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Research Paper on Groovy

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Abstract: ***Developers are often reluctant to adapt to the new framework since they need to allocate time in training and adapt. This study aims to determine the need for benchmarking JS and ReactJS application in a developer's viewpoint contributing detailed attention to React features and, in this context, evaluating the gap in comparing JS and React applications by considering the performance as principal criteria. To test the hypothesis, considered optimized methods, coding standards, and best practices using proper design and structure, using event listeners in JS, react-virtualized list, avoiding mutated values, and considering the production environment in React JS applications. The results showed a massive difference in the performance between the applications in high traffic situations since the React application uses virtual DOM that rendered what is needed at that point, making ReactJS approximately 97% faster than JavaScript. On this basis, React should be considered for developing apps as its advantages outweigh its disadvantages, making it easy to migrate for any organizations or developers.***
Keywords: virtual DOM, ReactJS

I. INTRODUCTION

This dissertation compares the current leader in the JavaScript UI framework, React with vanilla JavaScript. This research evaluates the performance, and other React features as they claim that React helps improve an application's performance due to their concepts like virtual DOM and other features. The study further helps expand further knowledge and investigation towards benchmarking React library.

As the emerging technology in the past decade, web applications have gained significant demand leading to more and more applications; thereby end users tend to access these applications by connecting to the Internet anywhere in the world. As far as August 2020, JavaScript is the most demanding client- side programming language that is used by 96.7% of the websites (Techs, 2020).

JavaScript is continuously gaining popularity with emerging new libraries and frameworks. Frameworks are known to dictate the application development process, reduce possible errors and the development time. Every framework has its pros and cons, hence selecting the suitable framework for a Software product is crucial for any company or a developer. As of 2020, React is one of the most used, and popular JS frameworks (overflow Survey, 2020) (Neha Mali, 2020) (Grzybowska, 2020)(Petrov, 2020)

In a study about the comparison of Single-page application (Molin, 2016), criteria and questions are collected to consider a SPA framework chosen by research and interviews with developers over comparative methods. The author makes the theoretical judgment and declares Angular JS is the popular framework based on popularity, which makes the study questionable because the sample group considered in the research might not lead to accurate findings. In the paper (Kaluža and Vukelic, 2018), the author discusses why manually writing a program code creates complexity in the entire application that advances low code quality. Consequently, it is easy to maintain the code quality and structure in multi-page applications or single-page applications using the framework. For any hypothesis, the developers consider popular frameworks. According to the analysis results among Vue, React, and Angular frameworks, the Vue.js and React framework has proved to be suitable for developing both multi-page and single-page applications. In the thesis (Wohlgethan, 2018), the author has tried to answer the excellent question that is: Does any one of the frameworks among Angular, React, and Vue JS stand out, whether there is any recommendation of the use of a particular framework in the aspects of web development for the majority of use cases?. The question sounds just right and acknowledged, as it is a fundamental question that arises among developers or organisation before starting any new project. The author confirms that the answer to the above question is a big no as the decisions depend purely on use cases and different factors such as the size of the projects, knowledge, and developers' experience. By considering these factors, he has seen all framework stand far individually from each other. The author from (Wohlgethan, 2018) summarises that React is recommended for its high importance of flexibility, serving a large scale of applications, its strong focus on using JavaScript and usage within large ecosystems. Deciding to adopt a new framework is a big deciding point for companies; where large companies need to take more time for evaluating since a small decision might lead to more immense financial struggles.

Simultaneously, smaller start-ups and more small development teams can test and adapt to a new framework more quickly. He suggests that their life cycle indicates how long they can be around the market in the JS frameworks' future work. He implies considering aspects like an additional speed comparison despite the approach may vary as per the requirements and the development of any web applications would go constant change in the process.

II. LITERATURE REVIEW

The following is a literature review for a React application benchmark comparing it with a JavaScript and giving it a developer perspective in benchmarking. The intent throughout is to explore the various features of React JS, primarily concentrating on its performance. While there has been much research comparing various JavaScript frameworks, few researchers have considered React JS a popular and widely used JS framework. Many research types had focused on comparing just the frameworks, and few had suggested that comparing with primary JS might be interesting as the development was using the core JS for these frameworks. In most of the research papers, the authors point that the application's performance plays a pivotal point for developing the application while considering that a lack of performance may result in the entire cost of application because it leads to a bad user experience. The prototype will be build using a ToDo application to compare the performance between JavaScript and React. This section helps with the information needed with the best methods for maintaining the performance and developing the optimized JavaScript and React JS applications from various research methods.

