UNIVERSITÀ DEGLI STUDI DI PADOVA

DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE

Web Applications, A.Y. 2018/2019
Master Degree in Computer Engineering
Master Degree in ICT for Internet and Multimedia

Homework 1 – Client-side Design and Development

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Objectives

The objective of this project is to build a Web Application to explore and visualize 20 years of CLEF publications in an interactive and catchy way. The goal is to make as much easier as possible the navigation through the site and make sure that all the papers are accessible. The users must also have the chance to create an account and to log into the website.

Main functionalities

The main functionalities of our Web Application are:

- Easily navigate through the site using the nav bar which is accessible from any page;
- Search papers by title , author or year of publication through a search form;
- Navigate through a dynamic graph in order to search for a specific author's profile;
- Provide a complete list of CLEF publications, sorted in alphabetical order and organized by title, authors, year of publication and mdate;
- Possibility of being redirected to SpringerLink official website in order to get all the information about papers;
- Log in to the site;
- Provide a complete list of CLEF authors, sorted in alphabetical order, and possibility of visualizing some author statistics, such as period of activity and most important collaborators.

Design choices

The application is divided into 4 pages (+1 for the sign up) which are organized in an horizontal navigation structure at the top of the page just below the logo. The pages are:

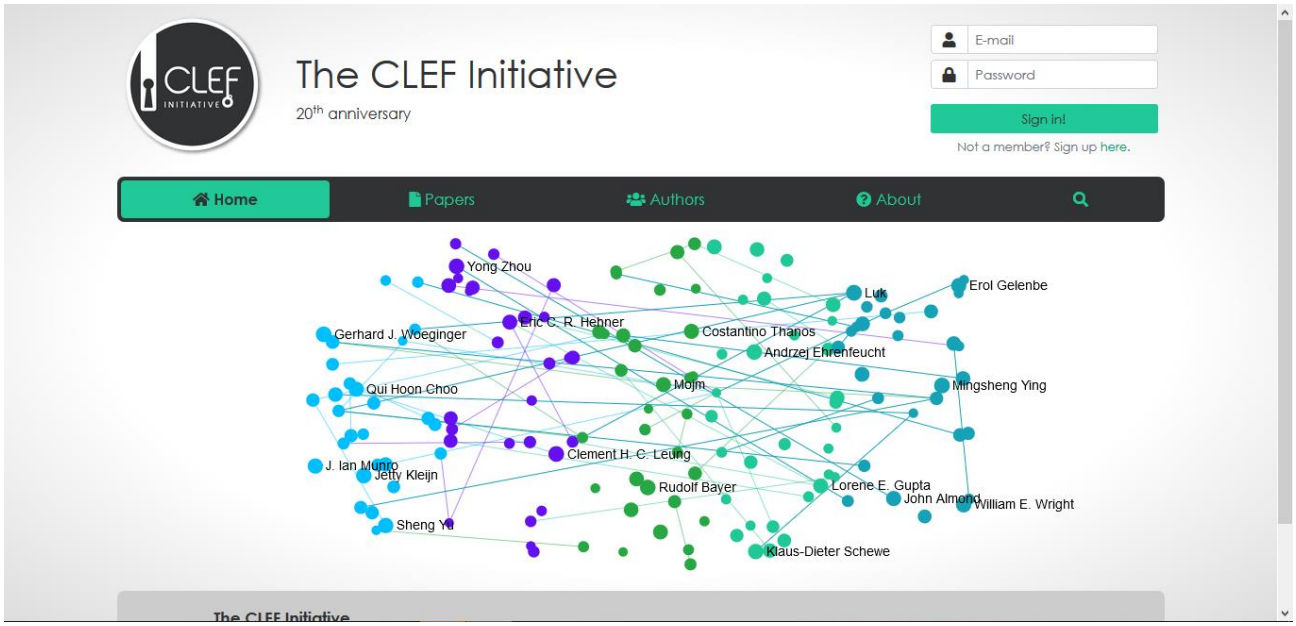
- **Home Page**, which shows an interactive graph representing the main authors (classified according to a PageRank algorithm).
- **Papers Page**, which contains a list of all the papers.
- **Authors Page**, which contains a list of all the authors.
- **About Page**, which presents a brief general description of CLEF. In this page it is also possible to send an information message and explore external sites related to CLEF.

