A Study on User Perception Towards Google Chrome

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Abstract— This research work was aimed at studying the major factors which determine the user preference of Google Chrome. The study also examined how users respond to the various features available on the Chrome such as performance, accuracy, speed, and appearance etc., and the innovative ideas of the Google Chrome. The impact of Google Chrome among the other browsers such as Mozilla Firefox, safari, opera mini, uc browser, internet explorer and the security level of Chrome to protect the information of the users. The difficulties of the Google Chrome were also determined and the satisfaction level of the users towards Google Chrome. The research survey design was adopted in the study while simple random sampling technique was used to select a sample size of 100 respondents that participated in the study. Data used for the study was collected from both primary and secondary sources. The primary data was collected from respondents through questionnaire and the secondary data was gathered from books, journals, websites, previous research papers.

I. INTRODUCTION

Marketing is the study and management of exchange relationships. Marketing is the business process of creating relationships with and satisfying customers. With its focus on the customer, marketing is one of the premier components of business management.

Marketing is defined by the American Marketing Association as "the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large." The term developed from the original meaning which referred literally to going to market with goods for sale. From a sales process engineering perspective, marketing is "a set of processes that are interconnected and interdependent with other functions" of a business aimed at achieving customer interest and satisfaction

The process of marketing is that of bringing a product to market, which includes these steps: broad market research; market targeting and market segmentation; determining distribution, pricing and promotion strategies; developing a communications strategy; budgeting; and visioning long-term market development goals.

The 'marketing concept' proposes that in order to satisfy the organizational objectives, an organization should anticipate the needs and wants of potential consumers and satisfy them more effectively than its competitors. This concept originated from Adam Smith's book The Wealth of Nations, but would not become widely used until nearly 200 years later.

When developing a website, one of the goals is that it has to be visualized by many users worldwide [1, 2]. Due to websites distribution, based on the client-server architecture model [3], users can access any site from many types of web browsers, from different platforms and devices. However, the differences between each browser and the way they interpret the website source code may cause incompatibility defects. One of the developer's tasks is to provide an accepted user experience to every user. Browser compatibility is a website's capability that makes it work correctly in a certain number of web browsers [4]. It is impossible to test a web application in all of the web browsers that exist in the world, and in all operating systems [4]. A website has cross-browser compatibility if it is interpreted in the same way by all of the browsers.

II. INDUSTRY PROFILE

Google LLC is an American multinational technology company that specializes in Internet-related services and products, which include online advertising technologies, search engine, cloud computing, software, and hardware. It is considered one of the Big Four technology companies, along with Amazon, Apple and Face book.

The company's rapid growth since incorporation has triggered a chain of products, acquisitions, and partnerships beyond Google's core search engine (Google Search). It offers services designed for work and productivity (Google Docs, Google Sheets, and Google Slides), email (Gmail/Inbox), scheduling and time management (Google Calendar), cloud storage (Google Drive), social networking (Google+), instant messaging and video chat (Google Duo, Hangouts), language translation (Google Translate), mapping and navigation (Google Maps, Waze, Google Earth, Street View), video sharing (YouTube), note-taking (Google Keep), and photo organizing and editing (Google Photos). The company leads the development of the Android mobile operating system, the Google Chrome web browser, and Chrome OS, a lightweight operating system based on the Chrome browser. Google has moved increasingly into hardware; from 2010 to 2015, it partnered with major electronics manufacturers in the production of its Nexus devices, and it released multiple hardware products in October 2016, including the Google Pixel smart phone, Google Home smart speaker, Google Wi-Fi wireless router, and Google Daydream virtual reality headset. Google has also experimented with becoming an Internet carrier (Google Fiber, Project Fi, and Google Station).

Chrome is internally tested with unit testing, "automated user interface testing of scripted user actions", fuzz testing, as well as Web Kit's layout tests (99% of which Chrome is claimed to have passed), and against commonly accessed websites inside the Google index within 20–30 minutes. Google created Gears for Chrome, which added features for web developers typically relating to the building of web applications, including offline support. Google phased out Gears as the same functionality became available in the HTML5 standards.

III. OBJECTIVES

- To know about the factors influencing the user decision of using Google Chrome.
- Identification of primary usage of chrome with users preference.
- To study the difficulties faced by user while using Google Chrome.
- To study the awareness level and usage of Google Chrome.

