Web Analytics to Improve Web Usability

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Abstract

Web analytic software gives necessary support to better recognize the user's behavior, identify bottlenecks and errors in user interface design, measure performance of web platform, checking website availability or recommend good website content. These tools are based on tracking techniques and sophisticated algorithms that process and evaluate large volumes of captured data.

Lot of platforms do not capture data about the user's activity in the websites, click, mouse movement, etc. Some software does capture some of this user activity, but they only process the information visually showing heatmaps. In this paper we present a novel research approach for collecting all necessary data of the user activity in websites, showing this in formation quantitatively and allowing its automatic statistical analysis and the rapid understanding by web masters.

INTRODUCTION

Web analytics is a scientific field that composed of many components such as measuring site visitors, collecting data, analyzing web performance, reporting processed outputs, business data mining, data visualization strategies, etc., There are a number of tools within these disciplines that greatly facilitate our work with captured data. However, for a proper understanding of these data, single tool is not sufficient.

This proposed system will do all the task that require to collect UX data to analyze web user experience.

RELATED WORK

Jaime Solis-Martinez, Jordan Pascual Espada, Ruben Gonzalez Crespo, B. Cristina Pelayo GBustelo, Juan Manuel Cueva Lovelle proposed a system which uses JavaScript code snippet to collect visitors' data, This JavaScript code need to be installed in each web which we want to track.

Beatriz Plaza in his review paper "Google Analytics for measuring website performance" to explained the use of analytics system to increase websites performance.

Ernesto Arroyo, Ted Selkar, Willy Wei in 2006 propose a system that will track mouse movement of visitor. This data will get sent to servers to process it. At server-side mouse movement will be shown with traces to get path movement.

Martin Tournoji developed a system named "Goatcounter" which collects some useful information from site visitors. The system is able to collect information like Site Visitors Count, Location, Browser Type, Top Referring Sites, Operating System.

Dugwood developed a system which will be able to show click heatmap of site visitors clicks. System is able to show heatmap for each web page where tracking code has been installed .

EXISTING SYSTEM

Comparison with different analytical platforms:

1)   Matomo:

a)   UX is hard to use.

b)   Large Tracking Script.

c)   Expensive.

2)   Fathom:

a)   Hosted Expensive.

b)   Doesn't give referrers per-page.

3)   Open Web Analytics:

a)   Somewhat complex UI.

b)   Large payload.

Problem Definition: -

To analyze the performance of any website there is need of system which will be able to collect visitors' data, device information, Referrers. Using this we monitor the usability of our website.

This proposed system will do all the tasks that require to collect UX data to analyze web user experience.

Objectives: -

The main objective of this application is:

•   Collecting click data of visitors and presenting it in the form of heatmap.

•   Recording of session and replaying it back at admin site.

•   Collecting user specific information and showing in graphical reports.

SYSTEM OVERVIEW

PROPOSED WORK

The proposed system bound to give useful secure and legitimate web analytics for business purposes, while still staying usable for non-technical users to use on personal websites. The choices that currently exist are between freely hosted but with problematic privacy. System attempts to strike a good balance between various interests. Major features include a free hosted version so people can easily add analytics to their personal website, an easy to run hosted option, an intuitive

user interface, and meaningful statistics that go beyond 'vanity stands' but still respect your user's privacy.

The system performs three types of tasks 1) Collecting Session Data and visualizing 2) Collecting Clicks of user and visualizing in form of heatmaps 3) Recording User Session and Replaying it back at Admin site.
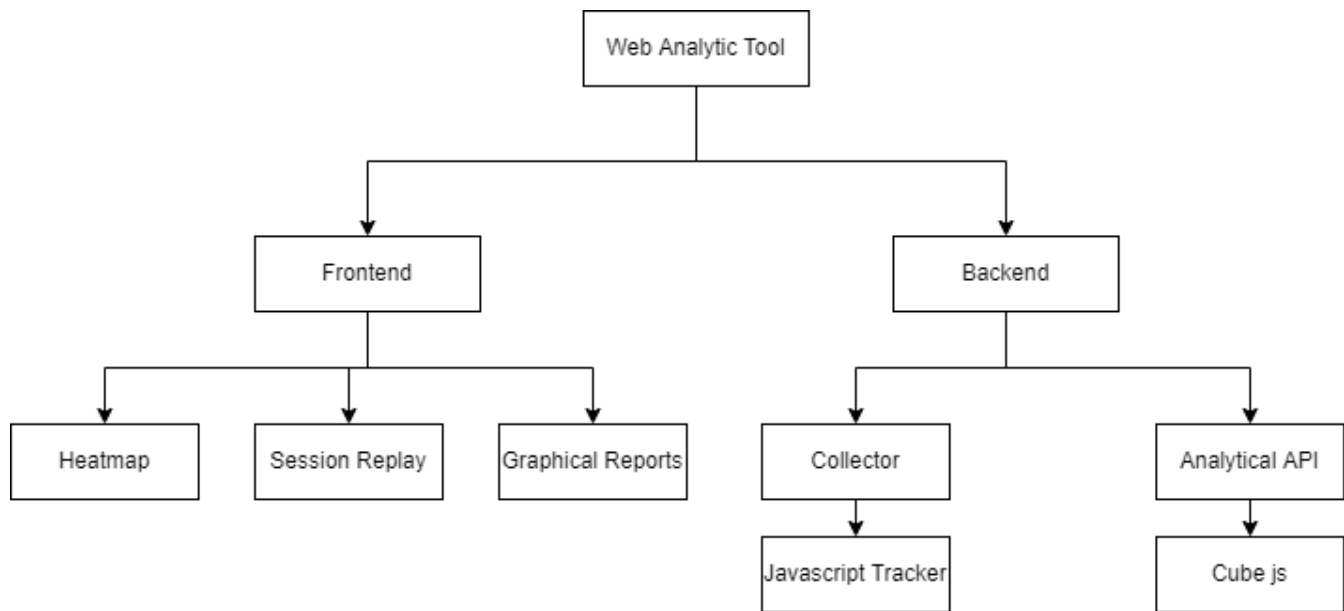

