UNIVERSITAT POLITÈCNICA DE VALÈNCIA

_ TELECOM ESCUELA TÉCNICA VLC SUPERIOR DE INGENIERÍA DE TELECOMUNICACIÓN

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

School of Telecommunications Engineering

DESIGN AND DEVELOPMENT OF A WEBSITE FOR PROMOTING LOCAL TOURISM IN LA RIBERA ALTA REGION

Bachelor's thesis

Bachelor's degree in Telecommunication Technologies and Services Engineering

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Resumen

El objetivo principal de este proyecto es diseñar y desarrollar una página web que promueva el turismo en la comarca de La Ribera Alta de Valencia. El proyecto consiste en una página web centrada en los municipios de La Ribera Alta y sus lugares de interés. La página web se divide en dos partes: una parte para los usuarios y otra para los administradores. Los usuarios pueden navegar por la página, ver los lugares turísticos y las publicaciones de los otros usuarios mientras que los administradores gestionan el contenido que se muestra a los usuarios, actualizando y manteniendo la información de la web. Para el desarrollo de este proyecto, se ha utilizado MySQL WorkBench para la creación de la base de datos, y los lenguajes de programación CSS, JavaScript y PHP para la construcción de la página web. Además, se han empleado las librerías de Bootstrap para agilizar el diseño gráfico y Google Maps JavaScript API para integrar mapas en la web. También se ha utilizado la tecnología de Chat GPT para asistir en la creación del contenido visual del sitio. En resumen, este proyecto busca realzar el valor turístico de La Ribera Alta mediante una plataforma digital que facilite el descubrimiento de sus encantos. A través de una combinación de diseño cuidadoso, desarrollo tecnológico y contenido relevante, se espera que esta página web impulse el turismo en la región y la dé a conocer a un público más amplio.

Palabras clave:

Ribera Alta; Página web; Turismo; MySQL WorkBench; CSS; JavaScript; PHP; Bootstrap; Maps JavaScript API;

Resum

L’objectiu principal d’aquest projecte es dissenyar i desenvolupar una pàgina web que promogui el turisme en la comarca de La Ribera Alta de València. El projecte consisteix en una pàgina web centrada en els municipis de La Ribera Alta i els seus llocs d'interès. La pàgina web es divideix en dos parts: una part pels usuaris i una altra pels administradors. Els usuaris poden navegar per la pàgina, veure els llocs d’interès i les publicacions dels altres usuaris mentre que els administradors gestionen el contingut que es mostra als usuaris, actualitzant i mantenint la informació de la web. Per al desenvolupament d’aquest projecte, s’ha utilitzat MySQL WorkBench per la creació de la base de dades, i els llenguatges de programació CSS, JavaScript i PHP per la construcció de la pàgina web. A més, s’han emprat les llibreries de Bootstrap per agilitzar el disseny gràfic i Google Maps JavaScript API per integrar els mapes en la web. També

s'ha utilitzat la tecnologia de Chat GPT per assistir en la creació del contingut visual del lloc web. En resum, aquest projecte busca realçar el valor turístic de La Ribera Alta mitjançant una plataforma digital que facilite el descobriment dels seus encants. A través d'una combinació de disseny acurat, desenvolupament tecnològic i contingut rellevant, s'espera que aquesta pàgina web impulse el turisme en la regió i la done a conèixer a un públic més ampli.

Paraules clau:

Ribera Alta; Pàgina web; Turisme; MySQL WorkBench; CSS; JavaScript; PHP; Bootstrap; Maps JavaScript API;

Abstract

The main objective of this project is to design and develop a website that promotes tourism in La Ribera Alta region of Valencia. The project consists of a web page focused on the towns of La Ribera Alta and its places of interest. The website is divided into two parts: one part for users and another for administrators. Users can browse the page and see tourist places and other users' posts while administrators manage the content shown to users, updating and maintaining the information on the website. For the development of this project, MySQL WorkBench has been used to create the database, and the programming languages CSS, JavaScript and PHP to build the web page. In addition, the Bootstrap libraries have been used to speed up the graphic design and the Google Maps JavaScript API to integrate maps into the web. GPT Chat technology has also been used to assist in the creation of the site's visual content. In summary, this project seeks to enhance the tourist value of La Ribera Alta through a digital platform that facilitates the discovery of its charms. Through a combination of careful design, technological development and relevant content, this website is expected to boost tourism in the region and make it known to a broader audience.

Keywords:

Ribera Alta; Website; Tourism; MySQL WorkBench; CSS; JavaScript; PHP; Bootstrap; Maps JavaScript API;

EXECUTIVE SUMMARY

CONCEPT (ABET)	Done? (Y/N)	Where? (page numbers)
1. IDENTIFY:		
1.1. Problem statement and opportunity	Y	1
1.2. Constraints (standards, codes, needs, requirements & specifications)	Y	17
1.3. Setting of goals	Y	16
2. FORMULATE:		
2.1. Creative solution generation (analysis)	Y	1-2
2.2. Evaluation of multiple solutions and decision-making (synthesis)	Y	1-2
3. SOLVE:		
3.1. Fulfilment of goals	Y	32-35
3.2. Overall impact and significance (contributions and practical recommendations)	Y	35

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1. Introduction

1.1. Justification

Today, tourism is one of the most important economic and cultural activities a region or country can have. Tourism can become a substantial economic boost for the development of a country or region. This is a well-known fact in Spain, the second country in the world to receive the most tourists in 2023. Therefore, La Ribera Alta remaining as a barely known and poorly promoted territory is a missed opportunity. Especially being a region with great tourist potential with its rich historical and artistic heritage and beautiful natural landscapes, and being within the Valencian Community, a community that attracted 10.2 million foreign tourists and 17.9 million domestic tourists last year. For this reason, taking advantage of the knowledge we learned during our GTDM (Degree in Digital and Multimedia Technology), we have chosen to develop a website to promote this region, which is unknown to most. We have decided to use precisely a website to promote tourism in the Ribera Alta and not any other application or activity for several reasons. First, a website offers wide dissemination and accessibility, reaching a global audience 24 hours a day from anywhere in the world. This assures maximum exposure to attract both domestic and international tourists. Additionally, unlike other media, such as printed brochures, a website is easy to update. This ensures that information is updated so the users view the most accurate information. Web technologies also enable the creation of a scalable site that can grow with increasing visitors and content. The use of content management systems (CMS) facilitates the efficient management of large amounts of information. In terms of sustainability and costs, the development and maintenance of a website is usually more sustainable and less expensive in the long term compared to producing printed promotional material, which is crucial in terms of efficiency and sustainability. (*La Ribera Alta; España - Turismo Internacional 2024;* Turismo, 2024; *Los 10 países más visitados del mundo en 2023*)

The training provided by our degree in technologies for graphic design, animation, and audiovisual production allows me to create a visually attractive and immersive experience. Thus offering a more prosperous and dynamic presentation of the Ribera Alta. Additionally, user interface design and usability, key components of the degree, allow me to create an intuitive and easy-to-navigate website. This improves the experience of tourists, allowing them to interact with interactive elements and maps, making it easier to plan their visit. Finally, the focus of the Degree in Digital Technology and Multimedia (GTDM) on digital transformation makes using a website a natural choice. The website is not only a promotional tool but also a practical demonstration of our skills in creating, distributing, and exploiting

digital content. In summary, using a website maximizes the skills acquired in our degree, offering a versatile, interactive, and effective platform for promoting tourism in the Ribera Alta. (*Bienvenido al GTDM*, 2019)

1.2.Description

This project consists of a web page focused on the municipalities and prominent places of the Ribera Alta. The website allows users to explore tourist sites and view other users' posts. In addition, it has an administration menu with multiple functionalities to manage the website's visible content for users, including the possibility of adding, editing, and deleting places and locations from the database of the website.

To achieve the development of this project, we used MySQL Workbench to create the database and the programming languages HTML, CSS, JavaScript, and PHP to build the web page. In addition, we utilized the Balsamiq software to create a website prototype. We also employed the Bootstrap libraries to speed up the graphic design and the Google Maps JavaScript API to integrate maps into the web. Besides, we used GPT Chat technology to assist and simplify the creation of the website's visual content. In summary, this project seeks to improve the tourist value of the Ribera Alta through a digital platform that facilitates the discovery of its charms. Through careful design, technological development, and relevant content, we expect to boost tourism in the region and make it known to a wider audience with this website.

2. Objectives

The primary goal of this project is to boost tourism in the Ribera Alta region by creating a website showing its cities and notable sites. To accomplish this, the website must reach as many people as possible to attract and retain visitors. As a result, it is crucial to create a website accessible from any electronic device, be it a mobile phone, tablet, or computer. Additionally, we implement an intuitive interface that requires minimal prior knowledge from users to ensure that the page is a useful and easy-to-use tool for a wide audience. It is common knowledge that a tool, regardless of its numerous functionalities, becomes ineffective when users do not understand how to use it.

In summary, the specific objectives of the project are:

- **Promotion of local tourism**: Develop a website to increase the visibility of the Ribera Alta and its tourist attractions through a digital platform.
- **Multi-device accessibility**: Develop a web page accessible from any electronic device, guaranteeing a fluid and consistent user experience.

- **Intuitive interface:** Design an intuitive and easy-to-use user interface, reducing the learning curve and improving the usability of the page.
- **Reach and retention of visitors:** Implement strategies and functionalities that attract and retain visitors, encouraging the discovery of the tourist treasures of the Ribera Alta.
- **Relevant and updated content:** Ensure that the information about municipalities and tourist sites can be continuously updated and presented attractively.

