

PhotoStorming

GEOGRAPHIC INFORMATION SYSTEM FOR PROFESSIONAL PHOTOGRAPHERS



GRAPHICS PROPOSAL

TEAM 61
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1. Introduction

Photostorming GIS has a user-friendly interface which helps professional photographers get their perfect shots in urban locations. Our proposal will thoroughly outline our decisions regarding the visual elements and the data management. Through the usage of a coherent and intuitive colour scheme, and a sidebar to present site information, we will ensure our GIS interface is convenient and easy to use. While our categorization of locations of points of interest will avoid rendering information that may slow down our interface. By analyzing existing Geographic Information Systems, we have made informed decisions about the aforementioned design elements.

2. State of the Art Review

2.1 The Scholar Geoportal: Data Management and Visualization

The Scholars Geoportal is a GIS web platform with the scope of providing access to large scale geospatial datasets as well as search and analysis tools for the Ontario academic community [1].

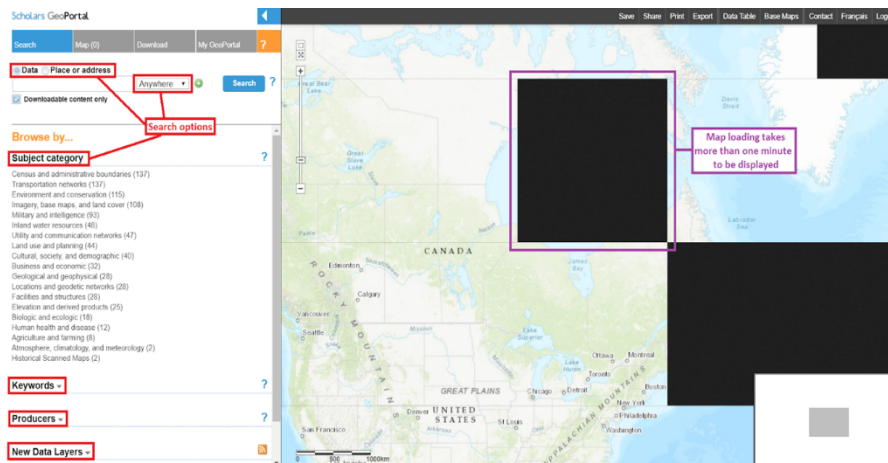


Figure 1: GIS Interface.

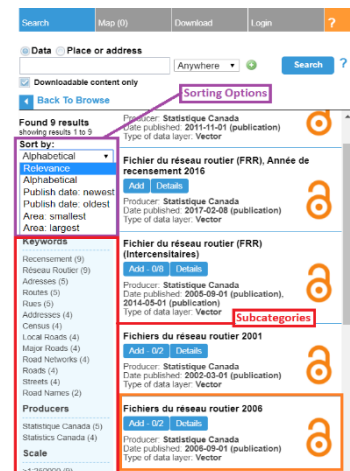


Figure 2: Data categories and sorting options.

It is a good example of how some design choices about data management and visualization have compromised the usability in terms of simplicity, responsiveness, and intuitiveness [2]. The simplicity of the GIS is compromised by the excessive number of research options provided [Figure 1]. In fact, when testing the search feature, it appeared that searching a topic using the search bar and through browsing the categories does not lead to the same endpoint; too many categories and sorting options [Figure 2] created more confusion for the users and slowed down the search process. The time taken for the map to load is also longer than one minute, resulting in insufficient responsiveness to keep the user's attention focused on the dialogue window [3].

This GIS also fails to meet the usability criteria [4] because more than one action is required to complete one simple search task, while in Google Maps one search task always corresponds to one result [5]. Taking as example a search on Ontario airports [Figure 3], an extra step is required to display the data found on the map and then another to see the legend.

