

Web-Based Geographic Information System for Tourism Mapping in Kebumen

Sistem Informasi Geografis Berbasis Web untuk Pemetaan Pariwisata di Kebumen

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Abstract

Tourism information in Kebumen is still dispersed across several sources, making it difficult for visitors to obtain focused information about destinations and their locations. This study develops a web-based Geographic Information System (GIS) for mapping tourism destinations in Kebumen. The system is intended as an alternative online information source that presents destination information and directions using Google Maps. The development uses the Waterfall method, consisting of analysis, design, development, testing, implementation, and maintenance. The analysis identifies user information needs and tourism data, while the design determines the website interface, data structure, and system architecture using HTML, CSS, JavaScript, PHP, and MySQL. The resulting website provides an introductory home page, a selection of three top destinations, a broader tourism destination list, an About page, and individual destination pages containing more specific information. The study indicates that a focused web-based GIS can provide more accessible tourism information and support visitors in identifying destinations in Kebumen. The Waterfall approach also provides a structured sequence for developing the system.

Keywords: web-based GIS, tourism mapping, Kebumen, Google Maps, Waterfall

Abstrak

Informasi pariwisata di Kebumen masih tersebar di berbagai sumber, sehingga menyulitkan pengunjung untuk memperoleh informasi yang terpusat mengenai destinasi dan lokasinya. Penelitian ini mengembangkan Sistem Informasi Geografis (SIG) berbasis web untuk memetakan destinasi wisata di Kebumen. Sistem ini dirancang sebagai alternatif sumber informasi daring yang menyajikan informasi destinasi serta petunjuk arah menggunakan Google Maps. Pengembangan sistem menggunakan metode Waterfall, yang mencakup tahapan analisis, perancangan, pengembangan, pengujian, implementasi, dan pemeliharaan. Tahap analisis mengidentifikasi kebutuhan informasi pengguna dan data pariwisata, sedangkan tahap perancangan menentukan antarmuka situs web, struktur data, dan arsitektur sistem dengan menggunakan HTML, CSS, JavaScript, PHP, dan MySQL. Situs web yang dihasilkan mencakup halaman beranda pengantar, pilihan tiga destinasi unggulan, daftar destinasi wisata yang lebih lengkap, halaman "Tentang Kami", serta halaman khusus untuk setiap destinasi yang memuat informasi lebih rinci. Hasil penelitian menunjukkan bahwa SIG berbasis web yang terpusat dapat menyediakan informasi pariwisata yang lebih mudah diakses dan membantu pengunjung dalam mengenali destinasi wisata di Kebumen. Pendekatan *Waterfall* juga memberikan alur kerja yang terstruktur dalam pengembangan sistem tersebut.

Kata kunci: SIG berbasis web, pemetaan pariwisata, Kebumen, Google Maps, Waterfall

INTRODUCTION

Kebumen is a small city in Central Java that is known for its coastal and natural tourism. The growth of digital technology has increased the availability of tourism information and has changed how people search for destinations before travelling. Visitors generally look for information about a destination before deciding where to go, including its location and other relevant details. A geographic information system (GIS) can support this need by presenting spatial information in an accessible form [1–4].

Kebumen has considerable tourism potential, particularly because of its varied beaches and other natural attractions. The availability of focused and easily accessible information may help visitors from outside Kebumen identify destinations and plan their trips. The original study therefore proposes a website as an additional information provider for travellers seeking tourism destinations in Kebumen.

The proposed website uses Google Maps as a familiar navigation aid and applies GIS concepts to tourism mapping. The study was motivated by the observation that tourism information for Kebumen was available from several sources, including the Kebumen Tourism and Culture Office, Geopark Indonesia, and national information providers, but these sources did not focus exclusively on tourism in Kebumen. The system is consequently designed as an alternative online information source focused on Kebumen tourism.

The research problems are: (1) how to design a web-based geographic information system for tourism mapping in Kebumen; and (2) how the Waterfall method can be applied to the development of the web-based GIS. The scope is limited to tourism in Kebumen, uses PHP for system development, and does not require visitors to log in or submit personal information such as usernames or email addresses.