IV. RESEARCH METHODOLOGY

The research method undertaken for this study is descriptive research. The main objective of using descriptive research is concerned with describing the characteristics of a particular individual or a group. The goal is to analyze scientific articles related to cross-browser compatibility, focusing in the proposed techniques and tools. The research questions (RQ) will guide the process and the findings will answer the raised questions. We believe that a summary of the state of art will aid works in this line of investigation.

V. STATISTICAL TOOL FOR THE RESEARCH

- Percentage analysis
- Chi - square analysis

VI. NEED FOR THE STUDY

The purpose of this study is to examine the personal perceptions of the users and the personal points-of-view of users regarding their issues. This study will seek the answer for the question related to the prevailing perception of Google chrome. To understand the extent to which users have the awareness of the attributes and benefits, and the approach of the users towards chrome. To study about the issues of the users and the opportunity to the advanced knowledge. This will help understand how the awareness of Google chrome needs to spread to the users. The outcome of the study will benefit the users to have a better knowledge about the Google Chrome.

VII. LIMITATIONS OF THE STUDY

- The results of the study are appropriate only for Google Chrome users and it may not be used in any other browsers.
- The solution provided by the research is not applicable to any other browsers.

- The findings of the research is not applicable to any other browsers.
- The location of the respondents are Coimbatore city.

VIII. LITERATURE REVIEW

Samir Ahammed (2013) The experience was great, in any case, it is such an amazing web crawler, to the point that individuals have utilized it against me every once in a while. In light of what I said it isn't the application that has the Flies, it is our monetary framework and the general population we've been compelled to utilize devices in the midst of incredible need.

Mohit Kumar (2014) Chrome been great previously however the new updates simply continue evacuating certain imperative highlights like the capacity to print a page in the wake of tapping on offer. This is one of the highlights everyone utilizes the most and greatly bothered that it's never again here.

Amit Kumar (2015) The best program. No stop no slacks. You can open the same number of new tabs. There is an in secret mode likewise accessible. There is work area mode is additionally accessible which causes me a great deal. Interestingly, it enhances the execution by giving the customary updates.

E. Dustin, J. Rashka and D. McDiarmid, Quality Web Systems: Performance, Security, and Usability, Boston, Massachusetts, USA: Addison Wesley, 2001.V. S. Moustakis, C. Litos, A. Dalivigas and L. Tsironis, "Website Quality Assessment Criteria," IQ, pp. 59-73, 2004.J. F. Kurose and K. W. Ross, Redes de computadoras. Un enfoque descendente, Pearson, 2010 ."Introduction to cross browser testing – Learn web development | MDN". Available: https://developer.mozilla.org/en-US/docs/Learn Tools_and_testing/Cross_browser_testing/Introductio n. Accessed on 2017-04-03. L.N. Sabaren, M. A. Mascheroni, C. L. Greiner and E. Irrazábal, "Una Revisión Sistemática de la Literatura en Pruebas de Compatibilidad Web," in XXIII Congreso Argentino de Ciencias de la Computación (CACIC 2017), pp. 812-821, La Plata, Argentina, 2017.

B. Kitchenham and S. Charters, "Guidelines for performing Systematic Literature Reviews in Software Engineering," Keele University and Durham University Joint Report, EBSE 2007-001, 2007.Z. Zakaria, R. Atan, A. A. A. Ghani and N. F. M. Sani, "Unit Testing Approaches for BPEL: A Systematic Review," in Software Engineering Conference, APSEC '09. Asia-Pacific, pp. 316-322, Penang, Malaysia, 2009.

E. Mendes, "A systematic review of Web engineering research," in International Symposium on Empirical Software Engineering, pp. 498-507, Queensland, Australia, 2005.S. Dogan, A. Betin-Can and V. Garousi, "Web application testing: A systematic literature review,"Journal of Systems and Software, vol. 91, pp. 174-201, 2014.

E. I. Nabil, "Specifications for Web Services Testing: A Systematic Review," in 2015 IEEE World Congress on Services, pp. 152-159, New York, USA, 2015. S. Choudhary, H. Varsee and A. Orso, "A cross-browser web application testing tool," in 2010 IEEE International Conference on Software Maintenance, pp. 1-6, Romania, 2010.

S. R. Choudhary, H. Versee and A. Orso, "WEBDIFF: Automated Identification of Cross-browser Issues in Web Applications," in 26th IEEE International Conference on Software Maintenance, pp. 1-10, Romania, 2010.S. Choudhary, "Detecting Cross-browser Issues in Web Applications," in 2011 33rd International Conference on Software Engineering, pp. 1146-1148, Hawaii, USA, 2011. A. Mesbah and M. R. Prasad, "Automated Cross-Browser Compatibility Testing," in 2011 33rd International Conference on Software Engineering, pp. 561-570, Hawaii, USA, 2011.