III. RESEARCH METHODOLOGY

This paper is based on research previously undertaken in the area of music streaming. It will analyses the streaming services of Spotify, Apple Music and Tidal in relation to consumers, artists and the industry as a whole. The sources used in this essay were found using the college library website and databases also through Google Scholar. However, due to the fact that these streaming services are relatively new, many of the referenced are from reputable websites and have been cross referenced to ensure the facts presented are correct. Many of the news articles online led to other interesting topics that were discussed in this essay. As these streaming services are very much present, interesting news articles were published while this essay was being planned. For example, the case study on Tidal's exclusivity was formed due to new albums being released by prominent artists while analyzing Tidal as a music streaming platform. Although it was difficult to find academic sources for this essay, the fact that many sources were used from the web meant that the information was very up to date. These web articles allowed for accurate statistics on subscriber's numbers and also regarding the media's interest in the streaming services. Recommendations for the future of music streaming services were based on an analysis on how the music industry and streaming has changed through the years using the sources researched.

A. Area Of Study

In recent years Spotify has received criticism from artists who believe they are not receiving enough money from their streams on the site. They believe that this is because Spotify offers their music for free to subscribers. McLean, Oliver, and Wainwright (2010) stated that at the time of writing 'only 2 percent of the total memberships' were paid subscribers. According to Passman (2015), 'Spotify freemium users outnumber paid subscribers about three to one'. Freemium is a term used to describe the free subscription service offered by Spotify. Similarly, to the problem with the available statistics relating to the amount of subscribers Spotify has, it is also difficult to understand how many of the users have subscribed for Spotify Premium. However it is clear to see that the number of paying subscribers has increased in line with the general subscriber increase. Lewis (2009) believed that the free aspect of Spotify would not be sustainable in the long term, however it seems that many early predictions for the service were incorrect. Nonetheless, the freemium aspect of Spotify has caused much controversy with artists.

B. Method Of Data Collection

The data will be collected mainly through observing different music streaming app. Secondary data in this research work will be collected through the review of related literature; the relevant literature will be obtained from published journals from the internet, different websites.

C. Limitations Of Study

The study is limited to only secondary ways of collection of data. The study considers project preparation as one of the aspects of academic preparation. Web development is one of the factors of effect have been taken for study.

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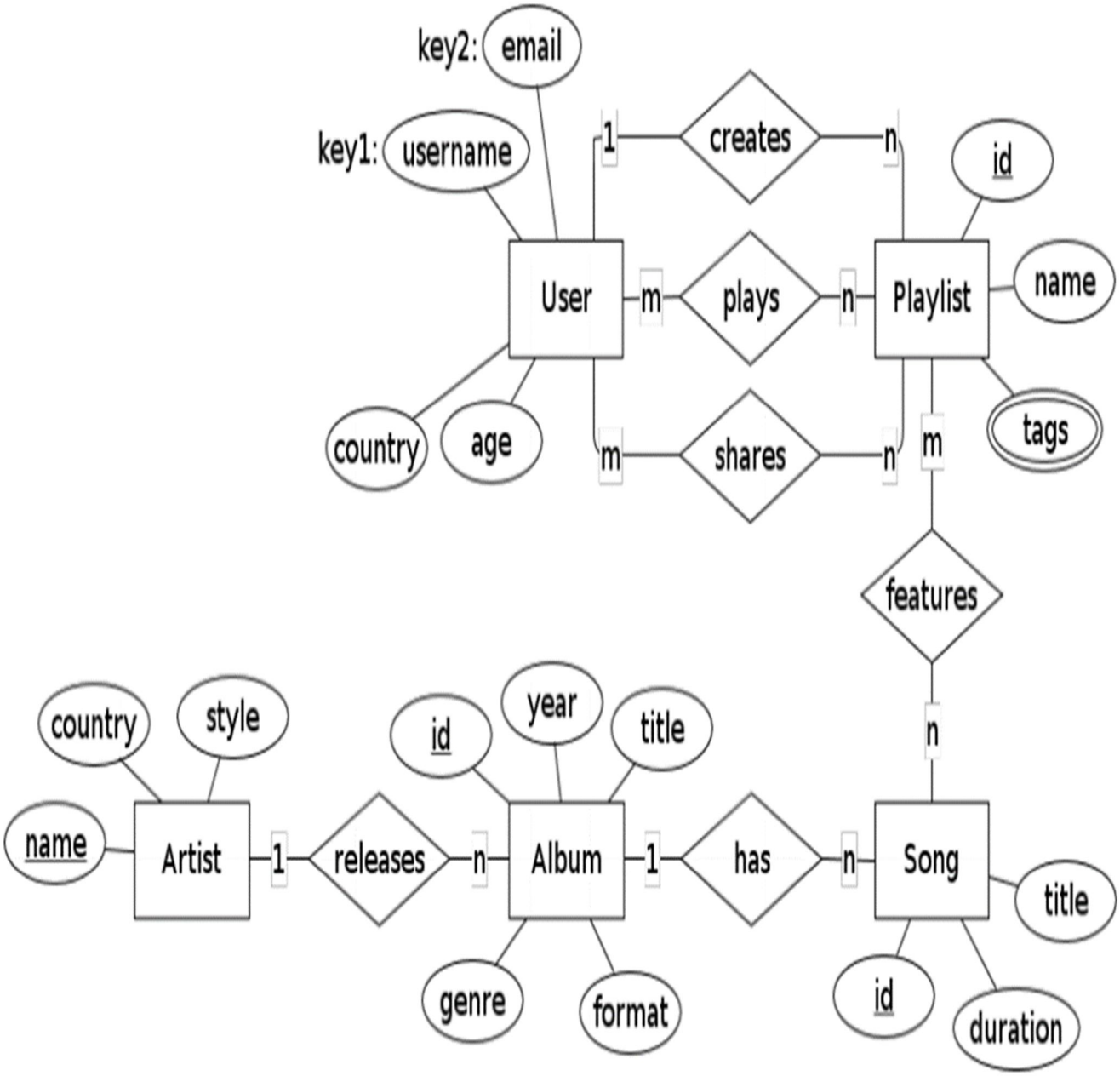
D. Collection And Analysis Of Data