The top left part of all the pages shows a clickable image of the CLEF logo which takes to the Home Page whenever the user clicks on it. It also presents the title of the page and the subtitle.
In the top right corner there is a form which allows the user to easily log in to the website. For the users which are not already signed up there is a link that allows to register to the site through a Sign Up Page.
The navigation bar is the same for all the pages and it contains also a collapsible search item. To activate the search form the user has to point with the mouse cursor over the search button, represented by a search icon: at this point an input form will drop down with an animation. The user can search papers by title, author name or year of publication. To hide the input form for the search, the user can simply move the mouse pointer outside the form. The nav has a dark background color taken directly from the official CLEF logo, while the text elements have a light green (Teal) color choosen from the Bootstrap documentation (https://getbootstrap.com/docs/4.3/getting-started/theming/#color) . When the mouse is moved over a button, its background becomes white and its text dark. For the active button (for the selected page) instead the background color is Teal green with dark bold text and the text becomes white whenever the mouse is moved over. Besides the text elements indicating the various pages (Home, Papers, Authors, About), also an icon, taken from the Font Awesome catalogue, is present in the buttons.
The footer of the page reports some general informations about CLEF and it is placed at the bottom of the page. It also allows the user to simply return to the top of the page just by clicking “Go on Top”.
All the links are colored in Teal green and become dark whenever the user moves the pointer over them.
The various elements are designed with rounded borders and all the buttons (except for those contained in the navigation bar, described before) have Teal green background and dark text: whenever the user moves the mouse over them, the background becomes dark, the text white and also a light green border is highlighted around the button.
All the elements (nav, buttons, forms …) have been created using Bootstrap, which has been used also for the general grid layout of the page.

Parsing and Analysis

The data used to build the interactive graph are taken from the dblp.xml document, provided by the Schloss Dagstuhl, through the use of a parser coded in java. Due to dimension of the xml document, a Stax Parser approach is used. Each publication's data is stored in a subclass of the Paper class. The superclass store all the data shared by all the different type of publications: Title, mdate, key year, ee and authors. All the additional mandatory information about the specific type of publication is stored in variable belonging to the subclasses. The outputs of the parser are an ArrayList of all the Paper objects, an ArrayList of all the Www objects (a particular Paper subclass object stored apart from the others) and an ArrayList of all the Author objects. The Author class object store the name of an author and the list of Paper objects in which he has contributed. Those ArrayList objects are passed as input to other classes that the perform the real analysis on the data and provide JSON file of the results.
The Analysis consists in a PageRank and in a Clustering algorithm that ranks the authors according to the number of their coauthor and that divide the into clusters. Moreover we have extracted some other informations, such as the number of publications per year and the number of publications per main coauthor of each author.

Home



In the Home Page we inserted an "author-collaborations network", represented as a graph in which nodes are authors and edges corresponds collaborations between authors. The size of a node indicates the total number of collaborations the author represented by that node has had: therefore, the larger a node, the more collaborations.