IX. SCOPE OF THE STUDY

The scope studies about the identification of primary usage of chrome with respect to user's preference and the factors for choosing a particular browser. To understand the users perception and awareness level of the Google Chrome with respect to design, performance, accessibility etc., and the importance of developing to the next level.

X.   ANALYSIS AND INTERPRETATION

PERCENTAGE ANALYSIS

Gender of the Respondents

Sl. No.	Gender	No. of Respondents	Percentage
1	Male	68	68
2	Female	32	32
Total		100	100

Interpretation

Table shows that 68 % of the respondents are male and 32 % are female. Hence the majority of the respondents are male.

Age of the Respondents

Sl. No.	Age	No. of Respondents	Percentage
1	15 – 25	54	54
2	26 – 35	22	22
3	36 – 45	11	11
4	Above 45	13	13
Total		100	100

Interpretation

Table shows that age of the 54 % respondents are 15 – 25, 22 % are 26 – 35, 11 % are 36 – 45 and 13 % are above 45. Hence the majority of the respondents belong to the age of 15 – 25 years.

CHI-SQUARE ANALYSIS

To test the relationship age of the respondents and satisfaction level

Null Hypothesis (H_0): There is no association the age of the respondents and the satisfaction level

Alternative Hypothesis (H_1): There is an association the age of the respondents and the satisfaction level

Satisfaction / Age	Highly Dissatisfied	Dissatisfied	Neutral	Satisfied	Highly Satisfied	Total
<20	4	5	8	10	3	30
21-30	1	4	16	18	26	65
30<	5	10	2	3	5	25
Total	10	19	26	31	34	120

$$Chi - square = \sum \frac{(O - E)^2}{E}$$

Where, O – Observed Value
        E – Expected Value

Calculated Value Chi-square value	Degree of Freedom (No. of row – 1) × (No. of column – 1)	Probability Level	Critical Chi-Square Value
3.87	8	0.05	15.51

Interpretation

The calculated value, 3.87 is less than the critical chi-square value, 15.51, null hypothesis is accepted. Hence, there is no association between the age of the respondents and their satisfaction level.

XI.   FINDINGS

- Majority of the respondents (68 %) are male.
- Majority of the respondents (54 %) comes under the age group of 15 – 25.
- Majority of the respondents (64 %) occupation is students.
- Majority of the respondents (37 %) educational qualification is UG.

- Majority of the respondents (48 %) are using Google Chrome right now.
- Majority of the respondents (29 %) respondents come to know about Google Chrome are by default browser.
- Majority of the respondents (16 %) have given + 2 rating for unwanted notifications.
- Majority of the respondents (21 %) have given + 2 rating for Chrome wont close.
- Majority of the respondents (19 %) have given + 2 rating for webpage crashes.
- Majority of the respondents (33 %) are using Android Browser other than Google Chrome.
- Majority of the respondents (28 %) have not shifted from Google Chrome.
- Majority of the respondents (60 %) have said Google Chrome is better when compared to the other browsers.

SUGGESTIONS

- Security- most of the users said that Google chrome is also having security issues like other browsers.
- Sharing files can be improved while sharing files, network is always depended.
- Downloading option can be improved downloading is not good compared to the other browsers.
- Improve RAM and ROM usage improve the capacity of RAM and ROM usage for good performance without buffering.

CONCLUSION

Currently, the selected platform for communication and exploitation is the web and effective web testing becomes a challenge for developers. The technology's rapid evolution and its popularity have increased the production of complex and dynamic applications This makes usability, compatibility and availability, key success attributes in the web However, different web browsers produce different content. Thus, the need for cross-browser compatibility testing gains importance. In this research, i have studied the developed techniques to test cross-browser compatibility. The visual analysis is the most popular technique. We also have reviewed the proposed tools to implement the

tests. The tools were classified depending on their source: developed by the authors or commercial applications.

We also addressed the validation phase of the proposed tools and techniques, listing the articles that provided a concrete number of testing artifacts. The visual analysis is the most validated technique. Finally, we listed the challenges described in the articles. The presence of dynamic objects was one of the biggest challenges found, especially in modern web applications. The tests automation was an important requirement mentioned as well. Several tools and techniques are developed with different levels of automation. Therefore, it is necessary to automate the testing process. As future work, we propose the development of a tool to conduct google chrome compatibility testing, addressing the challenges found in this reserach.

