

## TOPIC VISUALIZATION

Tag clouds aid users to recognize at a first glance what a group of various documents is about by displaying the most relevant words or topics.



Figure 1: Artistic tag cloud using Wordle

The **objective** is to deploy a web platform which generates tag clouds with meaningful information extracted from a collection of documents. This work focuses on such an insightful *visualization* of the topics in the documents.

## TACKLING THE PROBLEM

Several aspects were taken into account when choosing the right information to put in the tag cloud, such as:

**Stopword filtering** Unimportant words in the given context were discarded. Solved with *String matching algorithms* [2].

**Word stemming** Words with the same root were grouped together. Resolved with the *Snowball* [6] library.

**Language detection** Articles in other languages were to be excluded from the tag clouds. Resolved with the *language-detection* [4] library.

**The tag cloud** Manage structure and appearance of a tag cloud. Resolved with the *OpenCloud* [5] Java library

**Portability** As the intention was to reach as many users as possible, a web environment was chosen. Technologies used: *HTML5, CSS, Javascript, Servlets*

## INITIAL SOLUTION

The initial solution made use of OpenCloud, a Java library that aids the creation of tag clouds for the web. Using HTML and CSS, the tag cloud was given a simple styling and presentation.

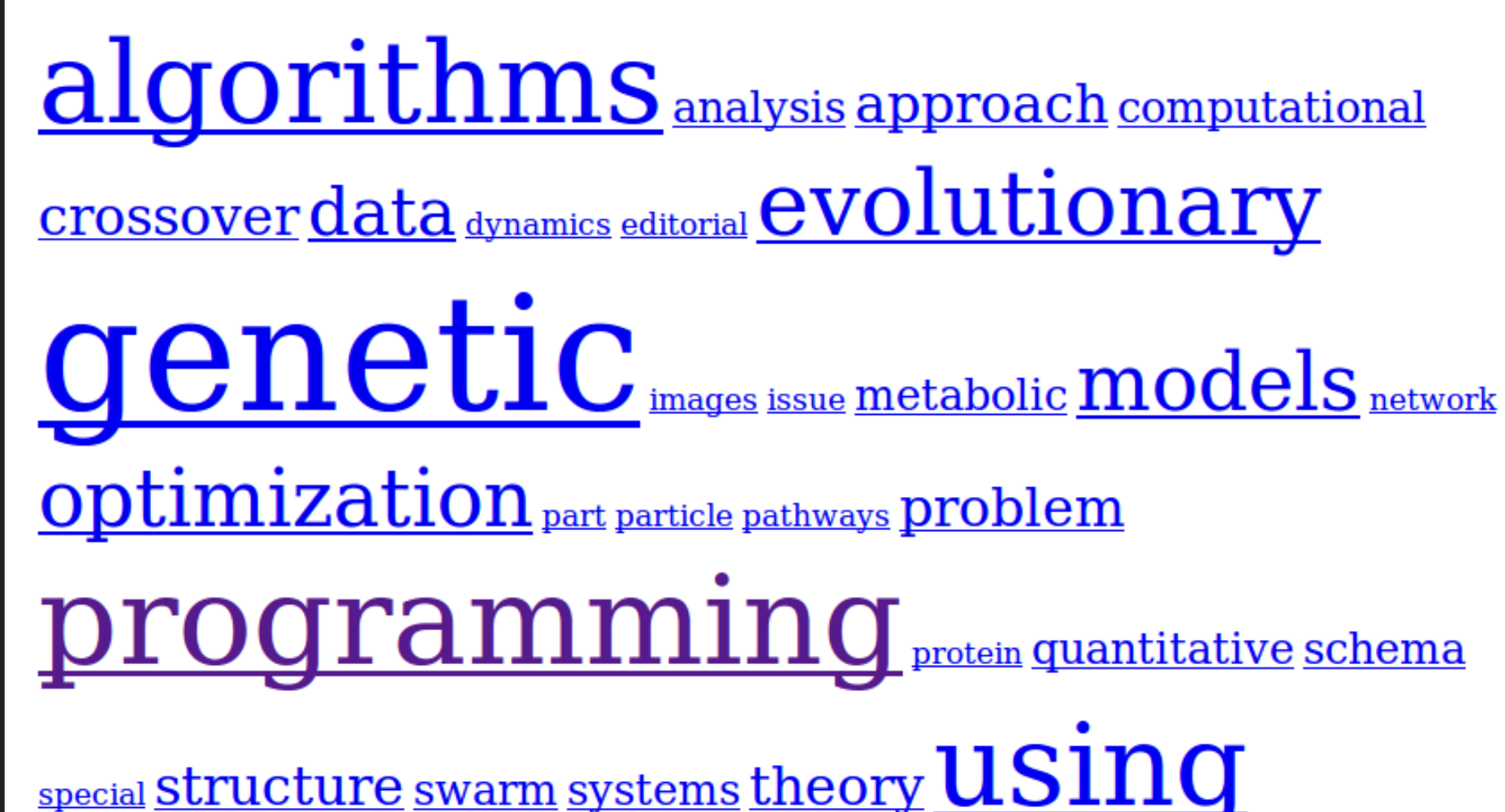


Figure 2: Tag cloud using OpenCloud

## SEMANTIC APPROACH

Rather than focusing on the artistic side of tag clouds, like most tag cloud tools do, an approach on **semantic similarity** between topics was taken. As such, the position of each topic is determined by the semantic similarity of itself and its surroundings.

