Performance analysis of websites of the government of Pakistan using online tools

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Summary
As the world is going to be smart day by day using the internet. Internet nowadays is used in every field and it is the need for time in this modern world. From private and public schools to government ministries each organization has its websites and performance of websites in terms of page speed, load time and optimization matters for the users. The government of Pakistan comprises of many ministries for many divisions and each ministry has a individual website. In this paper, we analyze the performance of websites of the government of Pakistan. In this paper, we have used online tools to analyze the performance of websites of the government of Pakistan.

Key words:
Website performance, website load time

1. Introduction

Web enhances the communication and interaction among users. Users may easily approach the required data with the help of particular websites [1]. The presence of websites shows the existence of an organization and makes the organization alive just like in university systems university websites show the existence and performance of the university [2]. Performance check matters in software, on websites and in any technology-related things. Performance check is not about to criticize behavior, design, and method of software or website. But performance check will help to eliminate the things which make the performance down. The performance check will not assess the functionality. To check the performance of software or website there are many parameters that can be considered.

Parameters to measure the performance of the website:

1. Response time: The amount of time taken to respond to any request is called response time. The lower response time gives the better results.
2. Reliability: It is the measure of credibility. In websites, reliability is considered as the accuracy which indicates that data on the website is credible and accurate.
3. Speed: The rate at which the website operates. Speed is measured in the time unit like in seconds, milliseconds
4. Availability: It can be measured to ping the website URL to check whether the website is reachable or not.

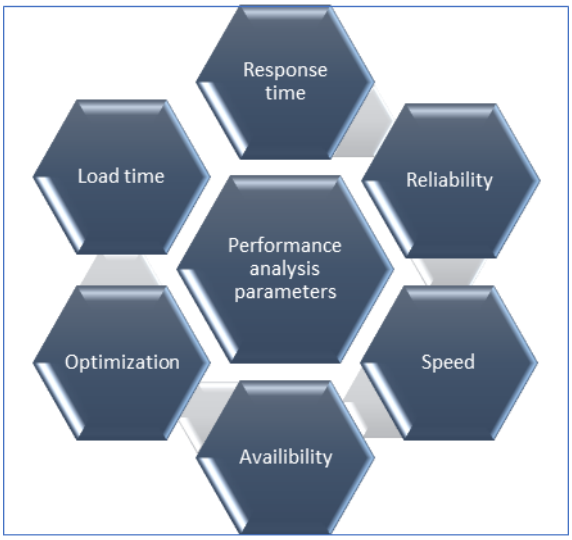

Fig. 1 Parameters to measure the performance of websites.

5. Optimization: Website optimization measures website traffic, and make the website convenient for users. There are many ways to measure website optimization using different parameters like SEO search engine optimization, page optimization, link optimization and so on.
6. Load time: Users don't like slow websites. Website load time is the time duration in which a webpage completely be available to users from initiation time to completion time.

In this paper, we have analyzed the performance of websites of the government of Pakistan. In section 2 we discuss the related work, section 3 comprises of research methodology, section 4 is about the performance analysis of the websites, in section 5 we had discussed the results

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and finally, we completed our paper with conclusion and future work.

2. Related work:

To engage the users or visitors more into organizations' websites then the organization must have to provide a high-performance website, to improve the performance of the web page and avoid page load then take some steps like put the HTTP cache, remove unused CS files [3]. Authors [4] work on the load time of the web pages over the internet, in this work authors, use various online tools and use different locations to measure the website load time and authors found in their results that web page load time increased when clients geographical location increases and contents on the web page also affects the web page load time. Authors [5] measures the performance of websites of Punjab universities and use various online tools. Authors measures the multiple factors of website like response time, load, page size, speed of website, SEO and security and authors use online tools like Pingdom, GTmetrix, website grader and site speed checker and authors allocate the symbols U1…..U12 to university websites and in results authors had found that universities U1 and U6 takes maximum load time while U4 gives maximum SEO. Authors in [6] measure the performance of Asian government websites in terms of quality. Authors
take multiple factors (response time, load time, size and etc.) to measure the performance of various websites of multiple countries of Asia. According to the author's analysis of results, Asian websites are not performing better in terms of quality.

