CSP 587 - Software Quality Management

Research Paper Framework

Name: Abhiram Ravipati

Student ID: A20539084

Abstract

This research explores the challenges and the best practices by assuring the quality of AI Systems. In this study we will be examining the risks posed by AI in various stages like development of AI, deployment, effective risk management and methods for ensuring the quality of AI. We will be discussing the impact of quality of data that is used for training the AI systems. The important challenges addressed in this paper will include the understandability and interpretability of AI models and the absence of clear requirements and specifications and the need for better and accurate validation of data and test input generation. A case study of real-world AI system is used to show the and analyse our findings.

Structure:

Section 1: Introduction

In this section, we will be providing an overview of the importance of QA in AI and will be discussing the key ethical and technical challenges addresses paper

Section 2: Literature Review

[1] Felderer and Ramler's paper on "Quality Assurance for AI-Based systems gives us a foundational overview of the challenges in ensuring quality and reliability in AI systems. This is relevant to our topic because validation techniques and quality control measures are very closely tied to the quality and reliability of AI algorithms.

[2] Prunk's analysis of "Human Autonomy at Risk" directly addresses one of the main ethical concerns of AI which is the future impact on the human autonomy. This paper is useful for our research because it provides how AI might affect the human decision-making and also it explores the concepts like consent and human oversight.

[3] Li's paper on "Ethical Considerations in AI is direct and relevant source for our research. It provides a detailed examination of issues in AI development and AI quality assurance.

Section 3: Quality Assurance for AI

This section will be for discussing various approaches and methods for ensuring the quality and reliability of AI systems.

Section 4: Challenges and Risks in AI

Here, we will be exploring major challenges and future risks posed by AI such as lack of transparency, privacy concerns, etc.,

Section 5: Quality Control and Moral Considerations in AI

In this section, we will be examining the quality control practices and the ethical considerations in AI.

Section 6: Case Study

We will be examining the Tesla Autopilot Crash in 2016 to illustrate our key findings of our research

Section 7: Future Work and Considerations

In this section, we will be analysing our research and explore new trends and areas for future research.

Conclusion:

We will be examining the critical aspects such as algorithm fairness, transparency and the need for robust validation process. We have given a basic outline of the paper which we will be writing. In the final paper, we will dive deep into all the aspects given above and provide a comprehensive understanding of how quality assurance can be effectively implemented in AI.

References:

[1] Felderer, Michael and Rudolf Ramler. “Quality Assurance for AI-Based Systems: Overview and Challenges (Introduction to Interactive Session).” *International Conference on Software Quality. Process Automation in Software Development* (2021).

[2] Prunkl, C. Human Autonomy at Risk? An Analysis of the Challenges from AI. *Minds & Machines* **34**, 26 (2024). https://doi.org/10.1007/s11023-024-09665-1

[3] Li, Ni. (2023). Ethical Considerations in Artificial Intelligence: A Comprehensive Disccusion from the Perspective of Computer Vision. SHS Web of Conferences. 179. 10.1051/shsconf/202317904024.