RESEARCH METHODS

The study uses literature study and observation as data collection methods. The literature study collects references related to the topic from journals, books, websites/blogs, and visitor reviews of Kebumen tourism on social media. Observation is used to support direct or indirect examination of the object being studied and to sharpen the focus of the discussion.

System development applies the Waterfall model. The development is performed sequentially so that each phase is completed before proceeding to the next phase. This approach is consistent with a structured software development process in which requirements are identified before design and implementation [8–15].

The development stages are as follows:

- 1. Analysis.** Identify user needs for tourism information, collect information about destinations, locations, facilities, and user needs, and determine the main features required by the system.
- 2. Design.** Design an intuitive web interface, determine page layouts and navigation, design the data structure for tourism information and related content, and determine the system architecture using HTML, CSS, JavaScript, PHP, and MySQL.
- 3. Development.** Build the web interface according to the design, integrate web technologies and Google Maps, develop the PHP backend, access the required data, and implement the planned business logic.
- 4. Testing.** Conduct functional testing and overall system testing, including interface, integration, and functional performance testing, followed by correction of errors identified during testing.
- 5. Implementation.** Deploy the system in an environment accessible to end users and provide guidance on effective system use.
- 6. Maintenance.** Monitor system performance after deployment, receive user feedback, and perform necessary improvements or adjustments.

The system flow is also represented using a context/DFD approach. The external entity is the visitor, while the main system process is the Home Page. The visitor sends a request for the Home Page, the system loads the required destination data, and the system returns the Home Page data and destination information to the visitor.

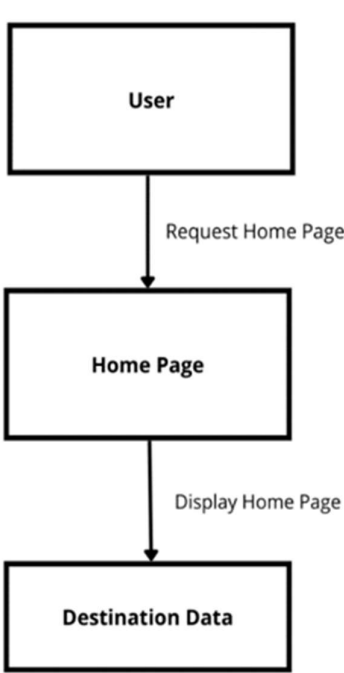


Figure 1. Data Flow Diagram Level 0

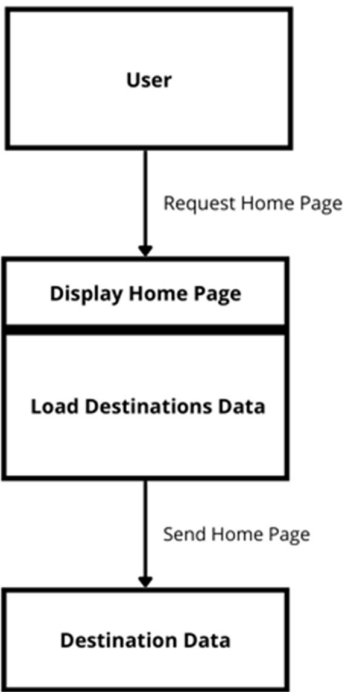


Figure 2. Data Flow Diagram Level 1

RESULT

The developed application is organized as a web-based tourism information system. Based on the original system description, the website contains one main page with three slides and several supporting pages. The first slide introduces the website, the second presents the three top tourism destinations in Kebumen, and the third presents a wider list of tourism destinations.