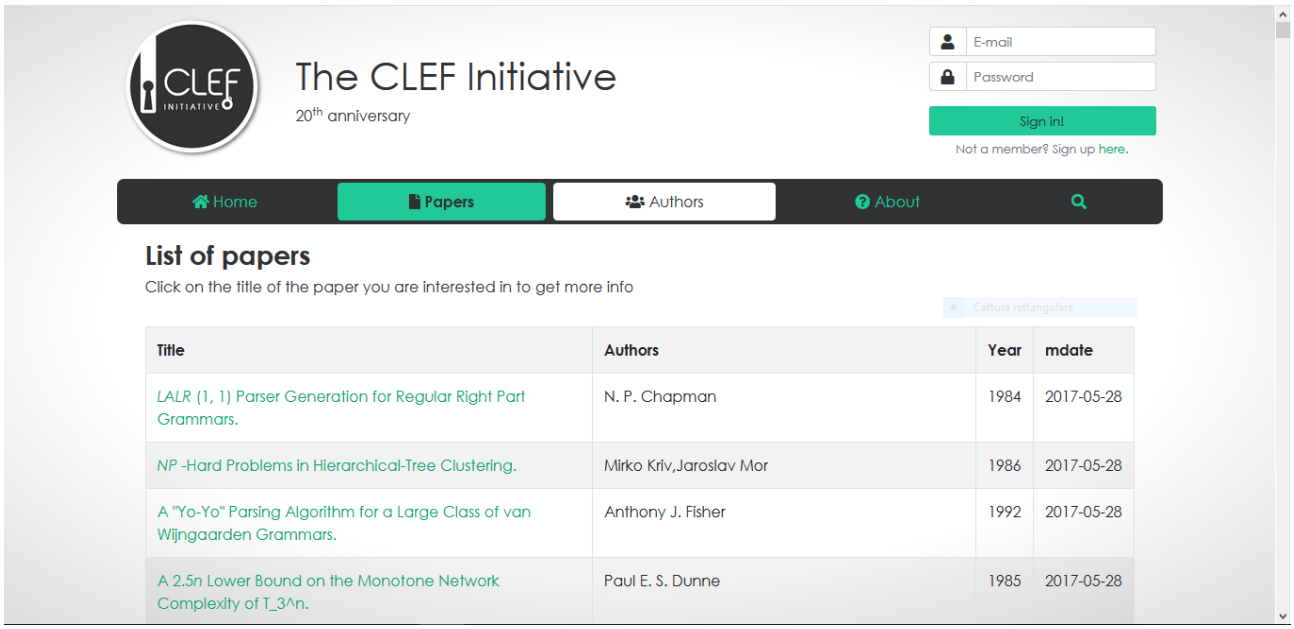
We used an adaptive PageRank algorithm to rank all the authors, in order to find which are the most “important” nodes of our network. Then, to display the graph more clearly in our home page, we ran a clustering algorithm on the network, and assigned a different color to the nodes and edges according to the different clusters.

It is also possible to navigate through the graph, zoom in and zoom out and, by simply clicking on a node, open the summarizing page of the author associated to that specific node.

Papers

The Papers Page contains a table which collects all the CLEF publications. Each publication, sorted in alphabetical order, is characterized by the following descriptive parameters:

- **Title**
- **Authors**
- **Year** of publication
- **mdate** : the date of the last modification of the document



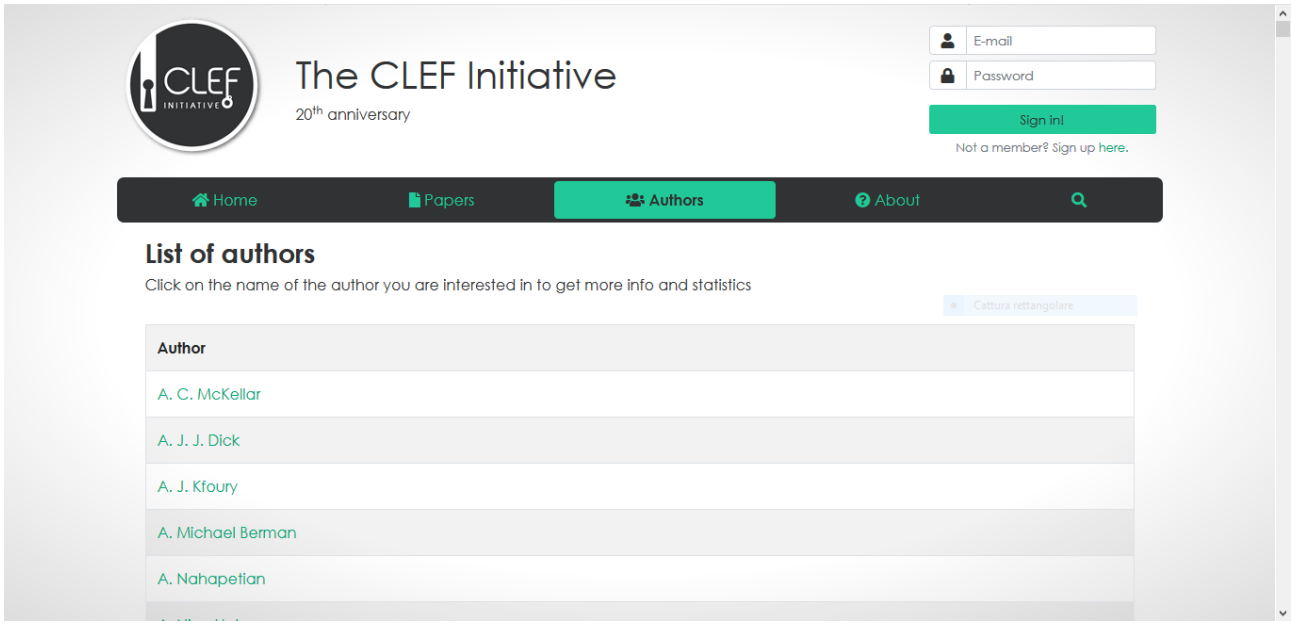
We introduced in our application the following feature: by clicking on the title of the publication of interest, the user is redirected to the SpringerLink official website, which is an online collection of scientific, technological and medical journals, books and reference works.
In this way, we allow the user to have more information about the publication: for example, he can have access to the abstract, he can get a preview of the PDF file, check prize, copyright information and so on.