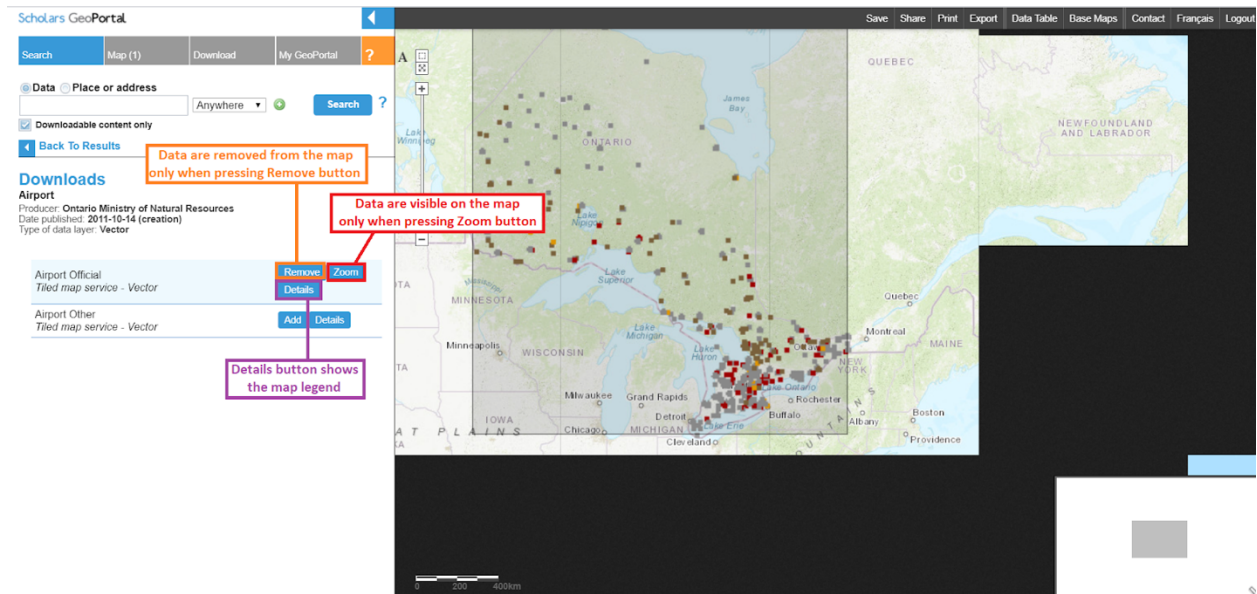


Figure 3: Searching example: Ontario airports.

2.2 Bracknell Forest Council: Nature and Wildlife GIS

The Bracknell forest council provides the public with the ability to grasp the biodiversity of the Bracknell forest and the area surrounding it through their Nature and Wildlife GIS.

The GIS makes use of more than 10 different colours to represent the data [Figure 4]. By visual inspection alone, it is clear this causes difficulty reading the map as the user is bombarded with colours that are not intuitive in what they represent. For example, the GIS uses purple to indicate geological sites and orange to indicate areas with biodiversity. Contrary to the way in which users would immediately be able to distinguish a body of water by the use of blue, orange and purple are not typically associated with the sites they represent, thus failing to give the user an intuitive understanding of their representation. Also, the number of colours cause the map to be confusing and overwhelming to look at. In fact, according to a study conducted on the effective number of colours, “when the number is more than 10, there is a trend of increase in time required... too much or too little colour categories or grades will reduce the readability of a map and make it hard to be identified.” [6]

