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Submission date: 20-Nov-2024 06:11AM (UTC+0800)

Submission ID: 2376746865

File name: assignment1.pdf (27.64K)

Word count: 418

Character count: 2491

Advantages of AI to develop Quality Assurance Testing Process

Quality Assurance testing is important to make sure software works well before it is released. As software becomes more complex, traditional testing methods can have a hard time keeping up. Artificial Intelligence offers new ways to improve quality by automating tasks, finding problems early, and making the process more efficient.

Literature Review

1- AI Powered Test Case Generation for Agile Environments.

- **Summary:** AI helps automate the creation of test cases, reducing duplication and increasing test coverage.
- **Strengths:** Saves time by automating repetitive tasks and adapts easily to changes.
- **Weaknesses:** Works best with structured datasets and faces issues with older systems.

2- Machine Learning in Defect Prediction

- **Summary:** Machine learning predicts which parts of the software are likely to have defects.
- **Strengths:** Improves testing accuracy and reduces manual effort.
- **Weaknesses:** Requires large amounts of high-quality data for training.

3- Using NLP for Test Case Prioritization

- **Summary:** Natural Language Processing (NLP) organizes test cases based on their importance, using past bug data.
- **Strengths:** Increases the efficiency of regression testing.
- **Weaknesses:** Depends heavily on the quality of textual data in bug reports.

4- AI Driven Tools for UI Testing

- **Summary:** AI tools automate the testing of user interfaces, focusing on dynamic content.
- **Strengths:** Reduces errors and handles dynamic updates effectively.
- **Weaknesses:** Limited to web applications.

5- AI in Performance Testing: A Case Study

- **Summary:** AI identifies bottlenecks in software performance, making testing faster and more effective.
- **Strengths:** Provides real-time analysis and supports scalability.
- **Weaknesses:** Can be resource-intensive.

6- Automated Bug Fix Suggestion Systems Using AI

- **Summary:** AI suggests fixes for detected bugs, speeding up the resolution process.
- **Strengths:** Works well with continuous integration systems.
- **Weaknesses:** Focused mainly on common types of bugs.

Findings

1. Common Strengths:

- Automation reduces manual workload.
- AI improves accuracy in identifying defects and prioritizing tests.
- Performance testing becomes more scalable with AI.

2. Common Weaknesses:

- High dependency on data quality.
- Integration challenges, especially with legacy systems.

3. Connections and Conflicts:

- All papers agree on the benefits of AI in efficiency and accuracy.
- Some studies highlight scalability issues, while others emphasize computational overhead.

Conclusion

AI has shown it can help make QA testing better by automating tasks, finding defects faster, and allowing for more growth. But there are still problems, like needing good data and making sure everything works together, that we need to fix for more people to use it. In the future, research can focus on making AI tools easier to change and use in different situations.

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