Interview Guide - Company
This document describes the interviews conducted in this project (Investigating the Impact of Data Annotation Requirements on Annotation Quality and AI-Enabled Automotive Perception System)

Before the interview
This section includes an invitation email to attract interviewees and an "Anchoring and formalities" email that shall be sent to the interviewee before the interview session.

a. Invitation mail

Dear,

My colleagues (cc) and I are reaching out to you on behalf of the partners of the XYZ project.
We are working on an interview study to improve the quality of data annotation processes, methods, and tools for developing machine learning (ML)-based perception systems.

As an industrial expert, we invite you to participate in our study and share your valuable experience and insights.

The interview will take about two hours and will focus on the following themes:

RQ1: How are data annotation requirements defined?
RQ2: What are the challenges in ensuring high-quality data annotation requirements?
RQ3: What are the practitioners' recommendations to improve data annotation requirements?
RQ4: What is the relationship between data annotation requirements, the annotation process, annotated data quality, and AI-enabled perception system performance?

If interested, please share your availability with us 😊.

If you have any questions or need further details, please do not hesitate to contact me anytime.

You can read about project XYZ FAMER at https://..... (removed the name of the project for the double-blind review policy of the RE conference)

Note: The industrial partners in XYZ will not participate in the interviews and will not have access to the raw data of this study. They will, however, help interpret the results based on anonymized and coded data.

Thank you very much for considering our invitation. We are excited to hear from you soon.

Kind Regards,
The Team.

Roles to Interview
To effectively address research questions (RQs), we must interview individuals from various roles within the company. Here are the roles we should consider interviewing.

1. Data Scientists and AI Engineers
2. Annotation Team Leads and Annotators
3. Quality Assurance (QA) Specialists
4. Product Managers
5. Software Developers/Engineers
6. Annotation Tool Developers/Engineers
7. Project Managers
8. Researchers

Note: roles from 5 to 8 are experts linked to developing AI-based perception systems.

General procedure
We will send information to the interviewees before the session.
Formal information

- Explain the purpose of the study (research goal)
- Share the basic concepts of the annotation process and types to get a deeper view of the participant's role in all processes (Figures 1 to 3).
- During the interviews, the interviewees will have a chance to object if the topic does not align with their views.

Interviews will be conducted in English using MS Teams (Zoom?)

- At least two researchers will be present during the interview sessions.

We will record audio and video during the meeting if the interviewee consents.

- MS Teams automatic transcription will be used, and we will manually post-process the content to fix errors.

Transcripts will be returned to interviewees for validation.

The interview session
Fill in the fundamental information in a protocol:
1. Date/Time:
2. Place:
3. Interviewer:

4. Interviewee:
Introduction and welcome (not recorded)

Start by informally introducing the meeting participants. Don't let the interviewee describe his/her entire background—that is part of the interview.
Did you get the instructions we sent you before the interview?
Double-check that the recording is ok.

[START RECORDING!]

This is an interview in the FAMER project with XX. Today's date is YY.
Can we get your consent to store your contact information and the interview material for the FAMER project study until the publication date of the resulting article or articles, plus five years?
Demographics
Please briefly describe your current role and your background as an engineer.
Relevant information includes.
- Role in the company? Previous relevant roles? Technical/management?
- Years of experience in the company? In the domain (previous employers)?
- Years of AI experience?
- Years of experience working with data annotations?

Foundational (Conceptual) Questions.
What is your Team structure (people working)

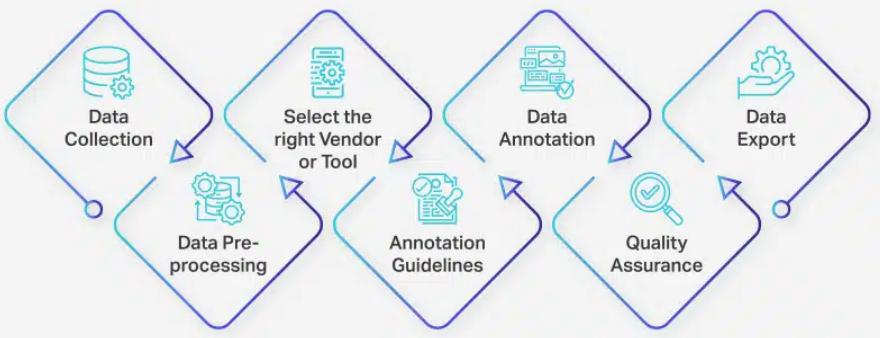

Figure 1 data annotation process flow.