These objectives seek to maximize the impact of the project, promote tourism in the Ribera Alta, and contribute to the economic and cultural development of the region.

3. Methodology

To design and develop the website about the Ribera Alta, we decided to use a methodology with a structured and systematic approach. This methodology consists of the following phases:

3.1.Planning and definition of requirements

In the initial phase of the project, the objectives and purpose of the website are established. The target audience and the fundamental and non-critical requirements are identified. To achieve this, we defined the objectives and pinpointed the target audience, which meant selecting potential tourists and local inhabitants interested in the region. Moreover, we had to document ourselves regarding the ability of the users to explore tourist locations and the capabilities of the administrator to manage content.

Performed activities:

a. Definition of objectives.
b. Identification of the target audience.
c. Define web requirements

3.2. Design and Prototyping

In this phase, a low-fidelity prototype is designed using wireframes in Balsamiq to get a general idea of how the website works. In addition, we define the style guide to follow to determine the visual and design elements used on the website. To do this, we first developed low-fidelity prototypes using Balsami and defined the style guide by selecting the main colors and visual styles of the website using Bootstrap libraries.

Performed activities:

a. Web prototype development.
b. Definition of the style guide.

3.3. Configuration of the development environment

During this process, we set up the necessary development environment. This includes installing the development tools and configuring a local server with XAMPP to use PHP and MySQL. To fulfill this, we installed local development tools like Visual Studio Code, XAMPP, and MySQL. Then, we created a local server with the help of XAMPP.

Performed activities:

a. Installation of the development tools.
b. Creation of a local server.

3.4. Front-end development

Develop the user and administrator interface using HTML, CSS, and JavaScript, with the support of Bootstrap libraries, to streamline graphic design and ensure a responsive and accessible design. To do so, we created semantic HTML markup, styled it with CSS and Bootstrap, and finally, implemented interactivity with Javascript.

Performed activities:

a. Creating semantic HTML markup.
b. Styling with CSS and Bootstrap.
c. Implementation of interactivity with Javascript.

3.5.Back-end development

We wrote PHP scripts to define our server logic and MySQL for database management. During this phase, MySQL Workbench is used to design and create the database where the information used on our website is stored. PHP scripts allow developers to perform CRUD operations and manage site content. The activities we performed were designing and creating the database using MySQL and WorkBenck, and lastly, we carried out back-end functional testing. (*Operaciones crud – ¿qué es crud?*, 2024)

Performed activities:

a. Design and creation of the database using MySQL WorkBench.
b. Implementation of the CRUD operations.
c. Back-end functional testing.

3.6. Integration

We integrated the front-end and back-end parts, ensuring fluid and correct communication between them. To achieve this, we first integrated the front-end and back-end and then we did some testing to make sure the system was coherent.

Performed activities:

a. Front-end and Back-end integration.
b. Integration tests.

3.7. Custom maps implementation

Implementation of the JavaScript API provided by Google Maps to integrate interactive maps on our website using the information included in our database. To achieve this, we first create a project on the Google Cloud Platform and a custom map. Then, we add a personalized theme to the map and the key for the Google Maps API. We made sure to restrict access to our Google Maps API key to make sure only we could use it., and then we started building the interactive maps on the web page.

Performed activities:

a. Creation of the project on Google Cloud Platform.
b. Creation of a custom map.
c. Creation of a personalized map theme.
d. Generation of our Google Maps API key.
e. Implementation of the maps on the web page.

3.8. Final testing and debugging

Extensive tests are conducted to ensure the quality of the final product (the correct functioning of the website as a whole). This procedure included unit, integration, usability, and security testing. To achieve this, we executed unitary tests to verify the individual operation of the components. We also integrated testing to ensure the identification of problems between cooperating components. Furthermore, we performed security audits to identify and mitigate vulnerabilities.

Performed activities:

a. Execution of unitary tests
b. Integration testing
c. Security audits

3.9. Add content

Lastly, we enriched the website with additional information about various places and municipalities in the Ribera Alta to provide a comprehensive and accurate overview. To speed up this task, we utilized the OpenAI AI tool, ChatGPT, which facilitated writing the information in the desired format more efficiently and effectively. To complete this level, We searched for data and images about towns and places in the Ribera Alta, selected the relevant data, and synthesized the information using ChatGPT. To finish, we added the information to the web page using the administration menu.

Performed activities:

a. Search data and images about towns and places
b. Select the relevant data
c. Synthesis of the information using ChatGPT
d. Add the information to the web page

Through the detailed and structured approach, we ensure that each project stage is clearly defined and executed. Obtaining a solid foundation for the development and subsequent deployment and maintenance of our website.

4. Theoretical Framework

The theoretical framework outlines the tools, knowledge, and techniques utilized in developing the Ribera Alta website. This section provides the conceptual and methodological basis the entire project is based on. The technologies used are described here, as well as the theories and principles that guided the design and implementation of the website.

4.1. Color Theory

Color theory focuses on how humans perceive, mix, and combine colors physically and psychologically. This is essential for creating harmonious designs and conveying specific messages through color. (Bruna, 2023)

Color is a perception created when our eyes detect different wavelengths of light reflected by objects and send this information to the brain. Color theory is the study of the use of color in art and science, encompassing how colors mix, combine, and contrast and the messages they convey. There are three main color models: RGB (Red, Green, Blue), used in electronic screens; CMYK (Cyan, Magenta, Yellow, Black), used in printing; and RYB (Red, Yellow, Blue), the traditional model frequently use in mixing paint and creating color palettes. Each

model has its way of mixing colors: additive (RGB) or subtractive (CMYK and RYB). (Bruna, 2023)

4.1.1. Color Wheel

The color wheel, created by Isaac Newton in 1666, organizes basic colors in a wheel that shows their relationships. This wheel includes primary colors (red, blue, green), secondary colors (mixes of primaries), and tertiary colors (mixes of primary and secondary colors). Understanding the color wheel is essential to access the entire spectrum of colors. (Wade, 2024; O'Grady & Rios, 2023)

Figure 1: Example of a color wheel

Font: (O'Grady & Rios, 2023)

In addition to the color wheel, color theory encompasses concepts like hue, value, and chroma, which allow us to discuss colors in greater depth. Hue is the pure form of any color, value refers to the lightness or darkness of the color, and chroma to the saturation or purity of the color. (O'Grady & Rios, 2023)

Color variations are created by adding black (shade), white (tint), or gray (tone) to a hue. Color temperature, which divides colors into warm (reds, yellows, oranges) and cool (blues, greens, purples), is also an essential aspect. This temperature affects the perception and sensation that colors convey. (O'Grady & Rios, 2023)

4.1.2. Color harmony

Color harmony is the arrangement of colors in a way that is pleasing to the eye and creates a sense of cohesion. Color harmonies include monochromatic, complementary, split-complementary, analogous, triadic, square, and tetradic schemes, among others. Each has its own advantages and challenges, and the correct choice depends on the desired effect of the design. (O'Grady & Rios, 2023)

The meaning of colors is fundamental in color psychology, as different colors evoke different emotional responses. Understanding the audience is crucial to choosing the colors that best convey the desired message. (O'Grady & Rios, 2023)

In summary, color theory is a complex but essential discipline for creating practical and attractive designs in art and marketing and in any other area where color plays a crucial role, such as a webpage.

4.2. HTML

HTML, which stands for Hyper Text Markup Language, is the standard markup language for creating web pages. HTML consists of a series of elements that describe the structure of a web page. Each element tells the browser how to display the content, labeling fragments of it. (W3Schools, *Introduction to HTML*)

4.3. CSS

CSS (Cascading Style Sheets) is essential for designing visually attractive web pages and applying styles to documents. While it is commonly used with HTML, CSS is compatible with other formats, such as SVG and XML. CSS describes how the elements of the document should be displayed and controlled for visual presentation. It allows developers to change the color and size of headers and links, create complex layouts, and even develop animations. (W3schools, *CSS Tutorial*; UOCccorcoles et al., 2023)

4.4. JavaScript

JavaScript is a programming language developed for web pages. It updates and modifies HTML and CSS dynamically, enhancing interactivity. Additionally, JavaScript performs calculations, manipulates data and validates inputs, providing a broad spectrum of functionalities that improve the overall user experience on the web. (W3Schools, *What is JavaScript?*)

4.5. PHP

PHP, an acronym for "PHP: Hypertext Preprocessor," is a widely used, open-source scripting language executed on servers. One of its main advantages is that it is free to download and use, making it accessible to various developers. PHP is a powerful, robust, simple programming language, often acting as the first server-side language for many beginners. PHP files can contain text, HTML, CSS, JavaScript, and PHP code with the ".php" extension. The PHP code runs on the server, returning the results to the browser as plain HTML. PHP can generate dynamic content, manipulate files on the server, collect data using forms, send and receive cookies, and manage databases. It also allows for controlling user access and encrypting data. Besides HTML, PHP can generate images, PDF files, and other text types such as XHTML and XML. Moreover, PHP is compatible with diverse platforms (Windows, Linux, Unix, Mac OS X) and servers (Apache, IIS) and supports a wide range of databases. Its efficiency and ease of learning contribute to its wide popularity in web development. We have chosen PHP to interact with the web server for all these reasons. (W3Schools, *PHP Introduction*)