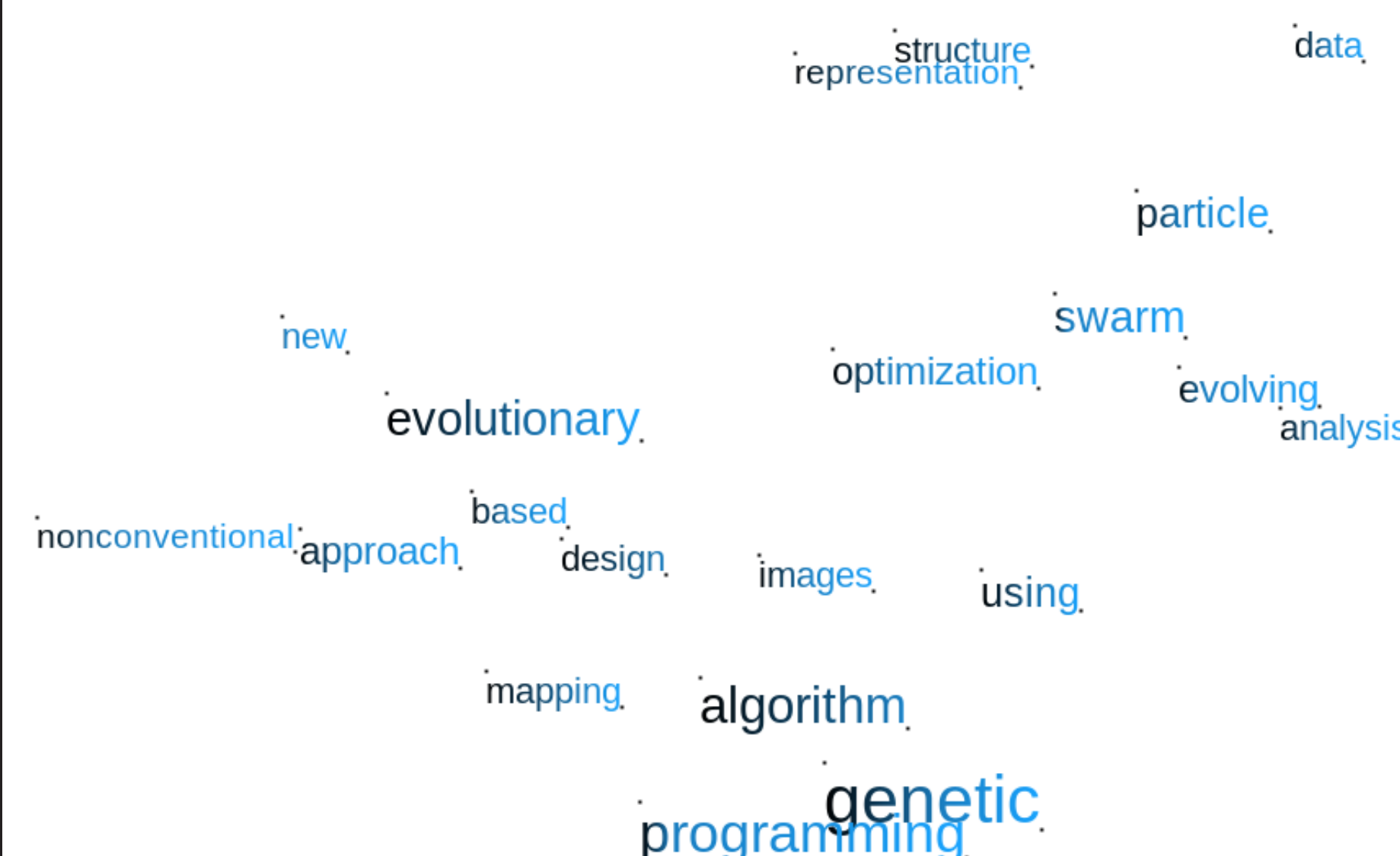


Figure 3: Topic grouping with gradients

It might be of interest knowing how active or inactive the topics have been throughout the years. For such cases, a **two-color gradient** is used, such that the brighter the color, the more active it is.