The few analysis of data is furnished below:

FINDINGS: A lot of people depend on music streaming services for their entertainment. During open-ended research, it was revealed that a lot of regular users feel that while searching they end up forgetting the song name and felt frustrated. I'll be walking you through the case study, explaining how I came up with a solution for the problem.

E. Data Design



F. Suggestions

Such apps as Spotify, and Apple Music are the most widely used music streaming apps. The primary purpose of the music streaming application is to play music available in the databases of the service, compose custom playlists and suggest similar songs. The main elements of music streaming apps are-:

1) *Discovery:* The central component of user engagement is the availability of the music and the ability to discover similar genres.
2) *Recommendations:* To provide users with more relevant recommendations you need to implement a recommender engine to your music streaming app.
3) *Personalization and Deep Categorization:* The music can be sorted by period, genre, performer association (solo albums of band members) or by more ephemeral characteristics such as mood (happy, sad, romantic), tone (dark, brooding, sunshiny), or pace (fast, slow, waltz) of the compositions.
4) *Social Networking:* You can apply custom playlists as promotional or educational tools. Thus, users can share playlists with friends via social media platforms.

IV. RESULT ANALYSIS

The introduction of music streaming services has had a large impact on the music industry. With subscription numbers for most services reaching well over a million, it is clear that the method by which consumers listen to music has changed. The way in which music has been distributed has transitioned over time from vinyl to cassettes to CDs and currently, digital. At the beginning of this century, Apple changed the way in which music was played by introducing the digital music storage site iTunes followed a few years later by the release of the iTunes Store. Record companies across the world have adapted to this new change by making their catalogues available digitally. Some companies attempted to set up their own online music stores, however they could not compete with the size of iTunes's catalogue. iTunes allowed any record company to place their music on the store and thus created an online store which contained music from all mainstream artists. However, the rise of digital music brought about a new form of music piracy which the industry had to tackle. Initially, many CDs were not developed to be playable on computers, this had to be changed due to rise of MP3 music players setting a requirement for MP3 files to be transferred onto a computer from a CD. The industry began to monitor websites sharing MP3 files during the rise of the internet. Streaming services naturally developed as an advancement, following the required adaption of MP3 files onto computers. Streaming allowed consumers to listen to the music they wanted to whenever they wanted to. All the device user needed was a subscription to a legal streaming site, mobile data or Wi-Fi and the application of the streaming service they subscribed to. Music streaming has forever changed the industry due to ease of access to music which modern streaming sites provide to the consumers. Record companies have adapted to using these services to their advantage for example, many record companies opt to acquire shares in Spotify while negotiating contracts for their artist's music. This mutually beneficial relationship, allows Spotify to gain access to the record labels associated artists music, while also increasing record companies profits through the acquisition of shares. This relationship works to ensure that CD sales which have been declining over the past two decades do not mean the end of a record company. Music streaming services allow record companies to save money on production costs if they are unsure of whether a new artist will succeed. Initially, the decline in CD sales was credited to the growth of online music stores such as iTunes, however more recently the media and industry have begun to view streaming sites as a cause of declining album sales. Nonetheless, it is clear to see that music streaming will continue to grow in popularity and as a result the industry must adapt to the ever changing trends in order to maintain a level of growth.