FIGURE 1 - System Architecture

The system is basically Divided into Two Parts Frontend and Backend. The backend part will collect the data from visitors while the frontend parts will visualize all the collected data in form of heatmap, session replay and graphical reports.

1)   Heatmap:
   We will create a click heatmap for collected clicks data from users. Color scale will vary from
Blue to Red. As the number of clicks on a particular coordinate   increases the red value of color will increase. App users can view the click heatmap with a custom time period. They can select the webpage of which heatmap they want to see.

2)   Session Replay:
In this module collected session recording data will get fed to replayer which will in response replay recorded sessions. On screen a list of all recordings will be shown. Users can select any recording they want to see. After clicking on any of the recording player will open in another tab.
To keep the sensitive information confidential, we will mask such input data with * symbol.
Users can change the length of recording by configuring tracker code in their main source code.

3)   Graphical Reports:

This is the last module of the system. Following data will be shown:

a)   Number of visitors

b)   Page Views

c)   Top Referrers

d)   Browser Used

e)   Location

f)   Screen Size

g)   System

4)   Collector:

This is a JavaScript file that will collect visitors event data and will send to the backend server for further processing.

5)   Cube js:

This is the analytical api we are going to use to make our session reports. Cube is an open-source library. We will use React App to communicate with Cube API.

Event Tracking:

1)   Initialize Tracking.
2)   Add event listener to document.
3)   If(event)
4)   Call the handler.
5)   Collect instance data and store it temporarily.
6)   After a specific amount of data and time send data to the server for permanent storage.
7)   Repeat the same process until the session ends.

Heatmap Generation:

1)   Add an SVG element to the screen.
2)   Append IFrame with website URL as src attribute.
3)   Read the stored file with clicks co-ordinates.
4)   Gradually increase the red value of the pixel.
5)   Repeat process for all file

Session Replay

1)   Create Frame, Cursor.
2)   Parse the data from the event object.
3)   Add a CSS cursor and create a dynamic element.
4)   Stop when playtime exceeds total record time.

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FUTURE SCOPE

•   The UI of the system could be optimized further.