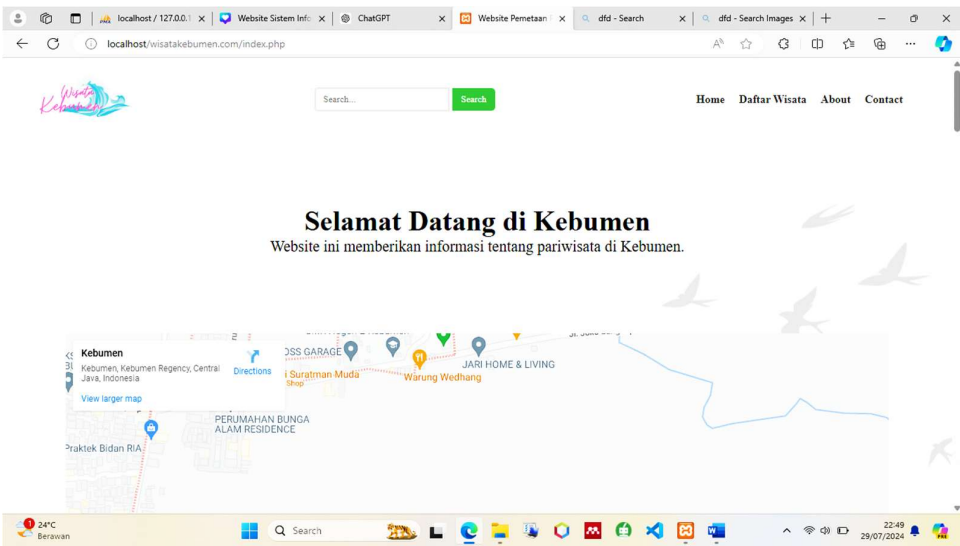


Figure 3. Home Page / Introduction Slide



Figure 4. Top Three Tourism Destinations

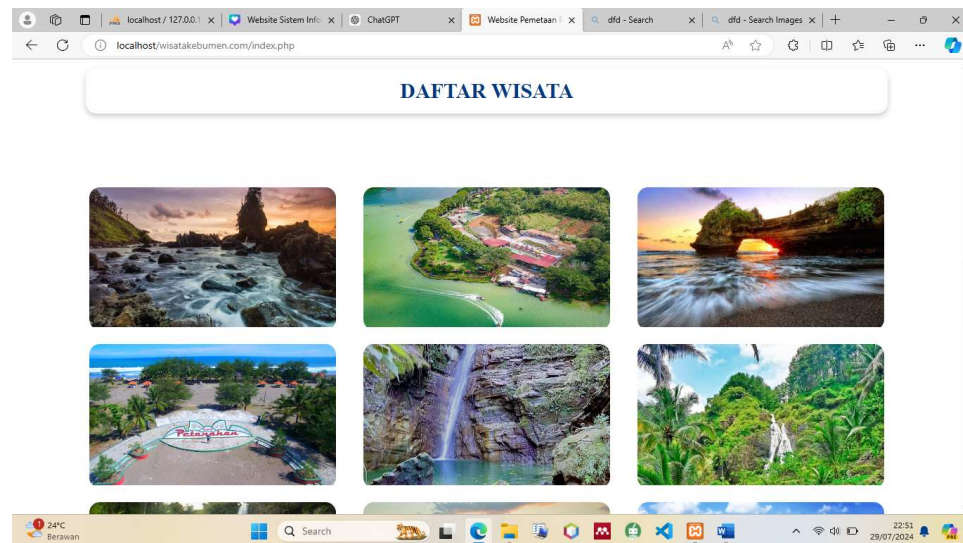


Figure 5. Tourism Destination List

The About page provides information about the website so that visitors can understand its function and purpose. The individual destination page provides more specific information about each tourism destination, allowing visitors to understand the destination before travelling.

