thermo Fisher Scientific

Aurélie Clodic
LAAS CNRS, ANITI

Emmanuel Kahembwe
VDE

Roland Behrens
Fraunhofer IFF

Rapporteurs: Vasiliki Charisi (JRC)

Audience interaction

slido.com

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- Select the **Industrial Automation and Robotics** room on Slido
- Zoom chat - only technical questions to host
- Camera and audio OFF

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Adil Amjad

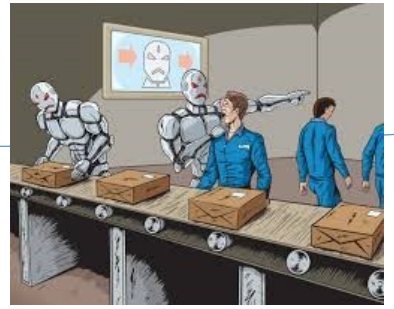
Thermo Fisher Scientific

Professional background

- Bachelors in Mechatronics (Robotics) [BEng. (Hons)]
- Certified Expert in Machinery Safety (CMSE)
- Certified Expert in CE marking (CECE)
- IEC Young Professional 2021
- Product safety and Regulatory Engineer, Thermofisher Scientific

Challenges Faced

Lack of unbiased data sets/Data sets to support an AI safety product development which can be verified



Uncertain impact on social structure when interactions with machines become the norm.

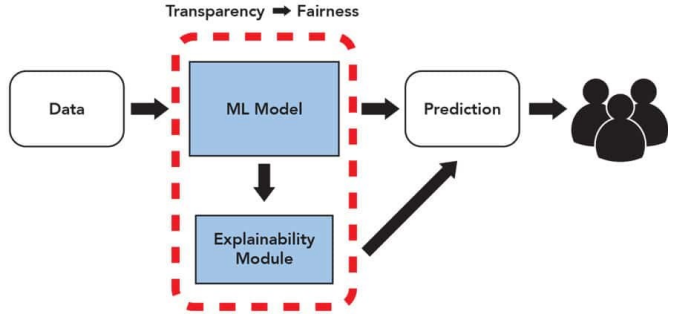
Introduction towards newer verification and validation framework with regards to AI safety implementations

Challenges with respect to safety assessment and verification due to close HRI (human-robot-interaction)

Lack of technical knowledge to assess the AI safety implementations

Solutions

- What are some solutions you found to these challenges?
  - Introduction of guidelines and methodologies or frameworks for AI safety development.
    E.g., ISO 13849-1(Machinery), ISO 10218-1(Robotics)
  - Hybrid standardization referencing and extracting methodologies of other standards
  - Training of workforce for collaborative efforts
  - Data sets preparation and contribution towards regulatory committees for preparation and maintenance of data



Example

Low-voltage directive

Machinery Directive

Radio Equipment Directive

Conformity Assessment

Identification of standards/directives

AI Act

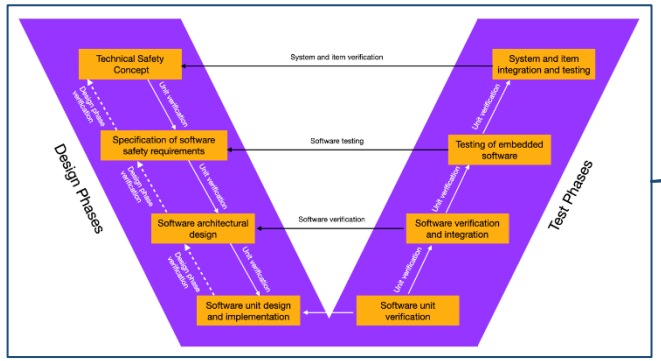
Checklist for Essential health and safety requirements

Assessment & Evaluation of data sets intended for the application

Application Data set for AI

Safety Risk Assessment

Product Development HW/SW



Verification & Validation checklist (V&V)

Product testing

Product Launch

Conformity Check

Way Forward, Next Steps

WAY FORWARD

Guidelines on tackling AI safety system issues and development;

Introduction of safety standards supporting AI safety implementation development;

On educational level introduction of importance of standardization and safety learning;

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Aurélie Clodic

LAAS CNRS, ANITI, Toulouse, France

Professional background

Background

- 2002-2007: PhD in robotics, LAAS CNRS,
  - Supervision for an interactive robot: action and interaction for an autonomous robot
  - work on a robot guide in a museum
- 2008-2012: Software Engineer then Project Manager, ATOS
  - Work for Airbus on Air Traffic Control project (DO-178B), Continental on Engine systems (ISO26262)
- 2012-now: Research engineer in Robotics at LAAS CNRS (www.laas.fr)
  - Work on decisional aspects of Human-Robot Interaction
  - Responsible for the robotics theme at ANITI (https://aniti.univ-toulouse.fr/)

Professional background

- Work on projects related to human-robot interaction
  - ANR **ai4hri** artificial intelligence for human-robot interaction
    - Germany/Japan/France cooperative project
    - Knowledge modeling for tri-partite interaction and short/long-term interaction
      - use case: robot interacting as an employee with customers as well as other employees
  - ANR **ELSA** Effective Learning of Social Affordances
    - Austria/France cooperative project
    - Learn from human-human interaction how we develop social affordances and how we can model them (collaboration with a psychology lab)
    - Use these models in a human-robot interaction setting
  - ANR ASTRID **DISCUTER**
    - Collaboration with linguists and a company (LINAGORA) to study how dialog models could take advantage of interaction models (and vice-versa)
  - ANR **EPIIC** ElectroPhysiological Involuntary Inputs for Collaborative robotics enhancement
    - Explore how physiological data (EEG, ECG, etc) could be used in an HRI setting