Refer to Figure 1
- Position yourself in terms of your role association in Figure 1.
- Is it (data annotation process flow) valid in your context? Correctness and completeness (do you want to add more information?).

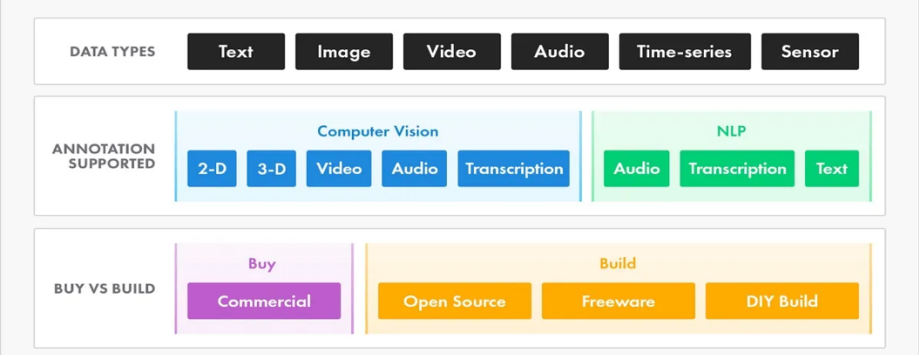

Figure 2 data annotation tools key elements.

Refer to Figure 2
- Is this information valid in your context (the data annotation tools only use or consist of the given elements?
- What data types are you dealing with for annotation?
- What kind of annotation is supported by your tool?
- Is the tool commercial or built by the company?
- Provide the reason(s) for choosing commercial or built by the company tool.

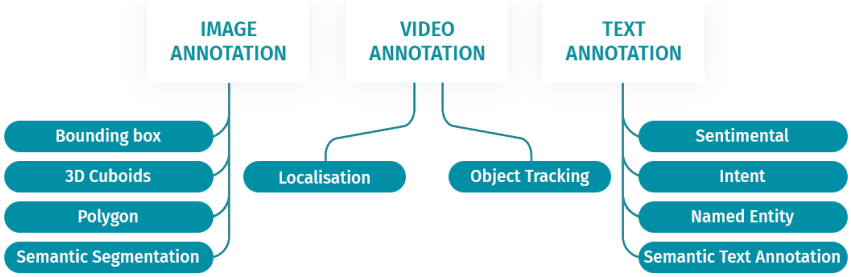

Figure 3 data annotation types.

Refer to Figure 3

- Is this information valid in your context (these are all the known or used annotation types?)
- What data annotation types are you working with?
- If you are working with video annotation, what tasks did you perform with video annotation? (localization or object tracking)?

Data annotation requirements, Annotation processes, and annotated data relationship (covering the RQ (1 and 2) of the study).

Definitions and Formalism: Annotation requirements are the key conditions, resources, and criteria for ensuring the data annotation process is accurate, consistent, and aligned with the intended goals. These requirements guide the entire annotation workflow and ensure the resulting labeled data is reliable for downstream tasks such as machine learning model training, analysis, or research.

- How do you define the requirements for the data annotation process?
- Do you have some specific requirements for data annotation? (e.g., Edge Case Inclusion: Annotators should ensure that rare or complex scenarios (e.g., pedestrians in unusual poses, sudden obstacles) are accurately labeled to improve system robustness.)
- Where are the data annotation requirements defined, specified, or gathered? (e.g., project specifications and documentation, annotation guidelines document, requirement specifications or software requirement documents (srd), embedded in instructions form in data annotation tools or platforms, training materials and onboarding documents, feedback and review documents, agile backlogs or task management systems, compliance, and regulatory documents?
- Are there any limitations in gathering, defining, and using data annotation requirements? How do these limitations affect the quality of the annotation process and annotated quality?
- What challenges do you face when defining unambiguous annotation requirements, and how do you ensure all annotators consistently interpret the requirements?
- How do you handle challenges related to evolving data annotation requirements during the project, and what strategies do you use to maintain consistency when requirements change? How do the changing requirements on annotation affect the annotation process quality and annotated data quality?
- What challenges arise when defining annotation requirements for complex or rare edge cases, and how do you ensure annotators handle these scenarios correctly? How do these challenges affect the annotation process quality and annotated data quality?
- What challenges do you face in scaling your annotation requirements for large datasets, and how do you maintain consistency and quality when scaling across multiple annotators or teams? How does this scaling affect the annotation process and annotated data quality?
- How do time and resource constraints impact the level of detail in your annotation requirements, and what trade-offs do you make between speed and accuracy?
- How do you address the challenge of ensuring consistency across multiple annotators when implementing your annotation requirements? Do you think inconsistent data annotation is a challenge for you?
- What challenges do you face in ensuring that your annotation requirements minimize bias, and how do you ensure fairness in the annotated data?
- What challenges arise when creating annotation requirements for tasks that require domain-specific expertise, and how do you manage this when non-experts are involved?
- What limitations in your annotation tools challenge your ability to meet your data annotation requirements, and how do you address these limitations?
- What challenges do you encounter in defining annotation requirements that ensure data privacy and compliance with ethical standards, particularly with sensitive data?
- What challenges do you face when breaking down high-level annotation requirements into specific, detailed tasks for annotators?
- What challenges arise when breaking down complex or multi-step annotation requirements, and how do you ensure that annotators understand and execute these correctly?
- What challenges do you face when breaking down annotation requirements across different teams (e.g., data scientists, annotators, quality control), and how do you coordinate between them?