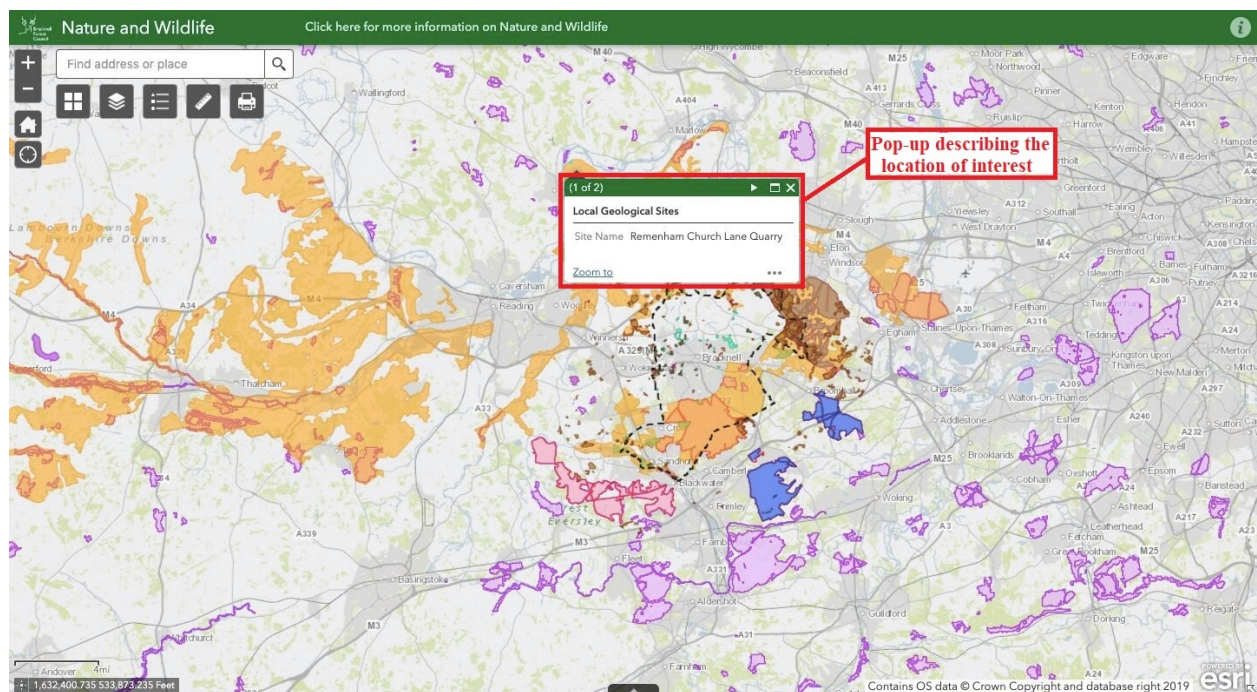


Figure 4: Nature and wildlife GIS interface.

The GIS also utilizes pop-up boxes [Figure 4] to display information about each point or area of interest. Upon clicking on a region of interest, a pop-up box appears and blocks the portion of the map. In order to access the points that the box is blocking, the user must click off the box and then click on the point. This greatly affects the usability of the map, as it makes the user click unnecessarily which could otherwise be avoided with better design.

Overall, the GIS is difficult to read as a result of the lack of intuition in colour choices and the number of colours used, while the popup boxes make the GIS inconvenient to use.

2.3 City of Toronto's Bridge and Structure Condition GIS

On the direction of the Public Works and Infrastructure Committee, the City of Toronto developed the Bridge and Structure Condition GIS to keep residents informed of the condition of City-owned structures as per their last inspection results [7]. The map uses opaque blue circles to represent transportation service structures as well as parks, forestry and recreation service structures, opaque purple stars to represent Conservation Authority service structures and Ministry of Transportation structures, and a thick red line to mark Ward Boundaries. These map markers remain constant in size on zooming in/out. The GIS allows users to search for specific streets/areas and provides required structure information in a white pop-up box that appears on the map when the user selects the particular marker that represents the desired structure [Figure 5].