4.6. SQL

SQL, which stands for Structured Query Language, is a standard language for accessing and manipulating databases. It can execute queries against a database, retrieve data, and perform various data manipulation operations such as inserting, updating, and deleting records. SQL can also create new databases, tables, stored procedures and views. It also allows for setting permissions on tables, procedures, and views, providing a comprehensive toolset for database management. In web development, SQL is essential for building websites displaying database data. This process typically involves using an RDBMS (Relational Database Management System), a database program (MySQL in our case), a server-side scripting language (PHP), SQL to query the data, and HTML/CSS to style the page. RDBMS, or Relational Database Management System, is the foundation of SQL and modern database systems, including MS SQL Server, IBM DB2, Oracle, MySQL, and Microsoft Access. A RDBMS stores the data in tables of rows (records) and columns (fields). Each table contains related data entries, with each field maintaining specific information about every record. This structured approach ensures efficient data management and retrieval. (W3Schools, *Introduction to SQL*)

4.7. MySQL

MySQL is an open-source relational database management system and one of the most popular open-source databases. As a relational database, it stores data in separate tables, structured in physical files optimized to obtain the highest speed. The logical data model offers a flexible programming environment, allowing to define the rules that govern the relationships between different tables. By applying these rules, MySQL ensures that with a well-designed database, you never present inconsistent, duplicated, orphaned, outdated, or missing data. MySQL is known for its reliability, performance, and ease of use, making it the best choice for many web applications. It supports different data types and provides robust security features to protect data integrity. This combination of attributes makes MySQL a powerful tool for efficiently managing and organizing large datasets. (Oracle, *What is MySQL?*)

4.8. MySQL Workbench

MySQL Workbench is an integrated graphical tool for MySQL database developers and administrators. It provides a comprehensive environment for efficient database design, development, and administration. The tool facilitates the creation of entity-relationship diagrams (ERD) for visualizing database structures, supports reverse and forward engineering, and includes an SQL editor for writing, executing, and optimizing queries. In addition, it offers user and permission management, backup and recovery, and performance monitoring tools for database administration. (Castillo, 2023)

The integrated data migration tool allows for the migration of databases from systems like Microsoft SQL Server, Microsoft Access, and Sybase ASE to MySQL, making platform switching easier. MySQL Workbench's intuitive interface simplifies database management without needing command-line interaction, combining multiple tools into one application for increased efficiency and productivity. In addition, its compatibility with different operating systems, such as Windows, macOS, and Linux, makes it a very accessible and easy-to-use free tool. (Castillo, 2023)

In summary, MySQL Workbench is a powerful and versatile tool that significantly eases working with MySQL databases through its user-friendly graphical interface.

4.9. XAMPP

XAMPP is one of the most widely used open-source, cross-platform web servers. Developed by Apache Friends, it helps developers create and test their programs on a local web server. XAMPP provides a suitable environment to evaluate and verify the operation of projects based on Apache, Perl, MySQL, and PHP through the host's system. The name "XAMPP" is an abbreviation where "X" stands for cross-platform, "A" stands for Apache, "M" stands for MySQL, and the two "P" stands for PHP and Perl, respectively. In the project, we only use Apache and MySQL. Apache serves our web pages, manages HTTP requests, and provides a stable and secure platform for our web application. On the other hand, MySQL manages our database, allowing us to store, query, and manage data efficiently. XAMPP makes development more accessible by integrating these components into a single installation. This allows us to focus on programming and assessing our application without worrying about server configuration or cross-platform compatibility. In addition, its intuitive interface and integrated tools allow us to manage our development environment easily, ensuring an efficient and productive workflow. (*Qué Es Xampp. Usos, Características, Opiniones, precios*)

4.10. phpMyAdmin

phpMyAdmin is a popular web application based on PHP that allows developers to easily manage MySQL databases through a user-friendly graphical interface. It simplifies tasks such as creating, modifying, and deleting databases and tables and managing the data within them. Thanks to its web-based nature, phpMyAdmin can connect to remote servers, which is not always possible with traditional graphical interface programs. (García de Zúñiga , 2024)

To use phpMyAdmin, one simply needs to upload the set of PHP files that make up the application to a web server, configure it with the MySQL access data, and start managing the databases. Additionally, it is crucial to keep phpMyAdmin updated to ensure the security of the managed data. Fortunately, XAMPP will manage this in our case, allowing us to manage our database more easily and efficiently.

4.11. Bootstrap 5

Bootstrap 5 is the latest version of the most popular CSS framework for developing responsive and mobile-first applications Bootstrap. Bootstrap 5 is a powerful, extensible front-end toolkit rich in features designed to create fast and responsive web pages. With Bootstrap 5, we can take advantage of a prebuilt grid system and various components and improve projects with powerful JavaScript plugins. This toolkit simplifies the development

process and ensures the websites are adaptable to different devices and screen sizes. (W3Schools, *What is Bootstrap?*; Otto et al., *Bootstrap*)

4.12. Balsamiq

Balsamiq is a user interface (UI) design and prototyping tool. It is software mainly used for creating wireframes and simplified and schematic user interface representations. Wireframes are helpful in the initial stages of website design, as they allow designers, developers, and others to visualize the structure and layout of elements before investing time in detailed design and coding. Balsamiq stands out for its intuitive interface, which allows users to drag and drop interface elements onto a canvas. Additionally, the tool has an extensive library of pre-designed components, such as buttons, menus, and text boxes, making it easy to create wireframes quickly. These wireframes have a drawing style, which helps emphasize the prototype concept. Additionally, Balsamiq enables collaboration between teams, allowing users to easily share and review wireframes and add comments and annotations directly to the design. It can also be integrated with other design and project management tools, such as Confluence or Jira. In summary, Balsamiq is a valuable tool that significantly helps us design and develop the website's user interface. It allows us to create the prototype and wireframes of the website quickly and efficiently. (Balsamiq Studios; Miro, *Wireframes*)

4.13. Google Cloud Platform

Google Cloud Platform (GCP) is a cloud computing platform offered by Google that provides different infrastructure services, development platforms, and data storage and analysis services. These services are designed to help companies scale their operations, store and analyze large volumes of data, develop and deploy applications, and collaborate effectively in digital environments. Google Cloud Platform leverages Google's global infrastructure and advanced technologies to underpin its broad range of cloud services that enable organizations to develop, deploy, and scale applications and services efficiently and securely. (Google, *Cloud computing, hosting services, and apis*; Google, *Consola de Google Cloud*)

4.14. Google Maps Platform

The Google Maps Platform is a Google solution offered through the Google Cloud Platform. It consists of a set of APIs and services provided by Google that allow developers to integrate Google Maps capabilities into their applications, websites, and services. These tools provide access to a wide range of maps, geolocation, and geographic data visualization functionalities. It stands out for its precision and reliability thanks to the constant updating of data, its scalability to manage large volumes of requests and data, and its various customization

options to adapt the maps to the specific needs of each project. In our case, scalability and customization are the most interesting points. Since they allow us to design an interactive map capable of efficiently displaying a variety of notable places, integrating the Google Maps Platform in the project not only significantly improves the user experience but also enriches the overall functionality of the website, making possible a more intuitive and detailed exploration of places of interest in the region of the Ribera Alta. (Google, *Google Maps Platform*)

4.15. Maps JavaScript API

Maps JavaScirpt API is an API (Application Programming Interface) provided by Google that allows developers to integrate custom maps with images and proprietary content on mobile devices and web pages. It offers four basic map types: road map, satellite, hybrid, and terrain. These maps can be modified through layers, layouts, controls, events, and other services and libraries. Using the Maps JavaScript API, we can incorporate advanced map functions into our web pages. This allows customization of the visual appearance according to the project needs and facilitates user interaction through events such as clicking and dragging on the map. This API is offered by Google Maps Platform, and we use it to integrate the maps into our website. (Google, *Maps JavaScript API*)

4.16. Visual Studio Code

Visual Studio Code (VS Code) is a source code editor characterized by its lightness and efficiency, and it is available for Windows, MacOS, and Linux. It is a popular choice among web and JavaScript developers, although its versatility allows it to support a wide variety of programming languages thanks to its extensive ecosystem of extensions. This editor offers native support for languages such as JavaScript, TypeScript, and Node.js and allows programmers to debug code directly from the editor using breakpoints, call stacks, and an interactive console. Additionally, VS Code is highly customizable, with many extensions available in its Marketplace, allowing developers to tailor the tool to their specific needs and improve their productivity in software development. (Microsoft, *Ide y editor de Código Para desarrolladores de software y Teams*)

4.17. Chrome Developers Tools

Google Chrome Developer Tools, often referred to as DevTools, is a comprehensive set of web development tools built directly into the Google Chrome browser. These tools are invaluable for web developers and designers, allowing them to inspect and troubleshoot their websites thoroughly. (Google, *Chrome for Developers*)

The key features and functions of Google Chrome Developer Tools are organized in the following tabs:

- **Elements Tab:** Displays the HTML and CSS structure of the webpage. Users can inspect and edit the DOM (Document Object Model) and CSS in real time, making it easy to test changes and debug layout issues. The interface shows the code with colored syntax highlighting for better readability.
- **Console Tab:** Provides diagnostic information and allows interaction with JavaScript. Developers can execute custom JavaScript code, log messages, and view errors or warnings related to the scripts.
- **Sources Tab:** Used for debugging JavaScript. Users can set breakpoints to pause code execution and inspect variables, call stacks, and other details. It also supports workspaces, enabling the mapping of local files to the source code and editing it directly within DevTools.
- **Network Tab:** Offers detailed information about network activity. Developers can monitor resource load times, see the status of requests, and troubleshoot network issues affecting the webpage's performance.
- **Timeline (Performance) Tab:** Helps analyze the runtime performance of the webpage. It shows how long different tasks take to execute, aiding in identifying and optimizing slow areas.
- **Profiles Tab:** Tracks memory usage and detects memory leaks. This is useful for optimizing the performance and efficiency of the JavaScript code.
- **Application Tab:** Inspects everything that loads into the webpage, including databases, cookies, local storage, and cache. This is crucial for managing persistent data and understanding the state of the web application.
- **Security Tab:** Diagnoses and fixes security issues, such as mixed content warnings and certificate problems, ensuring the site meets security standards and protects user data.