Challenges Faced & Solutions

- In HRI:
  - Take care of data acquisition:
    - Eg: your personal robot would be able to acquire data about you and for you but what about people around you?
    - Which data for which needs?
    - Design the system to be able to forget/delete data when they are not needed anymore
  - Take care of data sharing:
    - Eg: your personal robot will have information about you that you do not want to be shared with others
    - Always consider carefully the context when an information should be delivered
  - Take care of information that could be delivered:
    - Eg: what if your robot tells you to vote for one candidate?
    - Who decides which information could be delivered? Who decides the limits?
    - Need transparency

Way Forward, Next Steps

- What do you think is missing in the current regulatory and standardisation landscape with regard to the topic of this panel?
  - Formation for the professional/academic sector
    - e.g. MOOC with certification so professionals can value it and so be motivated to achieve it
    - Sometimes you miss the big picture
  - Communication to the general audience regarding the challenges and issues
    - Basic education from school years to university
    - Inform about opportunities and risks that AI and robotics can bring

Way Forward, Next Steps

- What do you think are next steps in this area?
- What do you think the focus should be for the short and long term?
  - Take a particular care of vulnerable people (e.g. children):
    - Eg: some people can develop empathy to robot while there are "only" machines that should be considered as such
    - Implications from the consumer law point of view
      - One robot for one need
      - Avoid attachment (ex: do not give name or change it regularly)
        - In Love with a Corporation without Knowing It: An Asymetrical Relationship Claire Boine, Céline Castets-Renard, Aurélie Clodic, Rachid Alami
    - Is it applicable to industry? Is there a meaning?
      - We studied the implication from the consumer law but perhaps it would be interesting to study from the labor laws (obligation of the employer etc)
      - Perhaps there are several dimensions that should be taken into account differently (e.g. security, transparency, ethics, etc)

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Emmanuel Kahembwe
VDE

Background

- Education: PhDs in AI & Robotics

- Professional:
  - CEO @ VDE (UK&I)
  - Chief AI Architect @ VDE e.V.
  - Standardization: StandICT EUOS, BSI (ART/1), OECD.AI

- Projects:
  - AI Trust Standard/Label
  - AI Quality & Testing Hub
  - AV Trust Standard/Label

Challenges Faced & Solutions

- Awareness: An easily accessible portal to all available and applicable AI for Robotics standards.

- Safety: Testing and certifying intelligent robot systems:
  - Comparable Performance and Safety Metrics.
  - Certificates of Safety (Proof of Behaviour) for data-driven methods.

- Autonomous Cars

Way Forward, Next Steps

- MISSING:
  - Central and easily navigable repository of robotics standards.
  - A clear approach/strategy on the standardization, testing and certification of autonomous car technologies.
- Next Steps:
  - Safety: Model-free data driven AI methods for robotics (e.g. RL)
    - Simulation testing (Exhaustive testing)
    - Sim-to-real
    - Standard simulators and testing environments
    - Automated testing

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Roland Behrens
Fraunhofer IFF

Professional background

BACKGROUND

- Mechatronics and Robotics; specialised in the field of robotics safety and human-robot collaboration
- Convener of ISO TC 299 WG8 “Validation methods for collaborative applications”

RECENT PROJECTS

- ISO/PAS 5672 “Test Methods for Measuring Forces and Pressures in Human-Robot Contacts and Collisions”
- EU-funded project ROSSINI

Challenges Faced & Solutions

CHALLENGES

- Safety in robotics ensured by AI-empowered sensors

SOLUTIONS

- Model-based Safety Validation (within the boundaries of the existing standards)

RECOMMENDATION

- Smart Safety / High-frequency CE (instantaneous certification of “micro” actions before executing them)

Way Forward, Next Steps

NEXT STEPS

- Acceleration of standardization (agile digital standards instead of “decade-wise” update standards in printed form)
- Clear and robust metrics to validate the reliability of AI-empowered safety sensors
- Considering Safety Assurance Cases as an alternative to SIL or PL
- More model-based approaches (e.g., for risk assessment)

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Thank you!

Programme – what's next?

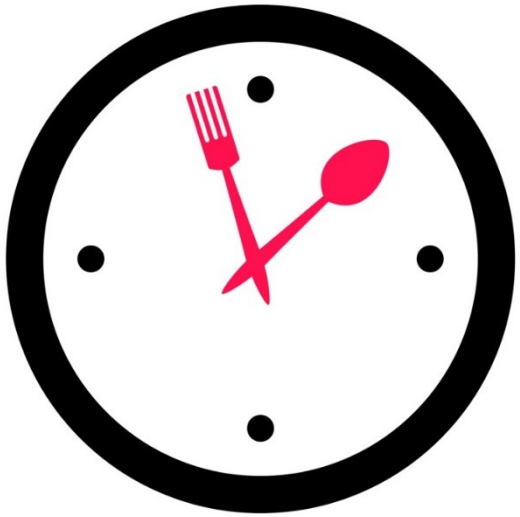
Main Plenary room

12:00 - 13:30	*Lunch break*
13:30 - 14:15	**Flash Summaries of parallel sessions**
14:15 - 15:45	**Panel discussion on ways forward**
15:45 - 16:00	**Concluding remarks**

Please check your confirmation email for the links to access main plenary room

The link will also be published on Slido and Zoom chat

Let’s take a break!



LUNCH BREAK

See you in the plenary room at 13:30!