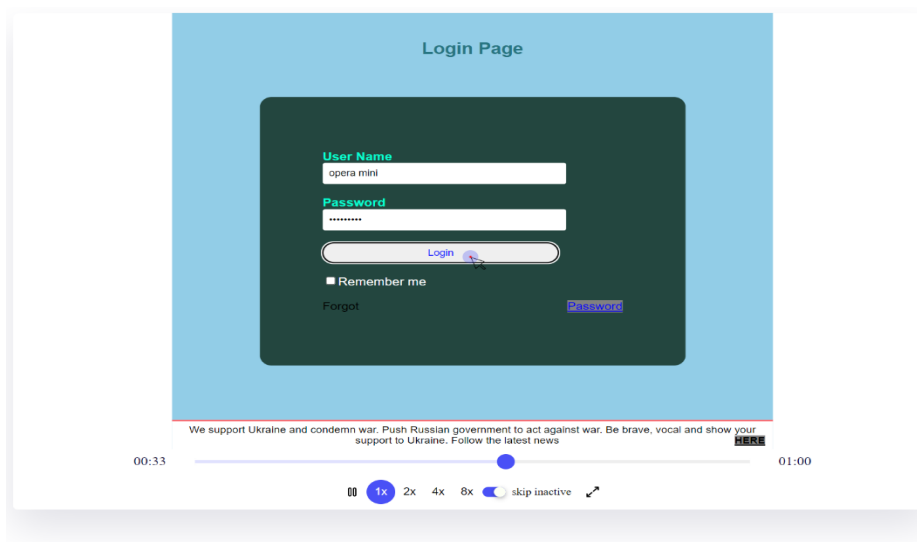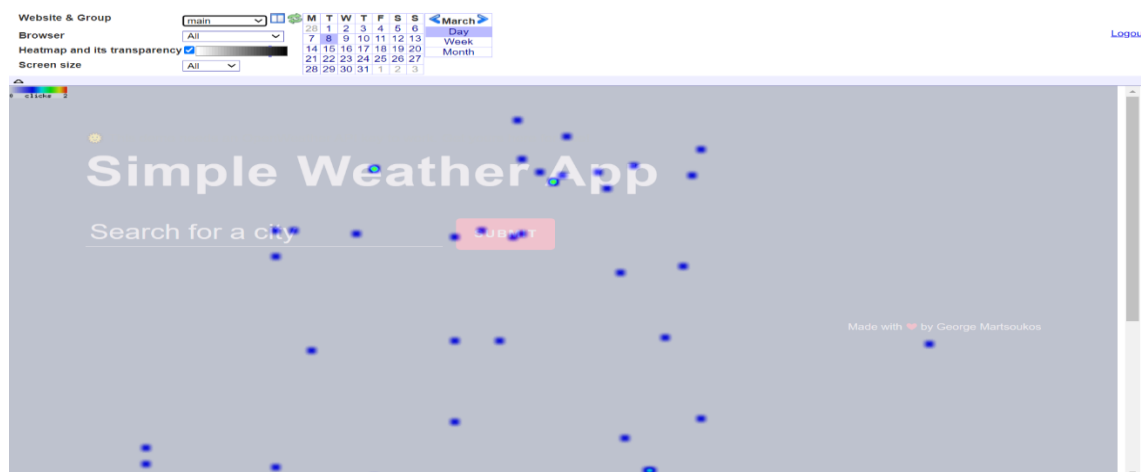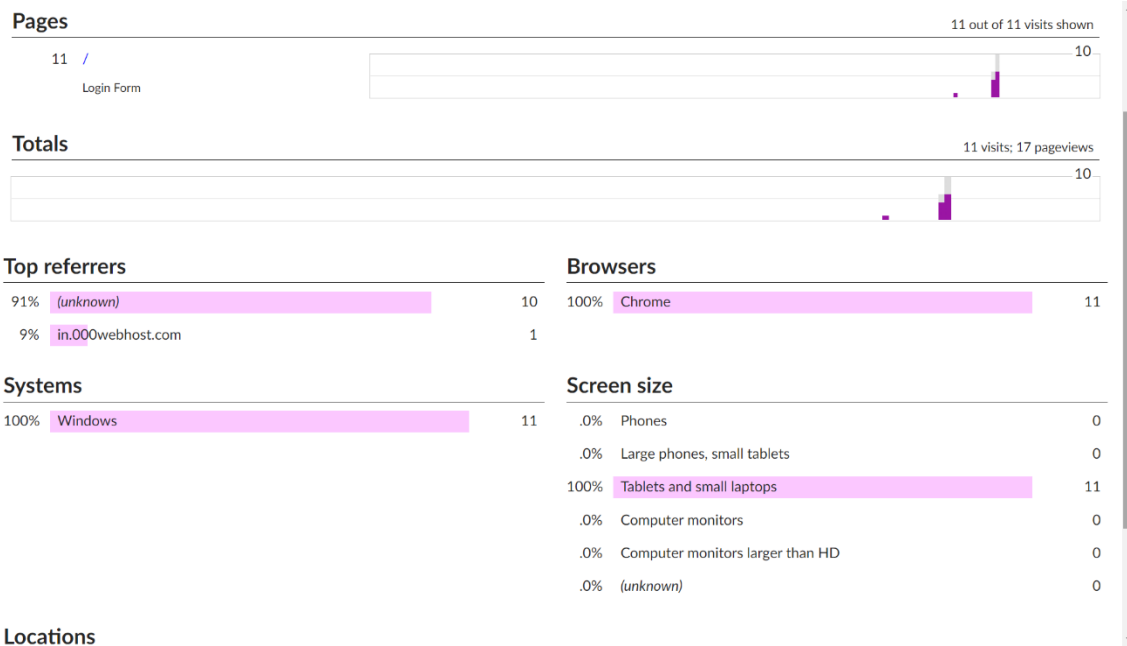•   Suggestion module could be implemented with the help of Machine Learning.

RESULTS

FIGURE 2– Web Analytics System

Pages   11 out of 11 visits shown

11   /   10
      Login Form
                                                                                          ▪   ■

Totals   11 visits; 17 pageviews

                                                                                          10
                                                                                    ▪   ■

Top referrers			**Browsers**		
91%	(unknown)	10	100%	Chrome	11
9%	in.000webhost.com	1			

Systems			**Screen size**		
100%	Windows	11	.0%	Phones	0
			.0%	Large phones, small tablets	0
			100%	Tablets and small laptops	11
			.0%	Computer monitors	0
			.0%	Computer monitors larger than HD	0
			.0%	(unknown)	0

Locations

CONCLUSION

The proposed system aims to implement web analytics platform using open-source libraries like
, snowplow analytics, cube js. Primary task of the system is to collect user generated event data interacting with the website. Cloud services from amazon will be used as the backend of the system. Use of JavaScript in the system will be useful to reduce response time of the system.

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