Accessing the DevTools is not difficult because it is already installed in the Google Chrome web browser. To open it, click on the three vertical dots in the top-right corner of the browser, go to "More tools," and select "Developer tools." Alternatively, use the keyboard shortcut Ctrl + Shift + I on Windows or Cmd + Option + I on Mac. Upon opening DevTools, the screen will split, showing the webpage on one side and the DevTools interface on the other. Each tab within DevTools offers specific functionalities, providing detailed insights and control over the web development process.

Google Chrome Developer Tools is a powerful and essential tool for web developers. It offers everything from element inspection to JavaScript debugging and network monitoring. Mastering DevTools allows developers to gain complete control over web development projects, ensuring that websites are efficient, secure, and visually appealing. This tool is designed for developers and does not impact which browser the end user uses to view the page. Furthermore, it is worth noting that other browsers like Microsoft Edge or Safari also offer similar toolsets. We only chose to use the one provided by Google Chrome because of its robustness and familiarity.

4.18. Chat GPT

ChatGPT is an advanced chat system developed by OpenAI that uses GPT-3.5 and GPT-4 artificial intelligence language models. This system can maintain conversations, answer questions, and carry out various language-related tasks. (Fernández, 2024)

Based on the GPT-3.5 model for the free version and GPT-4 for the paid version called ChatGPT Plus, ChatGPT has been trained with large volumes of text. This allows ChatGPT to perform tasks such as translation and text generation with great precision and detail, understanding conventionally formulated questions and providing coherent answers. There is currently also a limited free access ChatGPT version called ChatGPT-4º. (Fernández, 2024)

In terms of applications, ChatGPT is used in a variety of areas. In the educational and writing field, it can write articles, summaries, and scripts, adapting to different styles and tones. In programming and technology is helpful for writing code, comparing products and generating technical specifications. It also excels at creating creative content, such as poems, jokes, and song lyrics, and can provide explanations suitable for different audiences, including simplified explanations for children. (Fernández, 2024)

Additionally, ChatGPT offers assistance in the form of recommendations and answers to questions about general knowledge and other topics, providing lists of resources and purchasing advice. However, it is important to note that, although very accurate, ChatGPT can make errors and is only fully reliable sometimes in these cases. Therefore, it is recommended that the information provided is verified. (Fernández, 2024)

In short, ChatGPT is a powerful AI tool that facilitates natural interaction and the generation of high-quality written content. Its applications range from education and technology to creativity and personal assistance.

5. Development of the project web page

5.1. Planning and definition of requirements

As mentioned above, this is the first and most crucial phase in website development. At this stage, we establish the basis of our project and clearly define the objectives we seek to achieve. We outline the basic structure, essential functionalities, and success criteria to guide the development process.

5.1.1. Objectives

As we have already said, the primary goal of this project is to boost tourism in the Ribera Alta region by showing its cities and notable sites on a website. However, a little summary of the objectives could be:

- Promotion of local tourism
- Multi-device accessibility
- Intuitive interface
- Reach and retention of visitors
- Relevant and updated content

These objectives seek to maximize the impact of the project, promote tourism in the Ribera Alta, and contribute to the economic and cultural development of the region.

5.1.2. Target audience

The target audience of our website is broad and diverse, covering different groups of people without restrictions on age or the type of company. The only essential condition is the ability and interest in traveling. The website aims at people or groups interested in cultural and tourist exploration of inland areas. We specialize in attracting people interested in several specific fields. On the one hand, those visitors who seek to explore sites of religious interest, such as churches, hermitages, and other places of worship with historical and cultural relevance. We also focus on history enthusiasts who want to know and better understand the historical heritage of the Ribera Alta, including castles, museums, and archaeological sites. Another important segment is nature and ecotourism lovers, who are interested in natural places, hiking trails, and other areas of natural beauty. Furthermore, we address those with a particular interest in discovering civil and architectural monuments, such as bridges, squares, historic buildings, and other architectural and urban interest places.

5.1.3. Define web requirements

In this section, we define the minimum requirements the website must meet to be considered a success. As mentioned above, this page is organized in two parts: one for users, where they can explore the web looking for interesting cities and places to visit, and another for administrators to manage all the information about said areas.

For users, the website must be responsive, which means that it must be accessible from any mobile device. The main page should recommend places or cities in the Ribera Alta to visit. It is essential to have a simple and intuitive navigation menu that allows users to move around the site quickly. Additionally, each town or place added must have its own page with detailed information. An interactive map is essential to show the location of the cities or sites that can be visited in the Ribera Alta, while implementing a user login and registration system to offer personalized content is also necessary. Each user should have a profile where they can view their posts, create new ones, and save places to view in the future. In addition, it is important to allow users to leave reviews about the places or cities they have visited. On the other hand, the menu should be as easy and simple as possible for administrators since the person who uses it does not need high computer skills. In addition, it is crucial that administrators can add, modify, and delete cities and towns on the website. They must also be able to register and delete users and edit their data. Safety is another important consideration, there must be minimum measures to ensure that only administrators can access certain areas of the website. In addition, there must be an easy and simple menu to manage recommendations for cities and places in the Ribera Alta. These requirements ensure that users and administrators have a satisfactory and efficient experience, allowing the website to fulfill its purpose of promoting culture and tourism in the Ribera Alta.

5.2. Design and Prototyping

After having defined the objectives, the audience and the minimum requirements that our website must have, we began to design a prototype.

5.2.1. Design of the User Interface

In this section, we use the Balsamiq software to design the website user interface using wireframes. To achieve this, it is essential to consider the organization of our website. This website is organized into two parts: one accessible to the public and another exclusive to administrators. The first part, where information about the places and cities

of the Ribera Alta is shown, will be called the *User Menu*. The second part, intended to manage the content of the page, will be called *Management Menu*. Because of the clear differentiation between these two sections, we find the best way to approach UI design is to explain them separately.

5.2.1.1. User Menu

The User Menu consists of seven main pages that can be accessed via a navigation bar, as well as other links included on each page. This navigation bar is present on all pages to ensure an easy and intuitive navigation for users.

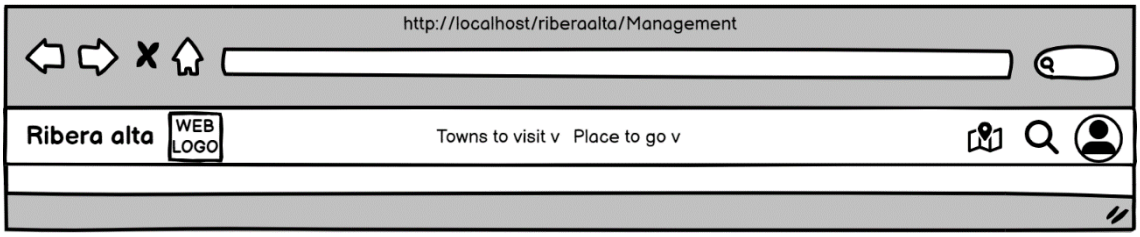

Figure 2: User Menu navigation bar.

Font: Own elaboration

The first page is the Main Page, which serves as the homepage and introduction to the website. Here, we welcome new users and recommend various cities and places to visit in the Ribera Alta. The second page is the search page, designed to be simple and easy to use, allowing users to find places and cities in the region as intuitively as possible, thus enhancing the user experience.

The Place page is dedicated to showing information about each place added to the website. This page displays the name of the place, the city where it is located, a button to save the place to the *saves* list (if the user is registered), a brief description of the place, two images (one large for the header and another smaller one to support the description), an interactive map showing the location of the place, and a carousel suggesting other nearby places to visit.

The Town page is another individual page dedicated to each city. It presents the name of the city, a brief description, a large image for the header, an interactive map with its location, a carousel showing other places in the city and a list of user posts about their experiences in that city.

Riberamap is the page where the map of the Ribera Alta is displayed, showing the places and cities added to the website. This page includes a filter to display items on the map by categories.

In Our Recommendations, the best places to visit in the region are highlighted, accompanied by inspirational messages of prominent figures who live or have lived in the Ribera Alta, whom we call contributors. Administrators manage our recommendations and the messages of our contributors in the Management Menu. Additionally, at the end of this page, we can find the most recent experiences of visitors to the region.

The User Profile page is where users access their profile information. Here, users can view their personal information, their posts, and the places they have saved in the *saves* list. From this page, users can access two additional pages: Edit User Profile, where they can edit some of their personal information such as username, phone number, and email, and New User Post, where they can add a new post about an experience in a city in the Ribera Alta that they have visited.

