

# AI for THW



## Opportunities and Challenges

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# THW

- Federal Agency for Technical Relief
- First responder organization
  - Civil protection and crisis management
- 80.000 volunteers
- Ca. 1.500 full time employees
- EU Mechanism
- World wide missions
  - USAR
  - Water purification

# THW Operational Capabilities



USAR



Cleaning



Clearing



Coordinating



Repairing



Pumping



Logistics



Lighting



Wiring



Detonating



Bridge Const.



Purifying

# Overview

- Which framework exists for the application of AI?
- What is AI? A few definitions
- Which opportunities might this offer?
- Which challenges exist?
- What is acceptable and what not?
- Conclusion

# Framework for AI

- The German Federal Government's Strategy for Digitalization
- AI is part of this strategy
- Particularly for the Research Division
  - EU Projects
  - National Projects (Federal Ministry of Education and Research)
  - An AI lab in which AR and VR will be combined with AI for training purposes

# What exactly is AI?

- *"The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages."*(Oxford Living Dictionary)
- *"A branch of computer science dealing with the simulation of intelligent behavior in computers. The capability of a machine to imitate intelligent human behavior."*(Merriam Webster Dictionary)

# What is weak AI?

- *"The assertion that machines could possibly act intelligently (or, perhaps better, act as if they were intelligent) is called the ,weak AI' hypothesis ..."* Russell, Stuart J.; Norvig, Peter (2003), Artificial Intelligence: A Modern Approach (2nd ed.), Upper Saddle River, NJ: Prentice Hall, ISBN 0-13-790395-2
- Expert systems
- Navigation systems
- Speech recognition
- Suggested correction (search engines)

# What is strong AI?

- Strong AI is a form of AI that possesses the same intellectual capabilities as a human being, possibly exceeding it. [http://crnano.typepad.com/crnblog/2005/08/advanced\\_human\\_.html](http://crnano.typepad.com/crnblog/2005/08/advanced_human_.html)
- Logical thought
- Actual decision making
- Planning
- Learning
- Communication/true human like interaction
- Using abilities to reach a common goal
- Awareness
- Self recognition
- Empathy
- Wisdom



# What is machine learning?

- *"Machine Learning at its most basic is the practice of using algorithms to parse data, learn from it, and then make a determination or prediction about something in the world."*  
– Nvidia
- *"Machine learning is the science of getting computers to act without being explicitly programmed."* – Stanford
- *"Machine learning algorithms can figure out how to perform important tasks by generalizing from examples."* –  
University of Washington

# Which opportunities arise?

- AI in trainings
  - The training simulation (AR, VR) reacts and adjusts according to the trainee's abilities/actions.
- AI in situational awareness
  - Autonomous navigation of drones, robots etc...
  - Sense making of fused sensor data
- AI in logistics
  - Decision support through sense making of aggregated data
  - Calculation of fastest, cheapest or most economical decision
- Possible connection of different AI through IoT

# Which challenges exist?

- AI needs big data
  - Who collects this data?
  - From where?
  - Is it open source or collected by the FR?
  - Legal aspects?
  - Societal acceptance?
  - How reliable is the data (especially open source data)?
- Once big data is available:
  - Is it available in the right format?
  - Who inserts the data into the system?
  - Who decides according to which rules how the AI reaches conclusions and suggests a course of action?
  - Which process is transparent and just?

## Which challenges exist cont.?

- If an AI suggests a course of action:
  - Will employers/volunteers follow it?
  - Will they overrule the decision?
  - Which consequences will it have if one overrules the AI?
    - Acceptance within the organization
    - Legal consequences
- How transparent will AI decision making patterns be?
- Are there good reasons for making “illogical” decisions?

# What is acceptable and what not?

- Is it acceptable that an AI is making autonomous decisions?
- Is the collection of desired data always acceptable from different perspectives?
- How much will it cost and what benefit will be derive from it?
- Who will be able to operate it and how much training will be necessary? (Volunteerism in CM)
- Will performance be measured – complete transparency of employees and volunteers?

# Conclusion

- AI seems promising
- At this time, I can only see the use of weak AI as acceptable and applicable
- Basic decisions have to be made before introducing AI to operational use
- Cost benefit analysis:
  - Procurement cost, set up and maintenance, personnel, training of FR, frequency of use – true benefit

Thank you for your  
attention!

Any questions?