REFERENCES

[1] Research on browser satisfaction level by Suresh & Luv Mendiratta Dronacharya College Of Engineering, Farrukhnagar, Gurgaon.

[2] Research on Google chrome and Mozilla fire fox: A Comparative Study by Levi Watson Department of Computer Science University of Denver Denver, CO 80208, USA

[3] Research on Google chrome and Uc browser app Market: Who is leading? By Amit Kumar Volume 3 Issue 4 April, 2013 Page No. 5553-5556 University of Delhi.

[4] A. Sivaji, N. A. Ramli, Z. M. Nor, N.-K. Chuan, F. Wan, A. Wan and S. Shi-Tzuaan, "Measuring and Improving Website User Experience using UX Methodologies: A Case Study on Cross Browser Compatibility Heuristic," in Southeast Asian Network of Ergonomics Societies, pp. 1-6, Langkawi, Kedah, Malasia, 2012.

[5] S. Choudhary, M. Prasad and A. Orso, "X-PERT: Accurate identification of cross-browser issues in web applications," in 2013 35th International Conference on Software Engineering, pp. 702-711, San Francisco, California, USA, 2013.

[6] V. Dallmeier, M. Burger, T. Orth and A. Zeller, "WebMate: Generating Test Cases for Web 2.0," in International Conference on Software Quality,

Software Quality. Increasing Value in Software and Systems Development, pp. 55-69, Vienna, Austria, 2013.

[7] N. Semenenko, M. Dumas and T. Saar, "Browserbite: Accurate Cross-Browser Testing via Machine Learning over Image Features," in 2013 29th IEEE International Conference on Software Maintenance, pp. 528-531, Eindhoven, Netherlands, 2013.

[8] S. Choudhary, M. Prasad and A. Orso, "X-PERT: a web application testing tool for cross-browser inconsistency detection," in 2014 International Symposium on Software Testing and Analysis, pp. 417-420, San Jose, California, USA, 2014.

[9] A. Deursen, A. Mesbah and A. Nederlof, "Crawl-based analysis of web applications: Prospects and challenges," Science of Computer Programming, vol. 87, pp. 173-180, 2014.

[10] B. Kaalra and K. Gowthaman, "Cross Browser Testing Using Automated Test Tools," International Journal of advanced studies in Computer Science and Engineering, vol. 3, nº 10, pp. 7-12, 2014.

[11] X. Li and H. Zeng, "Modeling web application for cross-browser compatibility testing," in 2014 15th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing, pp. 1-5, Nevada, USA, 2014.

[12] S. Mahajan and W. Halfond, "Finding HTML presentation failures using image comparison techniques," in 29th ACM/IEEE international conference on Automated software engineering, pp. 91-96, Vasteras, Sweden, 2014.

[13] E. Selay, Z. Q. Zhou and J. Zou, "Adaptive Random Testing for Image Comparison in Regression Web Testing," in 2014 International Conference on Digital lmage Computing: Techniques and Applications, pp. 1-7, New South Wales, Australia, 2014.

[14] M. He, H. Tang, G. Wu and H. Zhong, "A Crowdsourcing framework for Detecting Cross-Browser Issues in Web Application," in the 7th Asia-Pacific Symposium on Internetware, pp. 239-242, Wuhan, China, 2015.

[15] A. Hori, S. Takada, H. Tanno and M. Oinuma, "An oracle based on image comparison for regression testing of web applications," in 27th International Conference on Software Engineering and Knowledge Engineering, pp. 639-645, Pittsburgh, USA, 2015.

[16] S. Mahajan and W. G. J. Halfond, "Detection and Localization of HTML Presentation Failures Using Computer Vision-Based Techniques," in 2015 IEEE 8th International Conference on Software Testing, Verification and Validation, pp. 1-10, Graz, Austria, 2015.

[17] T. Saar, M. Dumas, M. Kaljuve and N. Semenenko, "Browserbite: cross-browser testing via image processing," Software—Practice & Experience, vol. 46, nº 11, pp. 1459-1477, 2015.

[18] H. Shi and H. Zeng, "Cross-Browser Compatibility Testing Based on Model Comparison," in 2015 International Conference on Computer Application Technologies, pp. 103-107, Matsue, Japan, 2015.

[19] S. Xu and H. Zeng, "Static Analysis Technique of Cross-Browser Compatibility Detecting," in 2015 3rd International Conference on Applied Computing and Information Technology/2nd International Conference on Computational Science and Intelligence, pp. 103-107, Okayama, Japan, 2015.