Users can access all pages without needing to log in or register, except for the profile page. If users try to access the profile page without being logged in, they are redirected to a Login page. On the Login page, the user can log in or go to the Registration page to complete a form and save their information in the database. After this step, the user can return to the login page.

Finally, after outlining the structure of the User Menu and the pages that comprise it, we have designed a common footer for all the main pages except the search page. The footer contains the logo of the website, links to our social media, and a small informational text. On the other pages, the footer is empty.

Figure 3: User Menu footer sketch.

Font: Own elaboration

Navigation map

Following the earlier explanation, we can create an associative diagram to illustrate the pages that make up the User Menu and the relationships between them. This diagram shows how users can navigate the website effectively.

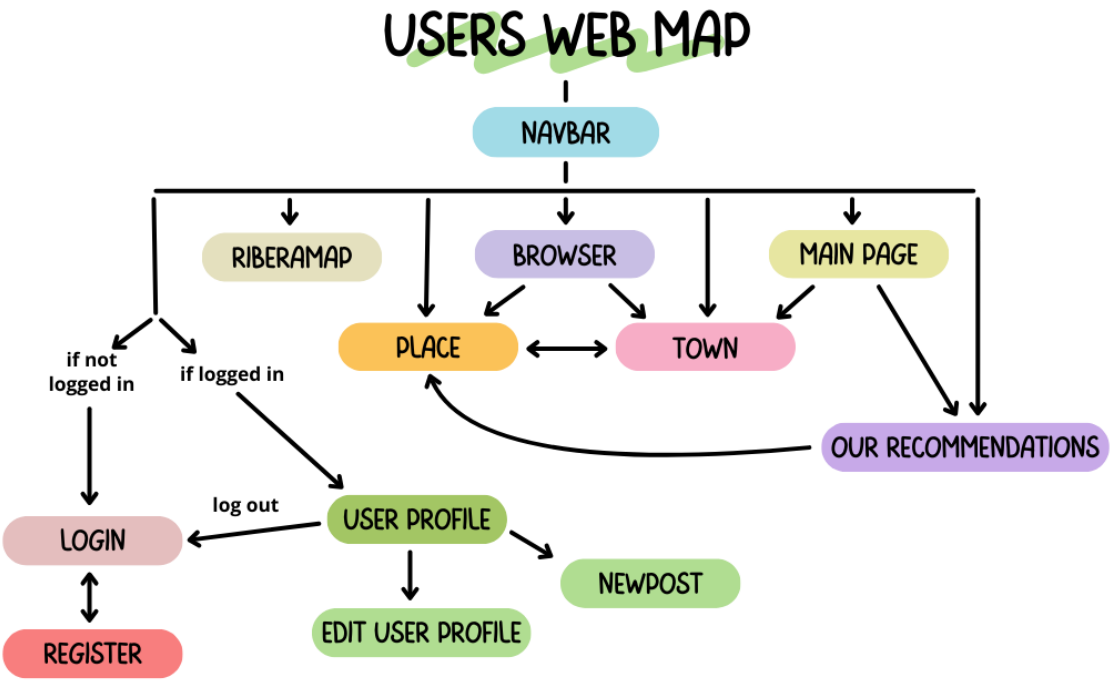

Figure 4: User Menu navigation map.

Font: Own elaboration

5.2.1.2. Management Menu

Navigation in the admin menu has been implemented using a navigation bar as its base. This navigation bar includes a section for the homepage, another for logging out, and one for each page element that needs to be configured. The elements to be managed are the homepage information, the recommendations page, recommendations for both places and cities, the categories of places, information about our notable characters, contributions of notable characters, user data, and their posts.

The homepage, named "Administrator," has a welcome message indicating the user is in the website's admin menu. The log out section simply log out the current user and redirect them to the user's main menu homepage.

Each element in the navigation bar functions similarly. By clicking on any of these links, the user is redirected to a page where part of the data for that section is displayed in a

table. Each row of the table shows at least the ID of the item and a column with the allowed actions: edit and delete. All items allow the delete action, but only some allow editing. Additionally, each table permits the creation or addition of a new item and includes a search feature to filter items to expedite finding a particular item.

The add, edit, and delete actions are performed via buttons. By clicking the add or edit button, the user is redirected to a page where they must complete or modify a form to perform the action. After submitting the form, the user is returned to the corresponding section page.

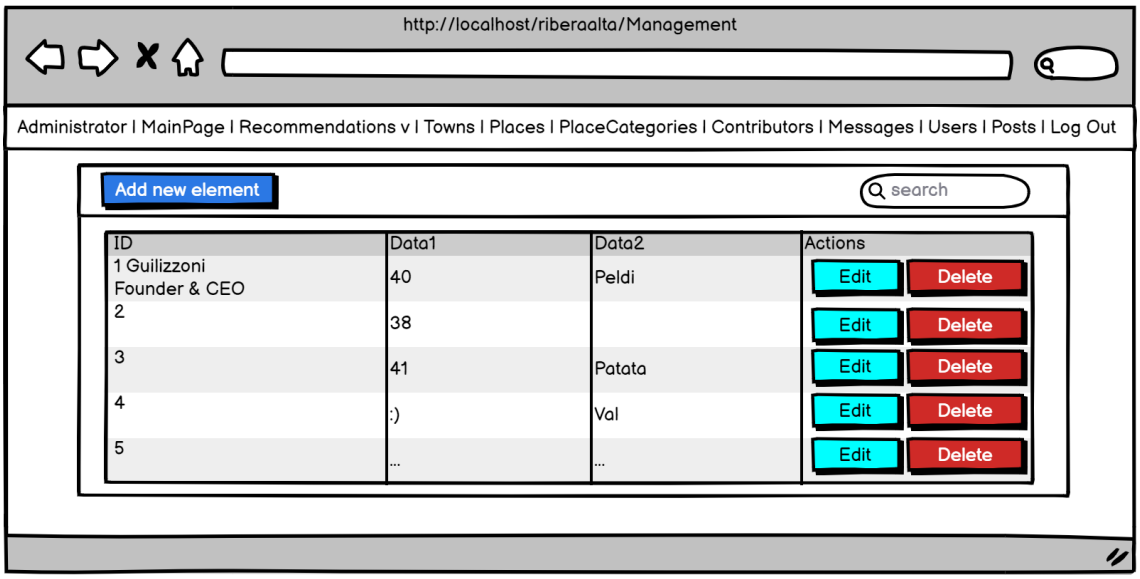

Figure 5: Management Menu interface example.

Font: Own elaboration

Navigation map

In this case, representing the navigation map of the Management Menu can become extensive due to the large number of web pages. We have decided to consolidate the sections dedicated to managing the website into one group to simplify this. This results in three main sections: *Administrator*, *Log Out*, and *Other Sections*. The *Other Sections* group includes the remaining sections, which share similar characteristics. The *Main Page* refers to the primary user interface page.

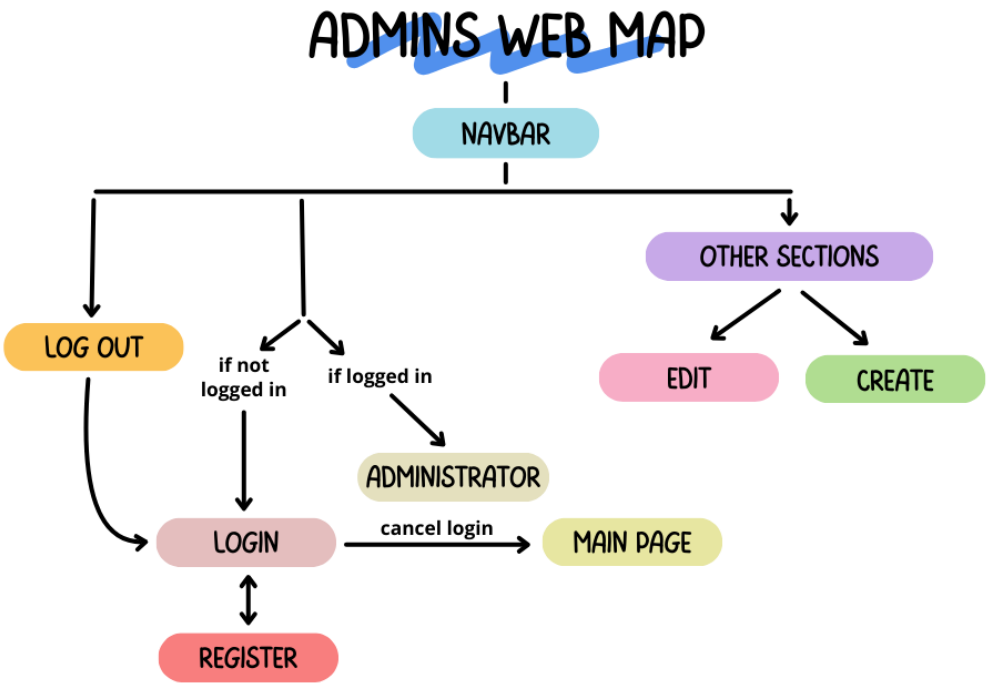

Figure 6: Management Menu navigation map.

