Appendix-A

Interview guide

This appendix shows the interview guide that was used for conducting the interviews.

Purpose of Study

The purpose of this study is to investigate challenges and current practices in requirements representation for safety-critical automotive perception systems. Specifically, for safety and fairness requirements. The goal of this interview is to get your personal experience and knowledge regarding the topic and to get insight into potential solutions.

Starting Questions

(10 minutes)

General Questions

Interviewee data

- What is your role in the company?
  - Describe shortly your role and what you work with?
  - How much relevant experience in years do you have with the development of perception systems in the automotive industry?
  - Are you working in management or in development? – Do you or did you actively develop software?
- Would you say that you are working mainly in research or in production / product development?
- What is your current relationship with requirements engineering in your company? For example, do you facilitate and define requirements or do you receive and apply them in development?

Company data

- In which markets in the world is the company active?
- Approximately, how many people work at your company?
- If your company works with suppliers, in which country/regions are they located?

- Where is your company situated in the automotive supply chain?
  - OEM
  - Tier 1 (supplies product directly to OEM) – Tier 2 (supplies Tier 1) – Others: Specify.

Terms and Concepts

- Define the following terms and concepts and ask if the interviewee agrees with the definition:
  - Non-functional requirements,
  - ML-component,
  - Safety-critical systems,
  - Fairness requirements,
  - Perception systems,
  - Related system or component (Sensors etc),
  - Reference architecture

Requirement representation

(10 minutes)

- In your work do you work with functional requirements for perception systems or related systems/components?
  - If they say no: How do they specify desired behavior?
  - If they say yes: Do they follow any standardized process for RE, such as those defined in ISO 26262 (for example SPICE software ..)?
  - If they say yes: How do you represent functional requirements for perception systems or related systems/components?
  - If they do not work directly with perception systems, what related system do they work with?
- What typical non-functional requirements do you get into contact with?
  - Can you rank them from the most to least important? (If not working with NFR then include slide with examples)
- How do you represent non-functional requirements for perception systems or related systems/components? For example use cases, ODD, natural language...
  - How do you represent the top 2 ranked requirements?

Multi-party collaboration

(10 minutes)

- How do you communicate functional and non-functional requirements for perception systems within your company?
  - What works well?
  - What does not work well?
- How do you communicate functional and non-functional requirements for perception systems with other companies in your supply chain?
  - Are you using the same methods as within your company or do you use methods from another company in your supply chain?
  - How do you figure which requirements representation to use between companies?
  - What works well?
  - What does not work well?

Machine learning specific challenges

(10 minutes)

- In a nutshell, how do you approach the integration of training data in your development process for perception systems?
- Do you see any challenges in representing requirements both functional and non-functional because of the introduction of ML components in the perception systems?
  - If additional challenges: What are or could be, in your opinion, potential solutions to these challenges?
  - Are there any additional non-functional requirements due to the introduction of ML-components?
    - If not working with fairness: Do you see any reason or benefit in defining fairness requirements for your systems?
  - Did the representation of both functional and nonfunctional requirements change because of the introduction of ML-components for your company?
  - How do you represent non-deterministic requirements for ML-components?

Potential solutions

(5 minutes)

- Do you think a common language between all companies in the supply chain could help alleviate the identified challenges of communicating requirements and requirements representation?
  - If yes, how? If not, why not?
- Do you think it is possible to have a clearly defined reference architecture for the perception systems across multiple companies in the automotive supplychain?
- Do you think it would help working with and defining requirements across multiple companies in the automotive supply chain?

A. Interview guide

Wrap-up questions

(5 minutes)

- Is there anything important that you felt we missed? Any question or subject that would be relevant to the topic (of requirement representations in multiparty automotive system development)?
- Do you have any person in mind (from your organisation or outside of your organisation) that we should interview as well?