DEVELOPMENT AND RESEARCH OF A SOFTWARE SOLUTION FOR THE ANALYSIS OF FRONT-END ARCHITECTURE OF WEB SITE

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In modern web development, front-end architecture plays a crucial role in ensuring the usability, maintainability, and performance of websites.

As the complexity of web applications increases, the need for tools that allow developers to analyze and improve the structure of their front-end components becomes more urgent.

This research focuses on the development of a software tool aimed at analyzing the front-end architecture of websites.

The main objective is to automate the detection of potential structural issues in HTML, CSS, and JavaScript components, and to provide suggestions for optimization.

This study considers the issue of analyzing the front-end architecture of websites, in particular, identifying possible problems, optimizing the structure and interaction of user interface elements.

The relevance of this study is stipulated by the need to ensure high performance, loading speed and convenience for website users in the current conditions of the Internet development.

Given the constant increase in the amount of web data and the complexity of the website structure, it is important to develop effective methods for analyzing and improving their front-end architecture.

The proposed solution integrates static code analysis [1], DOM [2] structure evaluation, and dynamic performance inspection using methods inspired by existing tools like Lighthouse, SonarQube, and React DevTools.

These methods allow to assess the quality of component design, code consistency, and performance bottlenecks.

However, unlike most existing tools that focus on either performance metrics or code quality, our tool emphasizes architectural evaluation – analyzing the organization and interaction of components.

The software supports analyzing key architectural aspects such as component hierarchy, coupling, cohesion, and render efficiency. The solution has been tested on several real-world websites to validate its effectiveness in identifying architectural flaws and recommending improvements.

As a result, the research confirms the importance and feasibility of automating front-end architecture analysis. The developed tool provides valuable insights for developers and teams striving to maintain scalable and efficient front-end systems.

References:
1. Static program analysis – Wikipedia. URL: https://en.wikipedia.org/wiki/Static_program_analysis
2. DOM in JavaScript – QAWeb. URL: https://qaweb.dev/coding-ua/421-osnovi-dom-v-javascript