For example, if the user is interested in the article “LALR(1,1) parser generation for regular right part grammars”, he just need to click on the name of the target article and the following page will open:

Scrolling down this page, the user will be able to retrieve all the necessary information about the article.

Authors

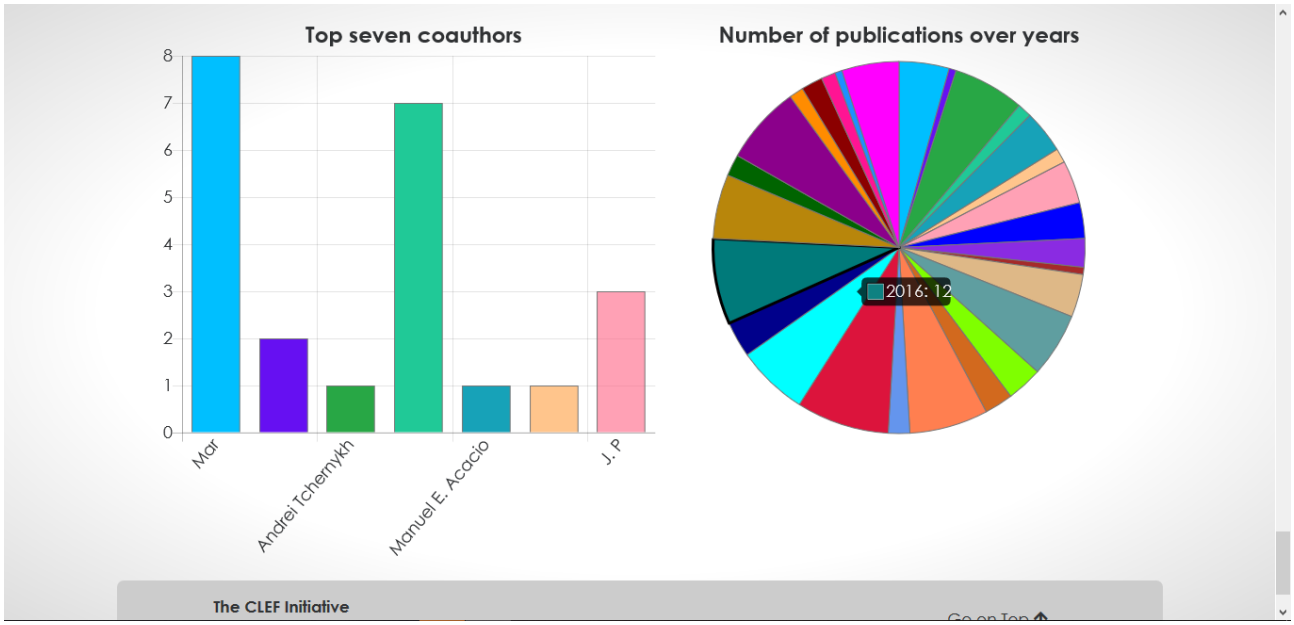
The Authors Page contains a list, sorted in alphabetical order, of all the authors appearing on the collection of the CLEF publications.