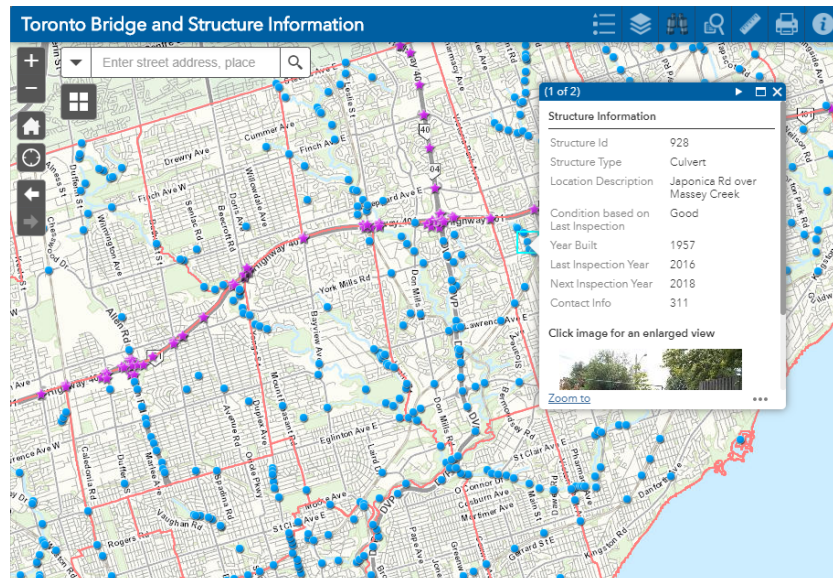


Figure 5: City of Toronto's Bridge and Structure Condition GIS interface

The GIS has an overall ambiguous and clustered appearance because of the overlap caused due to the constant size of map markers at different zoom levels and the inconvenient placement of the information pop-up box that blocks the view of the other points of interest. Additionally, the map does not have a well-established color scheme for its map markers. Clear, concise, accurate and easily interpretable symbols are a central part of all web-based applications [8]. A model-based predictive study of user-response to different colored map icons revealed a direct relationship between average user search time and selected icon color story, and concluded that the best optimization was to assign specifically distinct colors to high-frequency icons and similar, duller shades for the rest of the symbols [9]. Hence, by using general blue hues to represent all structures and bridges, the City of Toronto reduces the readability and usability of their Bridge and Structure Condition GIS.

3. Proposal

Our intended users are professional photographers and our design specifications are made to fit their best interest and intended use. The dataset will be curated so that it provides locations of scenic views of cities' skylines, historical buildings and main squares, street art and other niche spots to help photographers. The design specifications will mainly cover the amount of information that will be provided in the user interface and graphic design elements.

