Chapter 20
Challenges and Issues in Requirements Elicitation for Based Systems:
A Systematic Literature Review

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ABSTRACT

The rapid evolution of technology, driven by changing user needs, makes satisfying every requirement increasingly challenging, especially in AI-based systems. Eliciting requirements for these systems is difficult due to the complexity of AI and the lack of proper guidance, often leading to issues during software development. Without a well-structured requirements elicitation process and appropriate tools, the automation and functioning of AI systems can suffer. This paper aims to outline strategies and factors essential for effective requirements elicitation in AI, ensuring adaptability even when user needs change during development. Our methodology involves both qualitative and quantitative analyses to assess the quality of existing studies. The findings show that proper strategies, guided by well-defined factors and tools, can effectively address the challenges in AI requirements elicitation. By adhering to these strategies, the development process can better accommodate evolving user needs while maintaining the integrity of AI systems.

INTRODUCTION:

Requirements elicitation stands as a fundamental and indispensable step in the deployment of AI-based systems. It serves a critical role in guaranteeing that the resulting system effectively satisfies the demands and hopes of stakeholders. Requirements elicitation plays the foremost role as compared to other

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systems it takes more depth to understand the needs of stakeholders as the system holds the intelligence and any negligence can make us bear a big loss and a challenge for us.

Developing AI-based software significantly differs from other approaches to software development. In traditional software engineering, the process entails gathering requisites, scrutinizing, and crafting intricate blueprints for executing a program." primarily involving code writing However, AI-based software development adds another layer of complexity and necessitates a more iterative approach. Historically, Stakeholder involvement has been the driving force behind requirements engineering. With the advent of widespread digitalization, an abundance of data (Big Data) is now generated from various

The challenges in requirements engineering for developing AI-based complex systems are substantial due to the inherent complexities of AI. These challenges stem from the intricacies of comprehending, specifying, and managing the requirements for such systems, (Cirqueira *et al.,* 2020).

Developing AI-based software significantly differs from other approaches to software development. In traditional software engineering, the process entails gathering requisites, scrutinizing, and crafting intricate blueprints for executing a program." primarily involving code writing. Challenges emerge leading to uncertainties and gaps in the prioritization and traceability of requirements owing to the engagement of multiple stakeholders and human endeavors, (Haider *et al.,* 2019). However, AI-based software development adds another layer of complexity and necessitates a more iterative approach Internet of Things (IoT), handheld gadgets, and social media platforms, in addition to domain knowledge, (Lim, Henriksson, & Zdravkovic, 2021)

The objective of this paper is to conduct a systematic literature review to address the problem of requirements elicitation for AI-based systems. The conduction of different parameters like which factors and strategies are most commonly used to trace the requirements and how we can prioritize them to make our AI-based system effective. The paper is divided as **Section 2** investigates the background of all the conducted studies and why we need it. **Section 3** explains the methodology how we conducted our systematic literature review including conduct review for research questions and inclusions/exclusions. **Section 4 and Section 5** include selection based on Quality Assessment and research questions. **Section 6** includes the conclusion and future work

Background:

To conduct our literature we needed the background for the selected studies we have chosen for the literature review. We have parameters including **framework, methodology and research type**. In the column of the framework we explain which frameworks are being used in their respective papers or references and then we define what methodologies the authors used for conducting their research and lastly, and type of research they have conducted.

Artificial Intelligence (AI) has surfaced as a game-changing innovation, reshaping diverse industries through the provision of **intelligent solutions and task automation**. The success of AI systems depends extensively on the accuracy and thoroughness of requirements elicitation, (Heyn *et al.,* 2021)

Requirements elicitation is the critical process of gathering, analyzing, documenting, handling, and overseeing the system's requisites, this process becomes particularly intricate due to the multifaceted nature of AI models and algorithms, (Muhairat *et al*., 2020).

Eliciting requirements for AI-based systems presents unique challenges and issues. These challenges demand a comprehensive understanding and a structured approach. Understanding the requirements in detail is essential due to the **intricate and dynamic nature of AI systems**. This includes understanding