3. Research methodology:

In this research work, we had selected the specific parameters to analyses the performance of websites on behalf of these parameters we evaluate the performance of six different websites of the government of Pakistan as shown in figure 2. For performance analysis, we had used the three different online tools to measures the specific parameters of the website. The online tools which we used to measure the performance are Doctom monitor, GTmetrix and Pingdom.

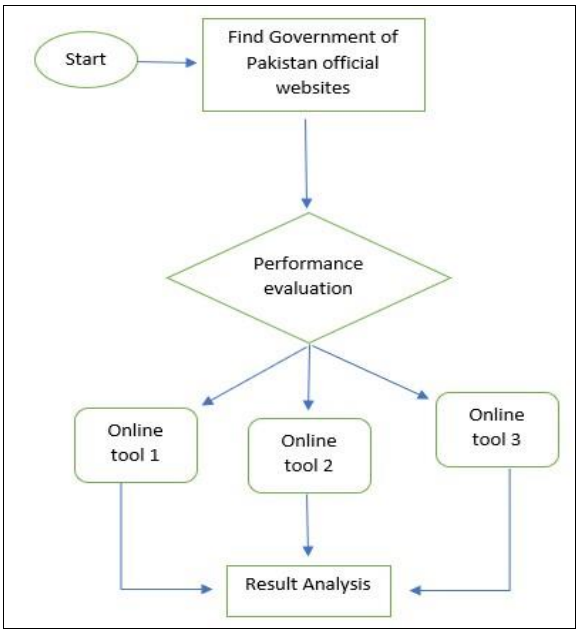

Fig. 2 Research methodology

4. Performance analysis of websites:

Government of Pakistan consist of many ministries and each ministry have their departments. Ministry refers to the political entities of the state and departments are the sub-entities that are working under specific ministries. Nowadays in the modern world, each entity is digitized in Pakistan. Pakistan's every ministry has websites so each and every information can be accessed from websites. In this sense website's performance matters to help the users to utilize the things timely and find out the material. In this paper, we analyze the performance of six different ministries websites of the government of Pakistan using three different online tools as shown in table 1. In this paper we take the following ministries websites to analyze the performance

1. Ministry of climate change government of Pakistan
2. Expanded program on immunization government of Pakistan
3. Ministry of finance government of Pakistan
4. Ministry of communications government of Pakistan
5. Ministry of federal education and professional training government of Pakistan
6. Ministry of Commerce government of Pakistan

Table 1: Websites, parameters and online tools used for analysis.

Websites	Symbols	Parameters	Online tools
www.mocc.gov.pk/	W1	•Page speed •Load time •Optimization	•Dotcom monitor •GTmetrix •Pingdom
http://www.epi.gov.pk/	W2		
http://www.finance.gov.pk/	W3		
http://www.communication.gov.pk/	W4		
http://mofept.gov.pk/ (W5)	W5		
http://www.commerce.gov.pk/	W6		

We used the PLO (Page speed, Load time, Optimization) parameters as shown in figure 2 to measure the performance of 6 different websites and we used three different online monitoring tools to evaluate the performance. The page speed of website and load time are inversely proportional to each other. When load time increases the page, speed decreases and when the load time of the website decreases the page speed increases.

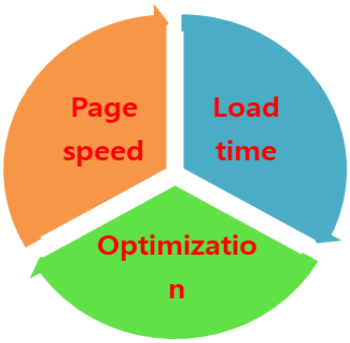

Fig. 3 PLO parameters

5. Dotcom monitor tool

Dotcom is an online tool to measure the website performance shown in figure 4. Dotcom checks the performance of websites using various locations. Table 2 shows the results of the website performance of the government of Pakistan using Dotcom online tool

Table 2: Performance analysis using Dotcom monitor online tool

Websites	Page speed	Load time	Optimization
W1	54%	4.7s	Not find
W2	27%	12.0s	Not find
W3	67%	5.4s	Not find
W4	63%	6.3s	Not find
W5	3%	13.4s	Not find
W6	16%	37.3s	Not find

