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Artificial Intelligence in Software Quality Assurance: A Systematic Review

Communication Info

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Abstract

As software systems grow more distributed and data-heavy, traditional quality assurance (SQA) is hitting a breaking point. Traditional Software Quality Assurance often fail to keep up with today's rapid release cycles and architectural diversity [1]. This has forced a shift toward Artificial Intelligence, where AI is no longer just a "helper" but a core mechanism for rethinking test generation, bug prediction, and self-healing frameworks [2]. This paper investigates how these AI-driven methodologies are actually performing in the modern industry. By reviewing peer-reviewed studies from 2023 to 2026, we examine how the integration of Large Language Models and multi-agent systems is changing the way engineers handle code analysis and defect localization [3, 4]. The study seeks to provide a systematic analysis of the field's progression by comparing current methodologies, identifying their advantages and disadvantages. The goal is to provide researchers and tool developers with a clear-eyed look at how AI impacts software reliability in real life, Highlighting research gaps in autonomous SQA frameworks [5].

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