Font: Own elaboration

5.2.2. Website Scheme

Choosing the right color is essential in web design. Biologist Timothy H. Goldsmith noted that "color is not a property of light of objects that reflect light. It is a sensation that arises within the brain." (Palombi, 2022)

These sensations are powerful, as colors can alter our mood, impact memory, and even change our heart rate. We do not just see colors; we feel them, making them a vital tool in a designer's arsenal. Understanding color meanings allows designers to use color psychology to evoke the desired reactions and emotions from the audience. (Palombi, 2022)

Selecting the right colors for a website is crucial. Whether for a logo or color-coding a spreadsheet, choosing colors that align with the message of the website is essential. Colors that resonate with the audience enhance user experience, effectively convey the message, and elicit the proper emotional responses, making the website more engaging and impactful.

We have chosen a palette of five shades of green for the website. It includes two analogous colors, *Fern green* and *Pistachio*, to which various tints, shadows, and saturations have been applied to generate three additional tones. By adding shadows to

Fern green, we obtained *Dark green* while increasing the brightness and saturation of *Pistachio*, resulting in the colors *Beige* and *Baby powder*. This choice of tones highlights the connection with the green landscapes and nature of the Ribera Alta de Valencia but also conveys tranquility, reflects the local cultural and agricultural identity, ensures a balanced and harmonious visual experience, fosters creativity, and promotes sustainable tourism, attracting environmentally conscious visitors.

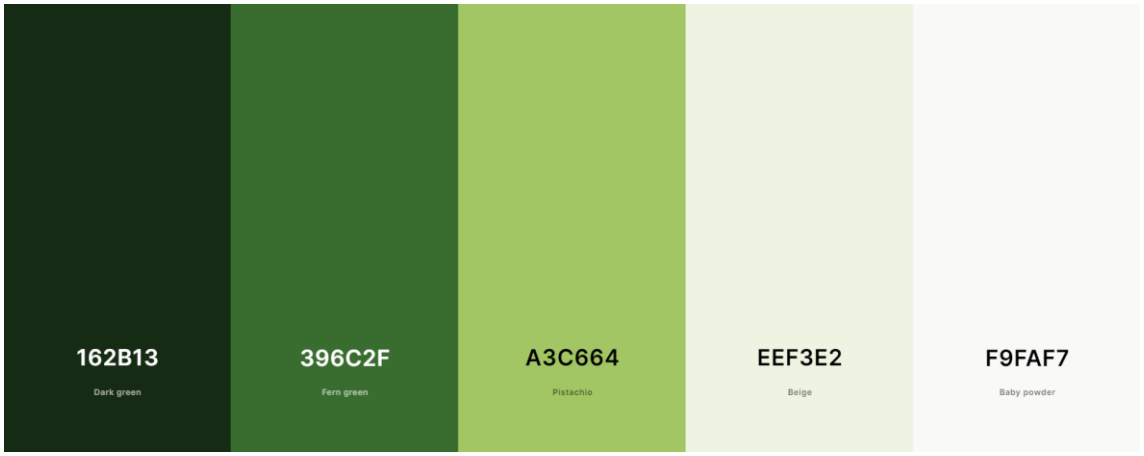

Figure 7: Web color palette.

Font: Own elaboration

- **Association with Nature:** Green represents the vegetation and natural landscapes of Ribera Alta, reinforcing its connection with the natural environment.
- **Tranquility and Relaxation:** Green induces calm and serenity. Tones like *Beige* and *Baby powder* soften the intensity, creating a relaxing and welcoming atmosphere.
- **Cultural and Regional Symbolism:** Green symbolizes fertility and hope, reflecting the cultural identity and agricultural heritage of the Ribera Alta.
- **Visual Consistency:** A cohesive palette ensures a harmonious and professional visual experience, enhancing ease of navigation.
- **Visual Balance:** Combining deep greens and soft tones maintains an attractive balance without overwhelming the eye.
- **Stimulating Creativity:** Green stimulates creativity, inspiring visitors and reflecting the cultural and natural richness of the region.
- **Promotion of Sustainable Tourism:** Green communicates values of sustainability and environmental respect, appealing to conscientious tourists.

In summary, this color palette enhances natural beauty, induces calm, reflects cultural identity, ensures visual consistency and balance, stimulates creativity and promotes sustainable tourism in the Ribera Alta de Valencia.

5.2.3. Design the web logo

In this section, we designed the logo of our website using the main colors of the already chosen color palette. The logo design is inspired by the outline of the map of the Ribera Alta region and a plant called cattail. For those unfamiliar, cattail is an aquatic plant that is quite common in the beds of rivers or lakes and is expected in the Xúquer River, the main river that runs through the region. This design not only seeks to represent the location of the Ribera Alta geographically but also to capture the natural and distinctive essence of the area, highlighting its connection with the river and its characteristic natural resources. (Álvarez Bernard, 2023)

Figure 8: Web page's logo.

Font: Own elaboration

5.3. Configuration of the development environment

In this section, we configure and set up the local environment on our computer to develop the front-end and back-end of the website.

5.3.1. Installation of the development tools

Here, we install the essential tools required to develop both the front-end and back-end of the website. However, only three programs must be installed locally, as the remaining tools can be accessed directly from the cloud.

- **Visual Studio Code:** This is used for the development of both, front-end and back-end. It provides an integrated environment for writing, debugging, and running code, making it essential for full-stack development.
- **MySQL Workbench:** This tool is used to create the entity-relationship diagram (ERD) and generate the database using MySQL. It facilitates database design, modeling, generation, and administration.

- **XAMPP:** This software is used to create a local server environment. It includes Apache, MySQL, and PHP, allowing us to assess and develop the website locally.

By installing these tools, we set up a comprehensive environment that allows us to efficiently develop, test, and debug the website. This configuration ensures we have all the necessary resources to develop a robust and functional website for the Ribera Alta.

5.3.2. Creation of a local server

To develop our website properly, we need a server that allows us to host the database and test its functionality. As mentioned earlier, we use XAMPP to set up a local server on our computer. The process is straightforward: once the program is installed, we start the program and then start the modules we need. In our case, we initialized Apache for HTML, CSS, and JavaScript and MySQL for the database. The other modules can be ignored.

Although XAMPP allows for various configurations, we keep everything at the default settings except for the database port, which we have changed to 3377 due to conflicts with ports already in use.

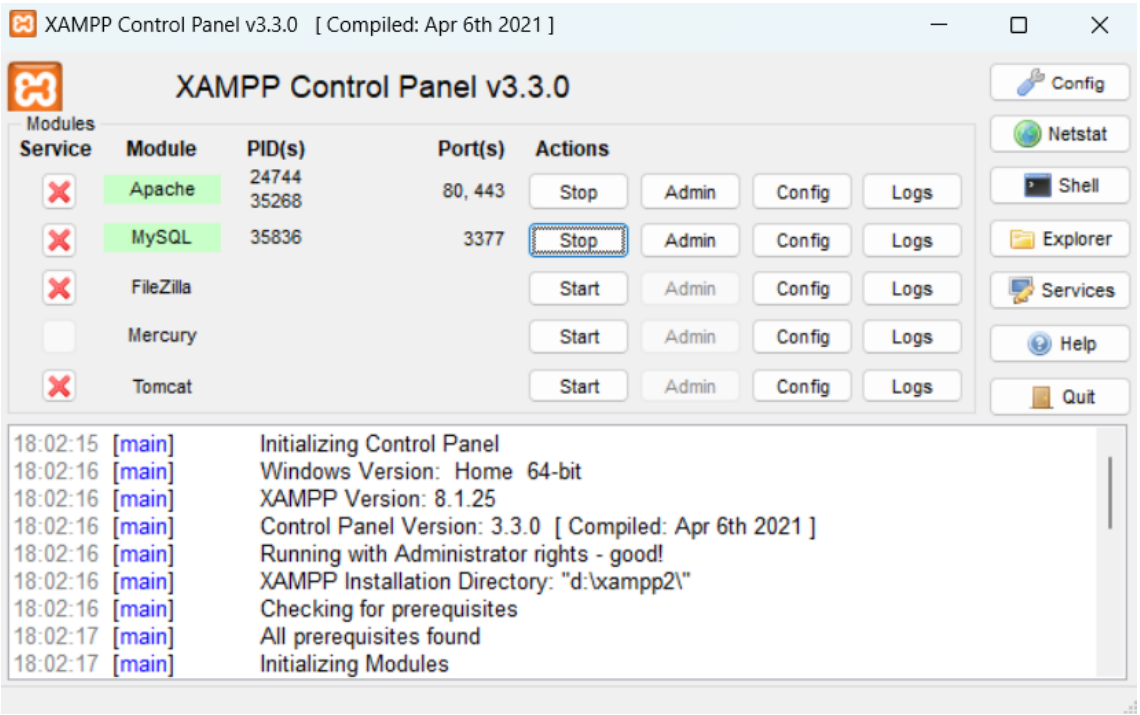

Figure 9: Example of the XAMPP's interface.

Font: Own elaboration

5.4. Front-end development

Using Visual Studio Code, we develop the User Menu and Management Menu interfaces using HTML, CSS, and JavaScript, with the support of Bootstrap libraries. A tool that streamlines graphic design and guarantees a responsive and accessible design. To do this, we follow the prototype that we have previously created with Balsamiq.

For the initial development, we used test values and data that the corresponding data from the database would replace later. However, there is one exception: we have decided not to develop any map in the current phase. Implementing maps with the Google Maps JavaScript API is a more complex process, which we consider easier and faster to conduct using the information in the database. Doing it manually would be time-consuming if we want to create maps with different markers, so automating this process makes it more efficient.