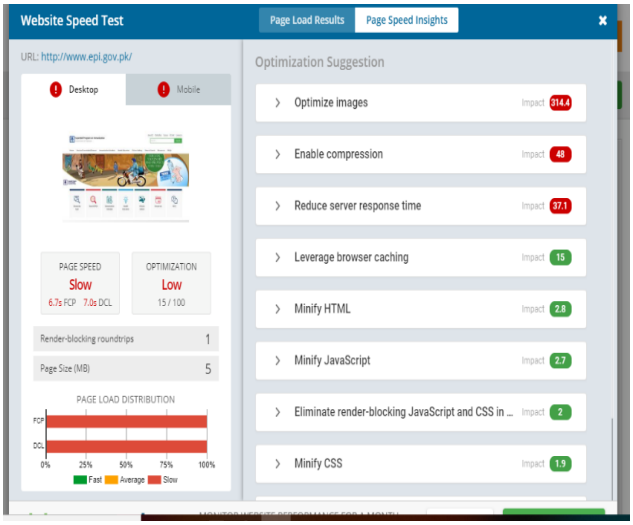

Figure 4. Dotcom online tool

6. GTmetrix online tool:

GTmetrix is an online tool to check the performance of websites. GTmetrix measures the page speed load time but it is not checking the optimization. Table 3 shows the results of the performance of websites of the government of Pakistan using GTmetrix online tool

Table 3. Performance analysis of websites using GT Metrix online tool

Websites	Page speed	Load time	Optimization
W1	Fast	5.3s	Low
W2	Slow	9.4s	Low
W3	Fast	4.7s	Medium
W4	Fast	5.3s	Low
W5	Slow	7.9s	Low
W6	Slow	13.2	Low

7. Pingdom online tool:

Pingdom is an online tool to measure the performance of websites. Pingdom is checking the speed of websites but it is not measuring the page speed and also not giving the optimization. Table 4 shows the results of the website's performance using Pingdom online tool

Table 4: Performance analysis using Pingdom Website online tool

Websites	Page speed	Load time	Optimization
W1	Not find	10.15s	Not find
W2	Not find	9.0s	Not find
W3	Not find	4.8 s	Not find
W4	Not find	2.8s	Not find
W5	Not find	6.42s	Not find
W6	Not find	10.81s	Not find

8. Results:

We have used the three different online tools to measure the performance of websites W1 …. W6. The website's performance in terms of optimization needs much more improvement. Only W3 optimization is in medium range other websites W1, W2, W4, W5, and W6 optimization is slow. Optimization is measured using Dotcom online tool only. The load time of the websites as measured by all three online tools which are used in this paper. In the load-time parameter performance of the W6 website is low all three online tools results show that W6 load time is greater than other websites. W5 and W2 websites were taking greater load time in GTmetrix online tool. W1 website was taking grater time in Pingdom online tool. Complete re
sults in terms of load time are shown in figure 5.

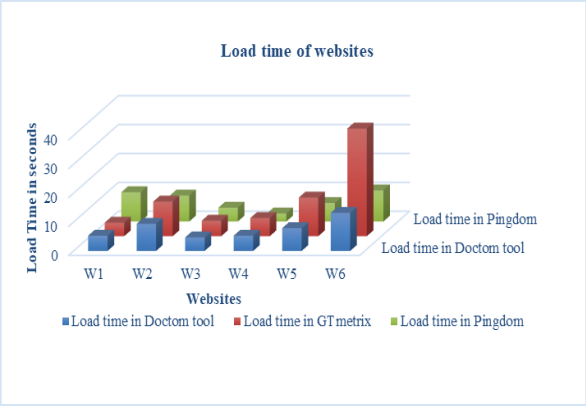

Fig. 5 Load time of websites

9. Conclusion

We analyze the performance of the government of Pakistan websites and we used online tools for performance analysis. Ministry of commerce website load time was greater as compared to others. In the future, we will analyze the accessibility of websites and the performance of websites in terms of security.

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