As for the Papers Page, we included the possibility of clicking on the name of the author of interest: by doing this, a page which summarizes the profile of the specific author will open.
In this page, the user can find:

- the name of the author
- a list of all his publications
- a bar chart showing both the names of the 5 authors with whom he collaborated the most (i.e., his main co-authors) and the number of times they worked together
- a pie chart showing the period of activity of the author: through this graph, the user is able to view the number of publications made by the author, year by year.

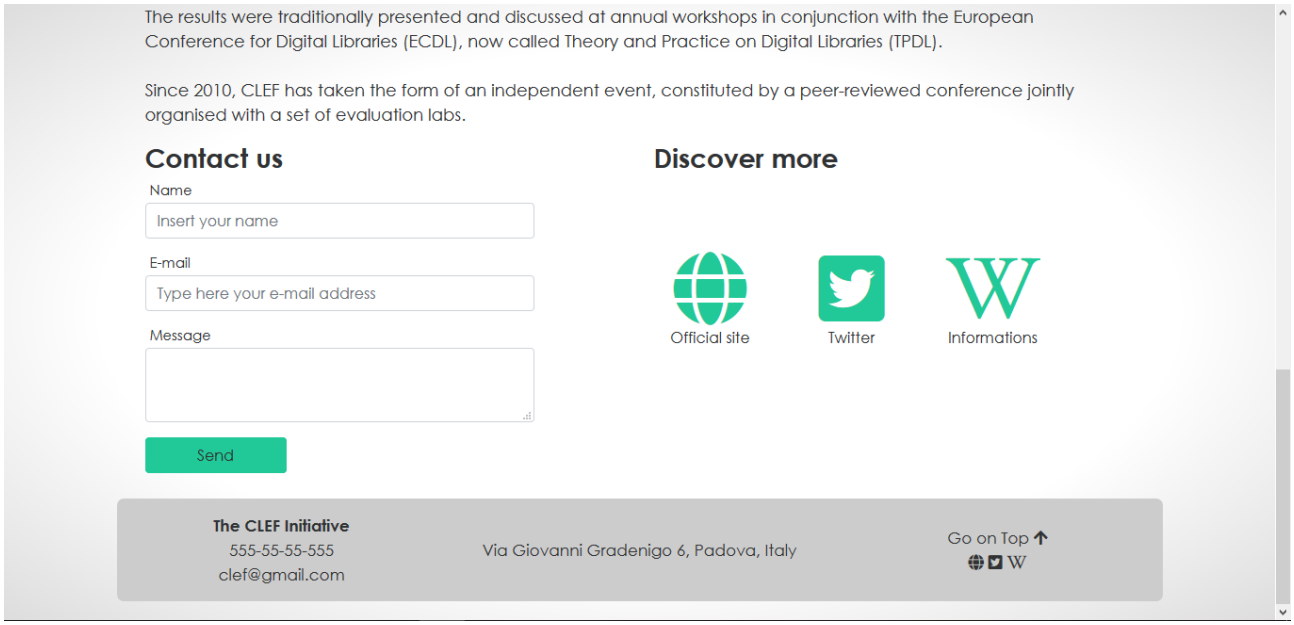
For example, if the user is interested in viewing the profile of an author, he just need to click on the name of the target author and the following charts will appear:



The bar chart shows his main collaborators (in this case, the target author made 8 publications with “Mar”, 3 with J.P. etc..), while the pie chart shows that the year in which he produced more articles is 2016 (in this case, 12 publications).