5.5. Back-end development

5.5.1. Design and creation of the database using MySQL WorkBench

Once most of the development of the User Menu and Management Menu interfaces has been completed and a clear understanding of the information we want to display and manage on the website, the next step is to design and create the database. This process is essential to ensure that all necessary data is stored efficiently and is easily accessible for use on the web platform.

We first focused on designing the Entity-Relationship Diagram (ERD) using MySQL Workbench. The ERD provides a visual representation of the database structure, showing the entities, their attributes, and the relationships between them. This stage of the design is crucial for identifying all the necessary entities, such as users, places, towns, categories, comments, and any other relevant information, as well as for defining the relationships and constraints between them.

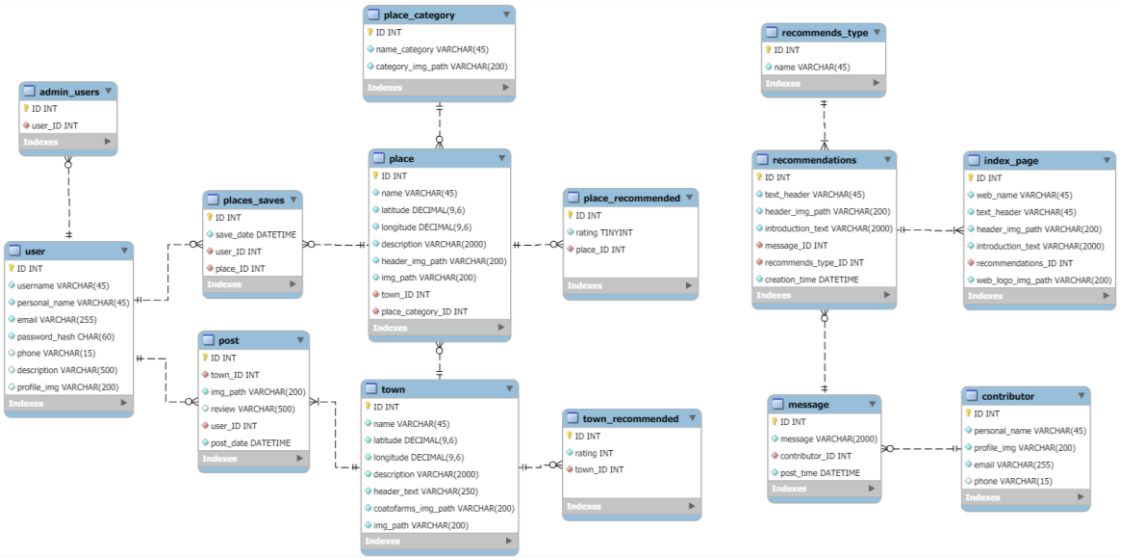

Figure 10: Ribera Alta database ERD

Font: Own elaboration

Once we had everything clear about the ERD, we created the database in the MySQL Workbench environment. This step involved translating the diagram into a series of tables, each with their respective columns and data types. During this process, special attention should be paid to normalizing the database to avoid redundancies and ensure data integrity. During this process, primary and foreign keys were configured to maintain the relationships defined in the ERD.

With the database structure established, the next step is to populate the tables with sample data. This fictitious data set is vital for the testing phase, as it allows us to simulate different usage scenarios and detect possible errors in the design and operation of the database. Through these tests, issues such as data inconsistencies, query errors, and performance issues can be identified and corrected.

In summary, the design and creation of the database for the Ribera Alta website involved several important stages. This meticulous process ensures the database is robust, efficient, and prepared to handle current and future website needs.

5.5.2. Implementation of the CRUD operations

Once the database has been created and its correct functionality has been ensured, we export it from MySQL Workbench into a *.sql* file and import it to the XAMPP server using phpMyAdmin. This step ensures that this database is available and accessible for the local development environment.

Next, we wrote the necessary CRUD functions for each page of the website using PHP and SQL queries. CRUD is an acronym for the four basic operations: Create, Read,

Update, and Delete. These operations are essential to manage the data on our website. (IONOS, 2019)

Once the PHP scripts for the CRUD operations are written, it is crucial to conduct thorough testing to ensure their proper functionality. Considering the project requirements, the tests were focus on:

- **Data Validation:** Ensuring that only valid data can be inserted into the database by implementing validations in both the front-end and back-end to guarantee data integrity.
- **Integrity Testing:** Ensuring that the relationships between tables are maintained correctly after CRUD operations by verifying that foreign keys are updated or deleted as necessary.

Implementing CRUD operations is a crucial step in the back-end development of any web application. These scripts enable interaction with the database, facilitating data creation, reading, updating, and deletion. By following best development practices and conducting intensive testing, we ensure that the database functions efficiently and securely, meeting the minimum defined requirements of the Ribera Alta web application.

5.6. Front-End and Back-End Integration

After separately developing and validating the front-end and back-end of the Ribera Alta website to ensure their proper functioning, the next stage involved integrating them to create the final website.

Upon successfully merging the two components and confirming the correct operation of the logic of the website, as well as ensuring the accurate display and interaction with the database data, we proceeded with several integration tests to ensure the seamless operation of both the front-end and back-end. These tests are crucial for validating the proper flow of data between the user interface and the server, and for ensuring the expected behavior of the application when different components interact. So, during this tests we also used the Developer Tools of Chrome to help me speed the process.

During these tests, we placed particular emphasis on validating the correct functionality of user login and registration to manage the user's personal information, posts, and saved places correctly and on ensuring that only admin users have the ability to manage the website's database.

5.7. Custom maps implementation

After successfully integrating the front-end and back-end, we can now implement geographic maps on our website using the Google Maps JavaScript API. The first step is to create a project on the Google Cloud Platform, which requires a Google account. Once this is done, we access the Google Maps Platform, create a JavaScript map, and then design a custom style for our map. In our case, we opted to use the standard Google Maps layer and modify the visible points of interest, hiding all except the landmarks. This decision was made to prevent visitors from being overwhelmed with information and to allow them to see the interactive markers clearly and easily.

Once the custom style is set, we create the API key needed to implement the maps and restrict it to prevent unauthorized use, which can be problematic if a credit card is linked to the Google account.

With these steps completed, we can start to include the maps on our website. The first task is to design the interactive markers, which expand to show more details about the site when clicked.

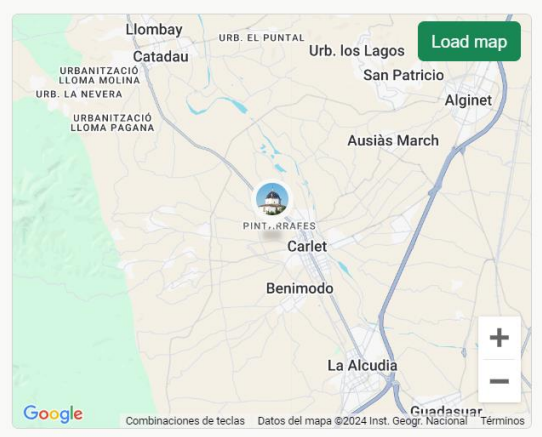

Figure 11: Ermita de Sant Bernat marker example.

Font: Own elaboration

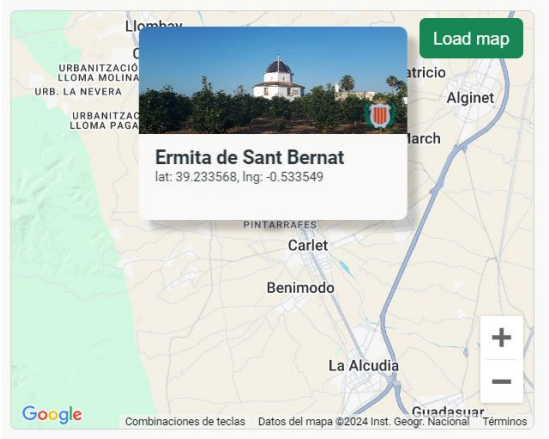

Figure 12: Ermita de Sant Bernat marker open.

Font: Own elaboration

Our website features two types of maps: the town or place map, which simply shows the location individually in the world, and the general map, which shows the cities and places of the Ribera Alta.

5.7.1. Town or Place Map

This is a smaller map that appears on pages dedicated to discussing a specific place or city. It shows its actual position in the region.

5.7.2. General Map

This map is found on the *Riberamap* page, which occupies almost the entire page and shows the places and cities of the Ribera Alta. It includes a series of category filters to classify the markers displayed, with six different categories:

- **All:** No filter is applied, shows all municipalities and places.
- **Cities:** Only shows the towns of the region.
- **Spiritual Site:** Only shows religious sites.
- **Historical Landmarks:** Shows places with historical significance.
- **Natural Wonders:** Shows only the Natural sites.
- **Civil Monuments:** Buildings, structures, or landmarks with civic, cultural, or architectural value for the region.

Moreover, we've implemented a proximity filter for the markers, ensuring they don't overlap when zooming in. This efficient feature enhances the map's functionality, providing a seamless user experience.