3.1 Data Management

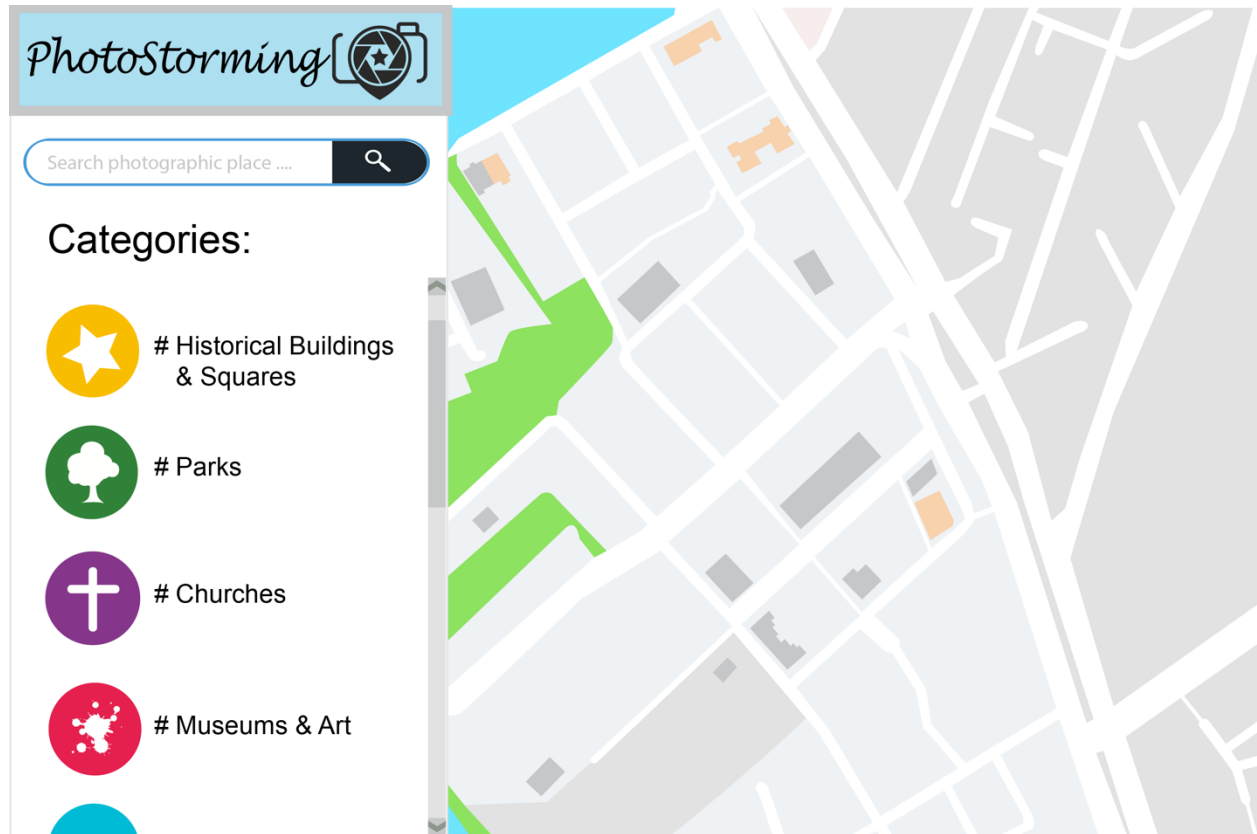


Figure 6: Photostorming interface and site categories.

The amount of data provided in the user interface will be restricted to essential categories including churches, parks and recreation areas, historical building and public squares, art locations and museums, and markets [Figure. 6]. This decision has been made to avoid the problems encountered in the Scholars Geoportal caused by information overloading [Section 2.1]. We want our map to be responsive enough to keep the user's attention and allow them to find the desired location as simply and quickly as possible. Keeping the information amount to the minimum will make the design usability higher and help increase the responsiveness of the GIS.

3.2 Points of Interest and Search Results Display

Through the SAR for the Bracknell Forest Council [Section 2.2], we learned that information about points of interest in the form of a pop-up is inconvenient. In an effort to ensure that our user does not need to unnecessarily click for site information, we will instead opt to provide information about the site in a sidebar. By doing so, we will ensure that the user does not need to exert any extra effort as the sidebar will update automatically each time the user clicks on point of interests [Figure. 7]. This is very similar to the way in which Google Maps displays information for points of interest. Keeping in mind both our personal experience of Bracknell Forest Council's GIS and the expertise of Google's UX team, we have made this decision to increase the usability of our interface.