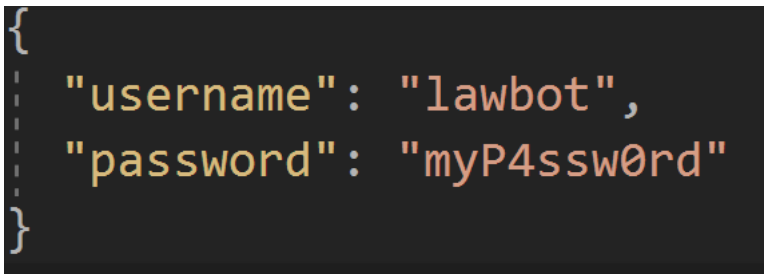
About

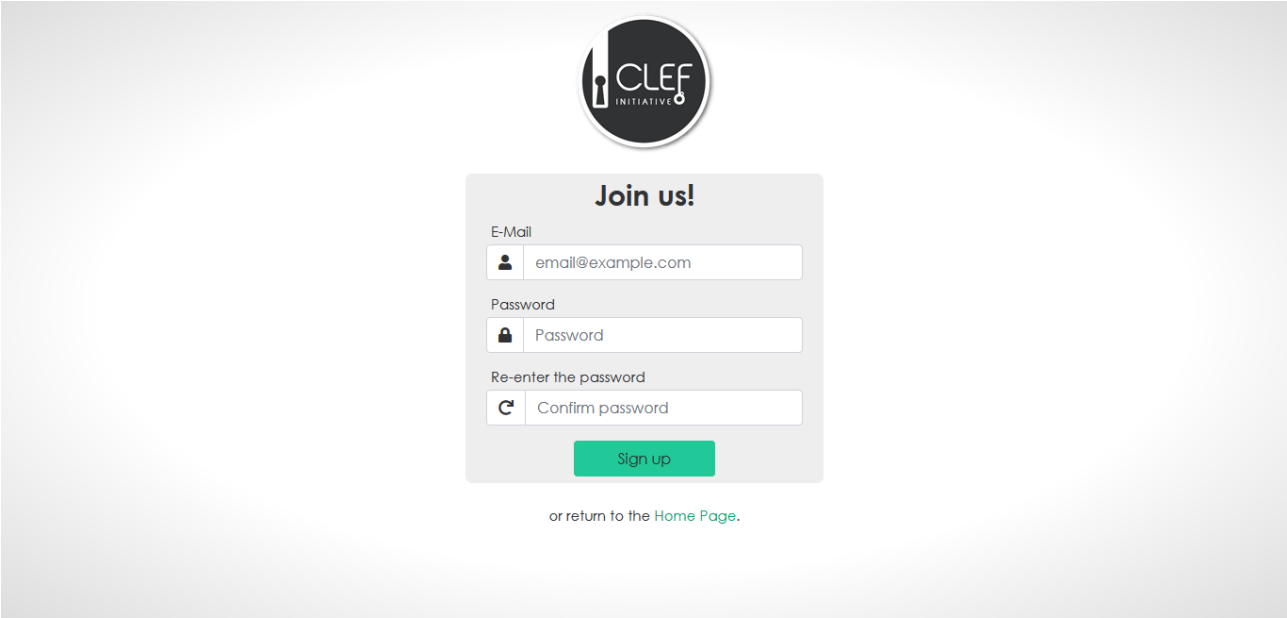
The about page reports some general informations about CLEF.
The first part is composed by an “About us” paragraph in which two unordered list and one ordered list are present. At the bottom, the page is divided in half by using Bootstrap. The left section is called “Contact us” and presents a fill in form in which the user has the possibility to send a message for informations. The user has to insert Name and E-mail in two different input forms which are required in order to have the possibility to send the message. The message is written in a text area which allows to insert multiple rows of text. The section at the bottom right part of the page is called “Discover more” and contains three useful links for the user represented by three icons. From left to right, the first icon refers to the official site of CLEF, the second refers to the Twitter page while the third one refers to the Wikipedia page.



Sign up

The user can log in to the site from any page by compiling the form placed in the top right corner of the pages. This form requires the e-mail and the password of the user: the input can be submitted by clicking the Sign in! button. Alternatively, he can Sign up to the site by clicking in the link below the input form.





In the Sign Up Page it is possible to create an account to access the page. As shown in the image, all the elements are disposed in the centre of the page. At the top there is the CLEF logo from which the user can go to the Home Page by clicking in it.

Below the logo there is a form which presents 3 inputs to insert, all mandatory, and a Sign up button to send the form. The first one is the e-mail address of the user. When the user inserts a non-valid e-mail address, the site notices the error by displaying a red message under the E-mail input form. The second input to insert is the password: it must be at least 5 characters long so, as seen for the e-mail, an error message appears if the user inserts a short password. Finally, the user must verify the password's correctness and the error message occurs when the second password is different from the first one: this error message can appear only after the Sign up button is clicked.
All the input forms have an icon placed in the left side: if the user clicks in the icon the cursor will appear in the form so that the user can begin writing text.
Finally, at the bottom of the Sign Up Page the user can return to the Home Page.