- What difficulties arise in identifying and breaking down annotation requirements for edge cases or rare scenarios, and how do you ensure these are covered adequately?
- What challenges do you face when defining safety-related data annotation requirements for AI perception systems? How do these challenges affect the final quality of perception system performance?
- What are the key challenges in ensuring fairness when specifying data annotation requirements, and how do you mitigate bias in the labeling process to ensure equitable outcomes? How do these challenges affect the final quality of perception system performance?
- What challenges arise when dealing with sensitive data (e.g., demographic information), and how do you ensure that annotations are fair and do not introduce bias that could impact the safety of the AI system? How do these challenges affect the final quality of perception system performance?
- How do you define fairness in data annotation when dealing with diverse and complex real-world scenarios, such as varying environments or user groups?
- What challenges do you face in identifying and addressing bias in the training data that could affect the fairness of the AI-enabled perception system, and how do you reflect these in the annotation requirements?

Questions regarding recommended and adopted strategies for enhancing data annotation requirements quality ((covering RQ3the studies).

- In your project/company, what improvements have been recommended or adopted to increase the quality of data annotation requirements?
- What challenges have you faced while implementing data annotation requirements quality improvements, and how were they addressed?
- Can you provide examples of successful data annotation requirements quality improvement in your company?
- Do you use standards or guidelines to set up the quality of data annotation requirements?
- How do you ensure consistency across different annotators or annotation teams and data annotation requirements?
- How do you ensure that annotation guidelines are accessible and understandable to both new and experienced annotators?
- Do you conduct regular training or workshops to keep annotators updated on the guidelines and best practices for data annotation requirements?
- How often do you review and update the annotation guidelines and processes?
- Do you use any standards or guidelines to set up the annotation guidelines and processes?
- How do you collect and incorporate feedback from annotators and stakeholders to continuously improve the quality of data annotation requirements?
- Can you share specific examples of how feedback loops between annotators, quality assurance teams, and stakeholders have led to tangible improvements in data annotation requirements quality?

Questions regarding the impact of annotation quality on AI-based perception systems development and its performance (covering RQ4 the study).

- Can you explain the relationship between data annotation requirements quality, data annotation quality, the perception system development quality, and its performance? Could you please give an example from your experience?
- How do annotation errors or inconsistencies in data annotation requirements impact the training and evaluation of AI-based perception systems?
- Which aspects of data annotation and requirements quality affect the AI-based perception system's overall development and performance quality?
- How do you assess and validate the impact of improved annotation quality and data annotation requirements quality on the performance of your AI-based perception systems?
- Can you share any instances where improving data annotation requirements and annotation quality significantly enhanced the system's overall development and performance?

Interview Questions END ☺

B. After the interview, mail for validating and verifying the clean and anonymized transcripts

Dear,

Thank you once again for participating in our research study. We truly appreciate the time and insights you have shared with us. 😊

Attached to this email is the cleaned and anonymized transcript of your interview. As part of our research process, we aim to ensure that all participants are comfortable with the way their information has been handled.
Please review the transcript and confirm whether you agree with the anonymization and its information. Please let us know if you notice any details that need further anonymization or corrections. We would appreciate a kind response within two

weeks. If we do not hear back from you within two weeks from the date of this email, we will assume that you have no objections or edits and that the information provided in the transcript is accurate and approved for use in our research study.

Please feel free to reach out if you have any questions or need clarification!

Kind Regards,
Project Team XYZ

Interview Guide END ☺