

# AI-Powered Semantic Framework for Inclusive Web Accessibility Evaluation

Vinaysimha Varma Yadavali

Independent Researcher

**Abstract:** *Web accessibility is a critical aspect of inclusive digital experiences, ensuring equitable access for users with diverse abilities. Despite significant advancements, existing automated tools often fail to detect complex and context-specific accessibility issues. This research proposes an AI-powered semantic framework for comprehensive web accessibility evaluation, leveraging artificial intelligence to analyze and interpret web content with a focus on inclusivity and compliance with accessibility standards.*

*The framework integrates semantic analysis to identify nuanced accessibility barriers, such as inadequate alt text, improper heading structures, and color contrast violations, which are often missed by traditional tools. By utilizing machine learning and natural language processing, the proposed solution aims to bridge gaps in guideline interpretation and enhance the detection of user experience challenges.*

*Additionally, this research incorporates user feedback mechanisms and expert insights to continuously refine the framework, making it adaptable to evolving accessibility needs. Extensive testing across diverse web environments demonstrates the framework's ability to improve detection accuracy, reduce evaluation times, and provide actionable insights to developers.*

*The proposed framework not only advances automated accessibility evaluation but also contributes to fostering a more inclusive internet by empowering developers and organizations to proactively address accessibility barriers.*

**Keywords:** Accessibility Evaluation Framework, Artificial Intelligence (AI), Automated Testing, Digital Inclusivity, Inclusive Design, Natural Language Processing (NLP), Semantic Analysis, User-Centric Accessibility, WCAG Compliance, Web Accessibility