



Thesis Defense

Computer Science Master's Program

“Optimizing Web Delivery: The Impact of Rendering Methods on User Experience Across Network Conditions”

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Abstract:

In an era where web applications are pivotal for global information dissemination and user engagement, ensuring the performance and accessibility of static web content is paramount. This need is particularly significant given the diverse accessibility requirements worldwide, influenced by varying network generations and the real-time rendering of static elements such as text, images, and videos on devices ranging from laptops to cell phones.

This thesis embarks on a comparative study of client-side rendering (CSR) and server-side rendering (SSR), two fundamental techniques determining how various platforms present static content. Through detailed examination, the study aims to shed light on the nuances of web performance optimization, particularly how CSR and SSR affect content loading times, interactivity, and overall user experience. This investigation covers popular web browsers like Google Chrome, Brave Browser, and Microsoft Edge while considering network generations from 2G Good to 4G/LTE Regular. The analysis will utilize performance metrics such as First Contentful Paint (FCP), Largest Contentful Paint (LCP), Cumulative Layout Shift (CLS), and Finish Time to provide a comprehensive evaluation. These metrics are essential for assessing the performance impact of CSR and SSR under different network conditions, offering a tangible measurement of user experience. By exploring the interplay between rendering techniques, device capabilities, and network environments, the research seeks to demystify the complexities of web performance optimization, ultimately offering strategies to enhance web application performance across different digital ecosystems.

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