

## DEVELOPMENT OF A SERVICE FOR ANALYZING THE POPULARITY OF TOURIST ATTRACTIONS IN GRODNO

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*This article is about the service, which was developed as a map with visual representation of the popularity of tourist attractions in Grodno by location based on photos from Instagram for a given polygon.*

Today, due to the intensive growth in the development of information technologies and services on the Internet, a number of all kinds of websites, portals and information resources are steadily growing.

Any user can easily find a website where he can pick up information about the city or country he is interested in. In the augmented reality mode user can go through virtual museums, see photos of his countries of interest.

However, all of the above cannot be compared with a true journey. And before going on a trip, users often think about what they will visit in the city, and about what attractions they will happily pay attention to.

The actuality of the work lies in the fact that Grodno is a territory of visa-free entry to the park "Augustow Canal"[1], and, consequently, the influx of tourists into the city should significantly increase.

The purpose of creating a cartographic service is to provide tourists and residents of Grodno with up-to-date interactive information about popular spots in the city. The service also identifies local attractions, plus historical and cultural heritage. This allows tourists to orientate themselves in an unfamiliar city and see it through the eyes of its inhabitants.

A web service is any piece of software that makes itself available over the internet and uses a standardized XML messaging system. XML is used to encode all communications to a web service. For example, a client invokes a web service by sending an XML message, then waits for a corresponding XML response. As all communication is in XML, web services are not tied to any one operating system or programming language--Java can talk with Perl; Windows applications can talk with Unix applications.

Web services are XML-based information exchange systems that use the Internet for direct application-to-application interaction. These systems can include programs, objects, messages, or documents. [2]

First of all, for the development of the service, a coordinate polygon was obtained from Grodno:

Coordinates of the northern part of the city: 53 ° 45'52.7 "N 23 ° 48'28.7" E

Western part: 53 ° 40'09.7 "N 23 ° 42'59.9" E

Southern part of the city: 53 ° 36'28.4 "N 23 ° 49'05.8" E

Eastern: 53 ° 39'23.5 "N 24 ° 00'00.8" E.

The work of cartographic service is implemented as follows, which are represented in the figure 1.

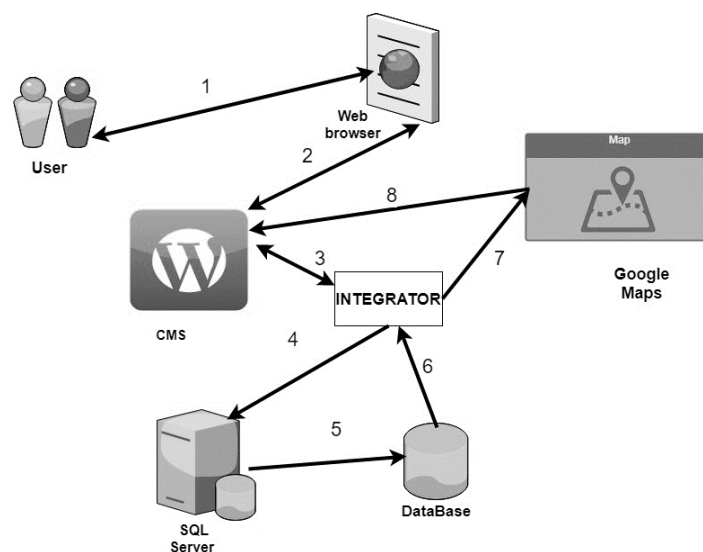


Fig. 1. The architecture of the developed service

The user enters the web browser at the specified address, the web browser in turn refers to the CMS (Content Management Software) WordPress. In order to display data to the user The CMS executes the request in the SQL server.

Requests are made through the PHP language and the MySQL Database. The server, in turn, accesses the database using SQL-queries and takes information at the user's request. In order for the user to return a map with content as a response, a query is received from the database to the integrator, which performs the function of integrating the request to the Google Maps API, where a map is formed for a given coordinate polygon with the required parameters from the user. Working with the Google Maps API is done using the JavaScript scripting language. In order to see the result, the card is transferred to the CMS platform. As a result, the user is shown a map where the total number of photos taken in this place is displayed.