V. CONCLUSION

There is no dispute claiming that JavaScript value lies in its emerging new frameworks, tools, and libraries. However, React is earning substantial popularity among other JavaScript frameworks today. The thesis shows why developers use this library to build and operate dynamic web applications that experience high traffic. Chapter 5 shows a massive performance difference between JS and ReactJS applications regarding extensive data loading. Observing the individual task functionalities like adding, updating, and deleting the list from the list showed unnecessary reloading of the page in JS application as it does not compare changes in the DOM, unlike React JS that creates a virtual dom and gets the difference between the DOM and re- renders only the changes instead of entire DOM. Also, React JS provides a better project structure, and it is worth spending a few hours for developers to learn React JS as it saves more time when revisited for updating or refactoring the code. Structuring the projects does not depend on JavaScript or React, although React provides a preliminary structure, it purely depends on the project requirements, developers experience, and project views in the succeeding stages. Without putting any extra efforts by the developer, ReactJS improves performance and best practices because of its minified version of files that get generated due to production build.

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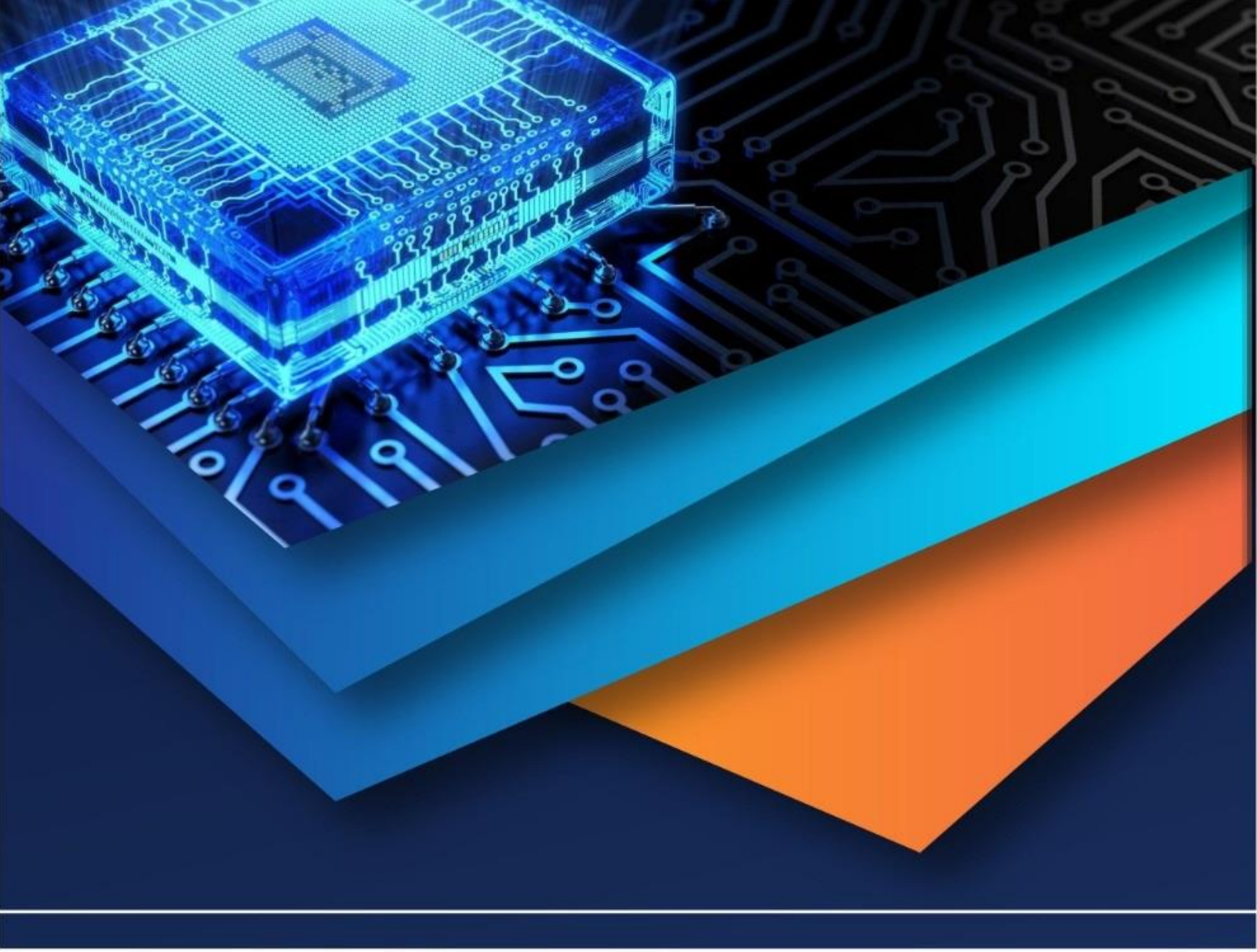

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