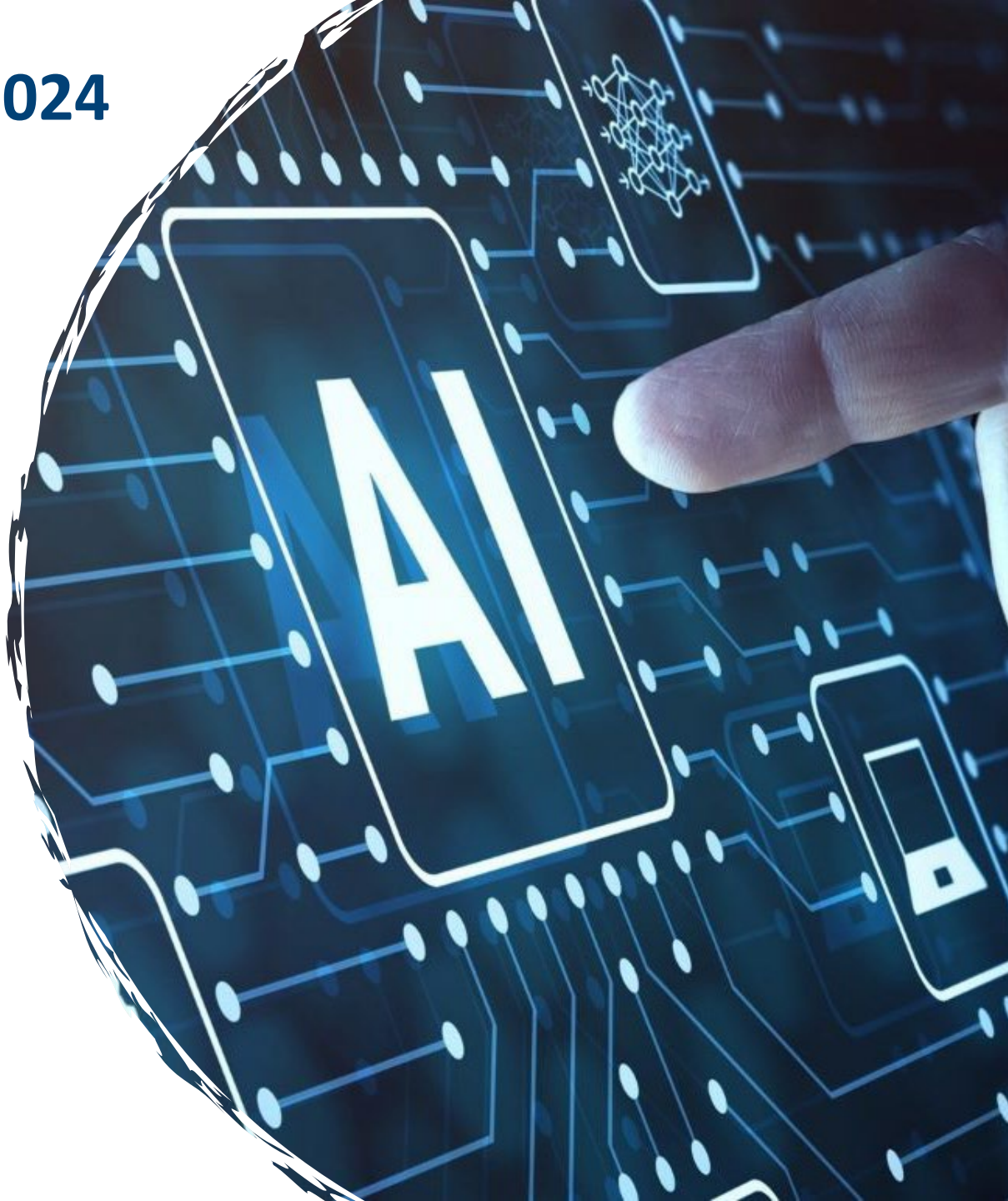
# ETSI AI Conference 2024




## AI in Intelligent Transport

Presented by: Niels Peter Skov Andersen

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# AI in Intelligent Transport

Niels Peter Skov Andersen
Anemone Technology

# AI in Intelligent Transport

- AI can be used in one or more of the following steps of traffic management
  - Data collection
  - Transformation
  - Augmentation
  - Refinement
  - Visualization
  - Decisions (applications)
- AI can be used in similar steps in the automotive sector

*The examples given in this slide and the following slide are pure theoretical and do not imply that such use of AI exist or are planned*

# AI examples at the data collection level

- Improved sensor performance
  - Camera, Radar and Lidar - Reducing impact of weather, such as rain, snow etc.
- Sensor fusion - combining input from several sensors to a single information
- Object detection, e.g.,
  - Categorization of vehicles for road tolling and traffic management
  - Object detection and categorization, such as pedestrians, bicycles, motorcycles, cars etc. for collective perception (sharing of the perception of the environment)

# Traffic management application examples

- Data Driven Traffic Analytics and Insights
- Traffic Prediction and Flow 0ptimization
- Real-Time Traffic Management
- Non-critical traffic light phase management
- Hard shoulder Management
- Dynamic Lane Management
- Adaptive speed limits
- Responsive & Adaptive Control of traffic lights

*Above examples are from the work of ERTICO TM2.0*

# Examples of potential Automotive applications



- Warnings
  - Hazardous locations
  - Adverse road conditions
  - Emergency breaking
  - Traffic jam
  - …
- Driver monitoring (distracted or tired driver etc.)
- Driver assistance
  - Lane assistant
  - Adaptive Cruise Control,
  - Assisted emergency breaking
  - ..

# Examples of potential Automotive applications



- Automated and semi-automated driving
  - Active Emergency breaking
  - Lane change
  - Lane Merging
  - Platooning
  - ODD based automated driving
  - Driverless driving
  - ..

# Some of the Challenges

- Can same tests be used for AI based and non-AI based implementations of same functionality ?
- Are tests repeatable for AI based implementation ?
- Is there a risk that an AI implementation adapts to the test case ?
- Should the AI implementation be tested as of factory line or after ‘learning’ in live environment ?
- How do we test when AI is used in a distributed system such a traffic management ?

# Some of the Challenges

- Does the AI Driver (for automated driving) need to pass a drivers test ?
- Can the AI Driver loose its ‘driver license’ – if so what does it mean
  - Is it all vehicles with that implementation ?
  - Is it only in the actual vehicle ?
  - Can it just be the ‘learning’ in the vehicle which is reset ?
  - ..
- Who is to decide what is the ethical correct choices, e.g., when accidents can not be avoided
- ..

# Many subsystems in Intelligent Transport

- Do all actors an subsystems have the same goals ?
- What happens when Traffic Management systems optimizes for environment, efficiency, traffic flow and, but other involved parties have different goals that might not have been foreseen ?

# Some learnings

- Use of AI for the Intelligent Transport should not lead to a general classification in a single risk category, neither for the infrastructure side nor the automotive side.
- Different use cases and applications needs individual consideration and potential grouping in risk categories.
- The fact that repeated tests might not always lead to same outcome when AI is used in implementations, can impact the general way to specify and perform testing when the functionality under test might or might not be using AI
- Ethical guidelines as well as social acceptance are needed when AI replaces human decisions

Contact: Niels Peter Skov Andersen
npa@anemonetechnology.com