Before executing all queries, the database must be filled with information. The architecture of this interaction is presented in Figure 2.

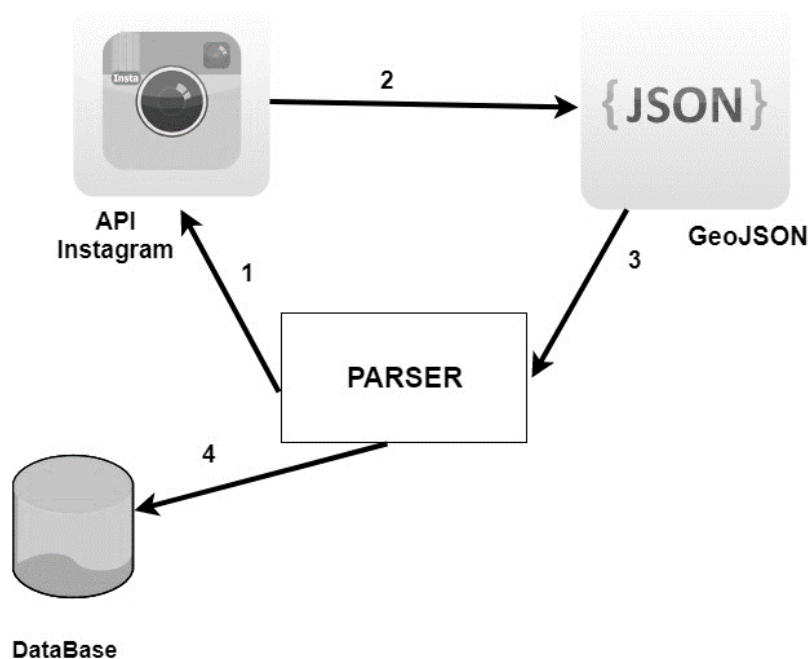


Fig. 2. Getting the geodatabase and filling the database

To access the Instagram API, first you need to register as an Instagram developer, and then register the application with Instagram Developer. After registration, you can use `client_id` and `client_secret` - this will allow you to take custom and photo data from the Instagram API. The parser, written using the Python programming language, accesses the Instagram API to retrieve the location of the photos to transfer this data to the Google map in the future. As a result, the analyzer returns a response in the JSON format. It processes this response and transfers the geographic coordinates to the database. Counting the total number of photos taken in one place is done through SQL queries.

User work with cartographic service in two modes: unauthorized user and authorized. To an unauthorized user, a city map is available that shows the total number of photos taken at different locations in the city, depending on the specified geolocation data of Instagram users; the same card is available to the authorized user and the ability to select certain criteria for map formation is added. So the user can select a certain period of time, at this point the query is sent to the database in the database for this period, then using the integrator and the PHP language, geolocation data from the database is mapped to Google Map coordinates and with the help of JS and GoogleMapsAPI the data is drawn on the map, presented in the CMS platform. Thus, based on a custom map, the user can see which places were popular for the period he selected. Also, the user has the ability to work only with the data of his account. If in your account in the Instagram the user has photos stored in Grodno with a marked geolocation, then a parser is started which fills the database for this user, where a map with visual analysis of the sights popularity of this particular user is presented.

As a result, a cartographic service was developed, which is a map with visualization of the analysis of the popularity of tourist attractions in Grodno by geographical coordinates of photos from the social network of Instagram for a given range.

## REFERENCES

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2. What are Web Services? [Electronic resource] // Tutorialspoint. – Mode of access: [https://www.tutorialspoint.com/webservices/what\\_are\\_web\\_services.htm](https://www.tutorialspoint.com/webservices/what_are_web_services.htm). – Date of access: 15.02.2018.