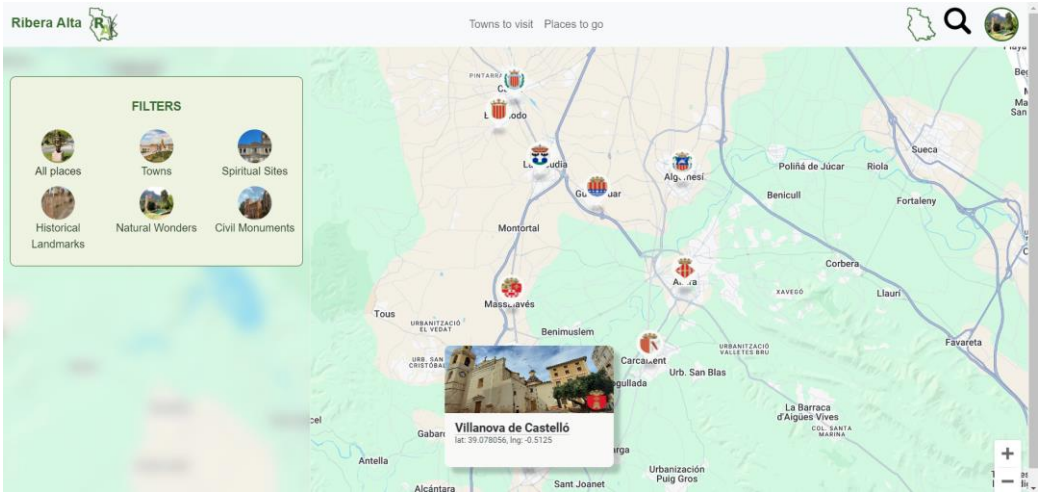

Figure 13: Ribera Alta Map example.

Font: Own elaboration

5.8. Final testing and debugging

With the maps added, our website structure is almost complete. The ultimate step is to ensure that everything functions correctly. This involves verifying that no errors occur when managing the database from the web, ensuring that user access control works properly by allowing users to access only the parts of the website they are authorized to see, confirming that the website information is displayed accurately and that there is no problem with the interface's navigation.

Furthermore, we utilized Chrome's Developer Tools to debug the code and address any issues. This tool has played a crucial role in monitoring network requests, inspecting elements, and resolving JavaScript errors. Its contribution ensures the website operates smoothly and efficiently, providing a secure performance for our users.

5.9. Add content

Lastly, after ensuring the proper functionality of the website, the last step is to fill the database with information to make the site more realistic and complete. The final result can be seen in Annex 1.

The Ribera Alta consists of 35 municipalities covering an area of 1011.50 km². Given the time constraints, entering detailed information for all municipalities, including notable or interesting places to visit in each, is an enormous task. Therefore, we decided to include data for only a selection of municipalities and locations within the Ribera Alta. To expedite this process, we used ChatGPT to help me summarize and write the website information, allowing me to add more content in less time. (*Ribera Alta (Valencia)* 2024)

This section required extensive research and selection of information to ensure the reliability of the information and images. While many of these images are our own, many others were sourced from the Internet. Due to the large number of references used, we decided to separate the external sources used to fill the database and include them in Annex 2.

5.10. Results Evaluation

After reviewing the obtained webpage (images available in Annex 1), we can confidently say that the website meets most of the minimum established requirements. However, some areas need improvement.

I've managed to make the website's content accessible regardless of the device's screen size, making it responsive. However, we acknowledge that there is still room for improvement, as something can always be refined to optimize the interface further.

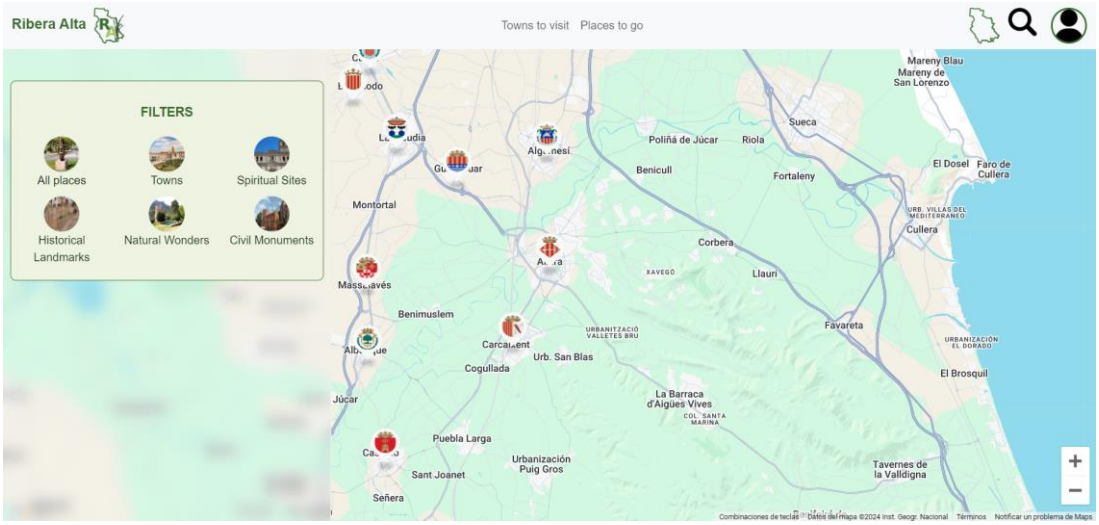

Figure 14: Ribera Alta responsive map example 1.

Font: Own elaboration

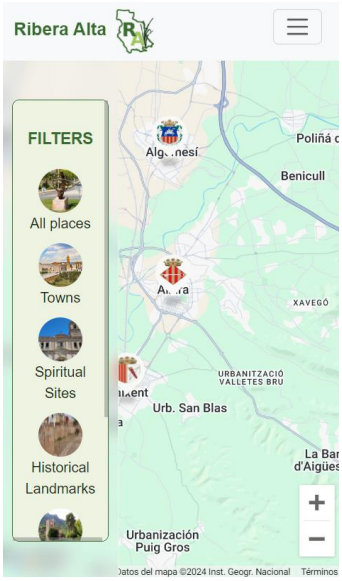

Figure 15: Ribera Alta responsive map example 2.

Font: Own elaboration

We have fulfilled the requirement of having the main page recommend places and cities in Ribera Alta to visit. These recommendations are visible and accessible, guiding users on which destinations to explore and effectively promoting local tourism. Regarding intuitive navigation, we have designed a simple and easy-to-use navigation menu. The intuitive structure of the menu allows users to move efficiently through the site's different sections, quickly finding the information they are looking for without complications. For each city or highlighted place in the Ribera Alta, we have created pages with detailed information. These pages provide relevant and up-to-date data about the sites, helping users better understand each destination and plan their visits in an informed manner. We have integrated an interactive map that shows the location of places of interest in Ribera Alta. This map is a valuable tool for users as it allows them to geographically visualize where the destinations are and plan their travel routes more efficiently.

Additionally, we have implemented a login and registration system that allows users to create personalized accounts. This system facilitates access to personalized content and allows users to save their favorite places, view their posts, and enjoy a more personalized experience on the website. User profiles allow users to view their posts, create new ones, and save places to view in the future. This functionality fosters user interaction and engagement with the platform, improving visitor retention. We have also enabled a feature that allows users to leave reviews about the places they have visited. This feature not only provides valuable

feedback for other visitors but also contributes to creating an active and participatory community around tourism in the Ribera Alta region.

The *Management Menu* is simple and accessible, designed to be used by people without advanced computer skills. This ensures administrators can effectively manage the site's content without technical difficulties. Administrators can add, modify, and delete cities and towns on the website. This functionality is crucial for keeping the information up-to-date and relevant, ensuring that users can access accurate data about tourist destinations. In addition to content management, we have enabled administrators to register and delete users and edit their data. This management capability is essential for maintaining proper control over the user community and ensuring the security and quality of the service.

Although we have implemented basic security measures to protect restricted areas of the site, such as the user profiles and the *Management Menu*, we recognize that this aspect needs to be reinforced. It is crucial to improve these measures to ensure that only users with the appropriate permissions can access and edit personal or restricted information.

Additionally, we have developed an easy-to-use menu for managing recommendations for cities and places in Ribera Alta. This allows the administrators to update and adjust recommendations efficiently and ensures that users receive the best possible suggestions.

In summary, we have managed to ensure that the website meets most of the minimum requirements we established. However, we recognize that there are still areas that could be improved. Security is the weakest point, and in the case of deploying the website, it would need to be reinforced to protect restricted areas and sensitive information better. Additionally, the website's responsiveness could be improved to offer a better experience across devices. Despite the challenges, we believe that by meeting these requirements, we have achieved the objectives of developing a website about Ribera Alta that can promote tourism, be accessible from any device, have an intuitive interface, reach and retain visitors, and allow updating its content and presented attractively easily.

6. Conclusions

This project consists of designing and developing a website that promotes tourism and cultural and economic development in the Ribera Alta region. This project has allowed me to deepen our knowledge in designing and developing web pages and databases learned during our career.

To carry out this project, we followed a structured and systematic methodology. Thanks to applying this methodology and analyzing the results, we have achieved the proposed objectives. We know the website still has significant room for improvement, but we are satisfied with the result obtained in the available time.

As mentioned earlier, if the website is to be deployed, it would be advisable to strengthen security related to access permissions and improve its interactivity. Additionally, it is necessary to add more information about places and cities to the database and, in the future, to include a new section on the website to inform about festivals and events in each municipality or the entire region.

In summary, this project aims to enhance tourism in the Ribera Alta region through a website that highlights its charms. Through careful design, solid technological development, and relevant content, this website is expected to significantly boost tourism in the region and present it to a broader audience. With future improvements in security and content, the site is well-positioned to achieve its goal of promoting tourism and contributing to the economic and cultural development of Ribera Alta.

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