## INDEXING DOCUMENTS

In order to quickly search through the documents by typing a keyword, a structure known as an index was used. The tool used to index the groups of articles, Solr, provides a simple interface between the data stored and the means of returning the desired information in a web environment.

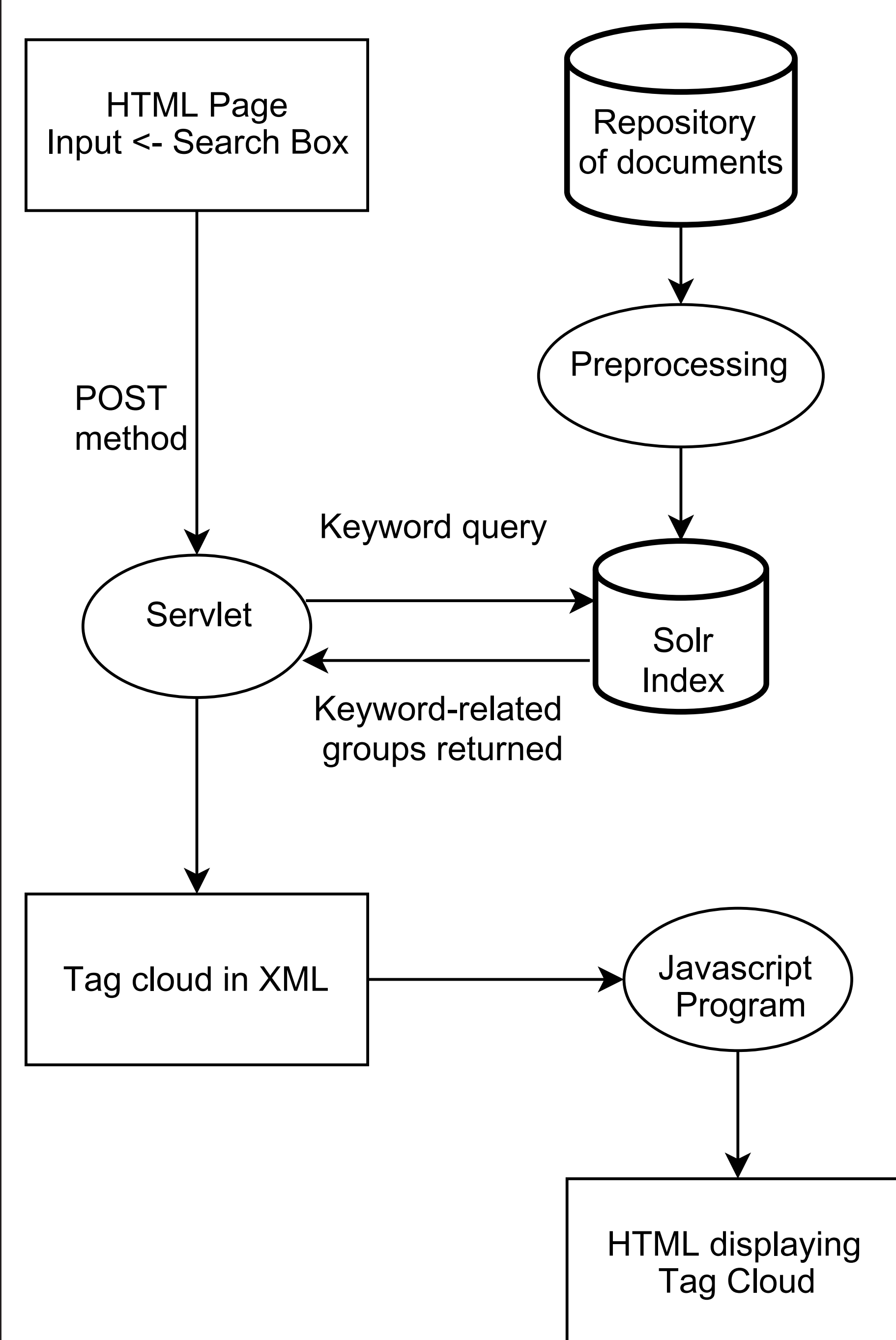


Figure 4: Overall Software Architecture

## USER INTERACTION

The first step to allow interaction with the tag cloud was through the functionality of clicking a word in the tag cloud and firing an event for that particular word. A match between the cursor's coordinates [3] and each of the words' coordinates is considered.

## FUTURE WORK

The **motivation** for creating *insightful* topic tag clouds has been shown, and a candidate **architecture** to deploy a web platform with such functionality has been presented.

Key points for further development are:

**Data retrieval from tag cloud** Through user interaction, more information about the selected topic can be obtained, such as researchers involved.

**Generation on the web** Given a document from the index in XML, a tag cloud should be generated.

## REFERENCES

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