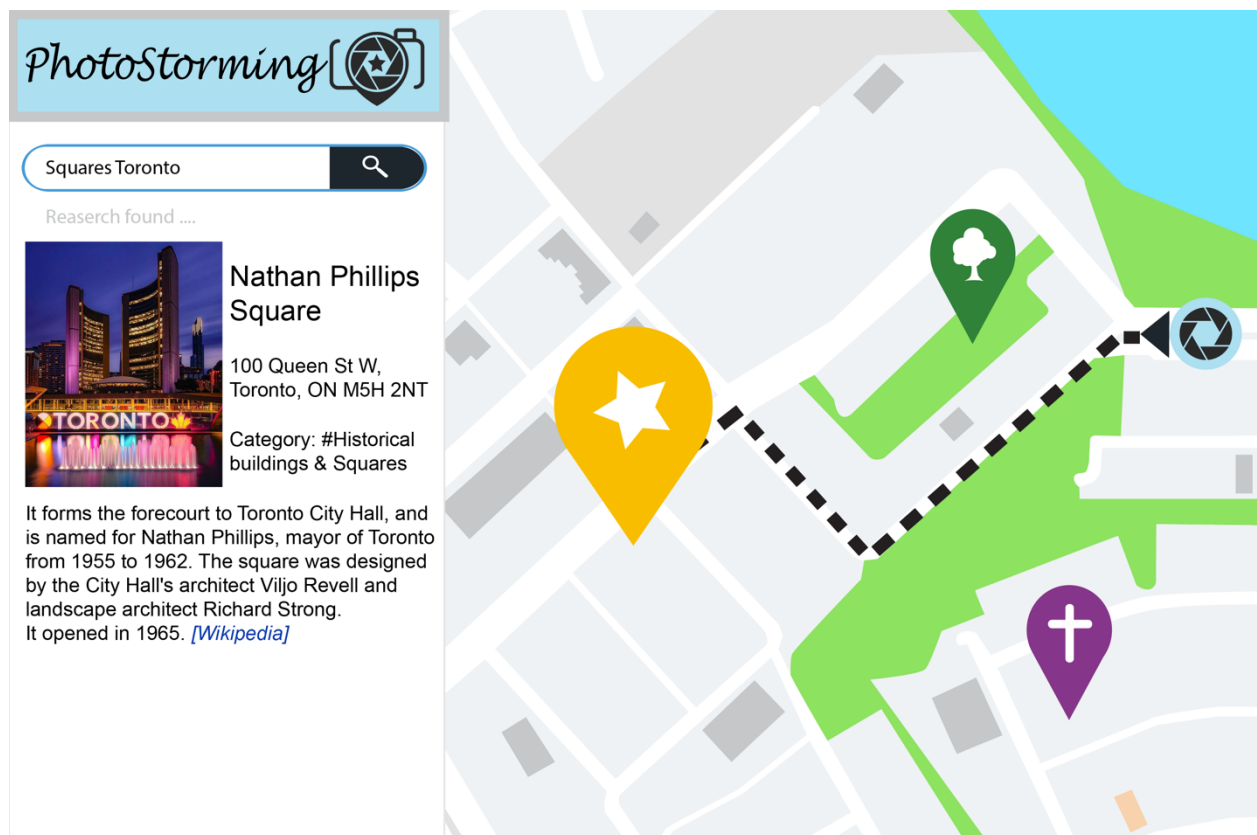


Figure 7: Sidebar for search results and point of interest information.

3.3 Colors

By assessing the Bracknell Forest Council's [Section 2.3] overwhelming use of colour, we found that the number that optimizes both map identification and the readability of the map is 10 [6]. Therefore, in representing our data, we have chosen to set 10 as our colour limit. This will ensure that the map is not ambiguous in what it is displaying and also not overwhelming to look at. Photographers will naturally pay more attention to colours, as they are in a profession that focuses on visual elements. So, it is significant that our use of colours is intuitive in their relation to the location categories they represent.

4. Testing

During the implementation of Photostorming's design, usability and responsiveness tests will be conducted. Results from these tests will make the refine the design process to assure optimal user satisfaction.

4.1 Usability

To make sure our final design meets usability criteria [4], two A/B testing will be conducted on a test sample of professional photographers. The first set of tests is aimed to determine what type of slide bar graphic is easier to use while the second one will help us understand the best information flow to help the user find the wanted location in the simplest and quickest possible way. The slide bar test will be done by testing the user performance with a vertical and horizontal scroll bar. For the second test, we will assess the user's performance when provided minimal description for locations (link to location website) versus when given a short description.

4.2 Responsiveness

According to Nielsen Norman Group, world leaders in research-based user experience, the time limit to keep the user's attention focused on the dialogue window is of 10 seconds [3]. The team will therefore perform speed tests to assure that the searching algorithms remain under this bound.

5. Conclusion

Taking lessons from our SAR, we made informed decisions regarding our colour scheme, data categorization, and results sidebar, which will ensure that our GIS interface is easy to use and responsive to our user.

6. List of References

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7. Attribution Table

Legend:

RS - Research GR - Grammar Revision
MD - Main Draft FP - Final Proofread

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Introduction	FP	GR, FP	RS, MD
SAR - Section 2.1	FP	GR, FP	
SAR - Section 2.2	FP	GR, FP	
SAR - Section 2.3	FP	GR, FP	RS, MD
Proposal	RS, MD, FP	RS, MD, GR, FP	RS, MD
Testing	RS, MD, FP	GR, FP	
Conclusion	FP	RS, MD, GR, FP	
List of References	MD, FP	FP	
Images Labeling & Prototypes	RS, MD	GR	