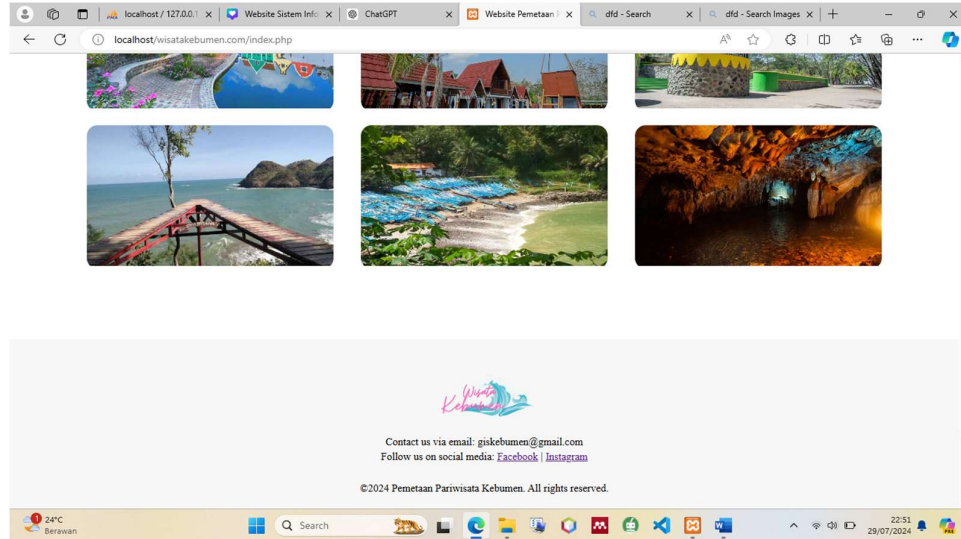
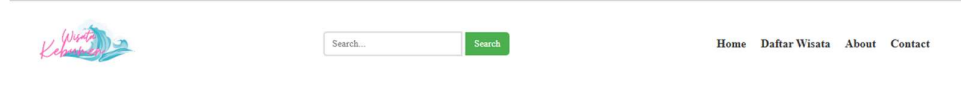


Figure 6. About Page



Tentang Kami

Website Pemetaan Pariwisata Kebumen ini adalah website yang hadir sebagai alternatif bagi calon wisatawan dalam mencari informasi terkait wisata di Kebumen secara detail. Kami berkomitmen untuk memberikan informasi yang akurat dan terpercaya mengenai berbagai destinasi wisata, termasuk tempat-tempat menarik, fasilitas, dan kegiatan yang dapat dilakukan di Kebumen.

Tujuan dari website ini adalah untuk memudahkan para pengunjung dalam merencanakan perjalanan mereka dengan menyediakan peta interaktif dan data yang komprehensif. Dengan informasi yang mudah diakses, kami berharap dapat meningkatkan pengalaman wisatawan dan mendukung pengembangan pariwisata lokal di Kebumen.

Figure 7. Individual Destination Page

The system also incorporates location information and Google Maps to support directions to tourism destinations. The system architecture described in the original article uses frontend technologies (HTML, CSS, and JavaScript) and a PHP/MySQL backend. The DFD describes the Home Page as the main process that loads destination data and displays the resulting destination information to visitors.

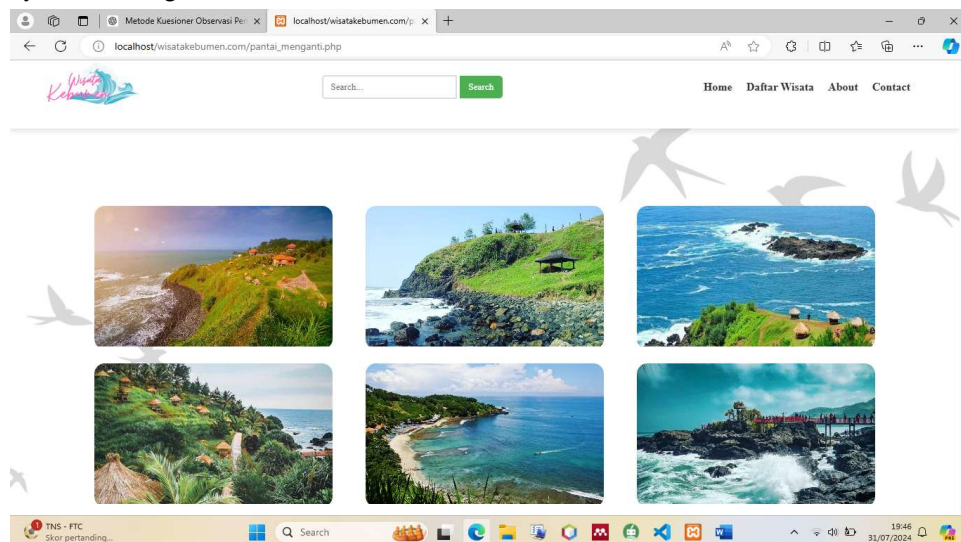


Figure 8. Destination Information Interface

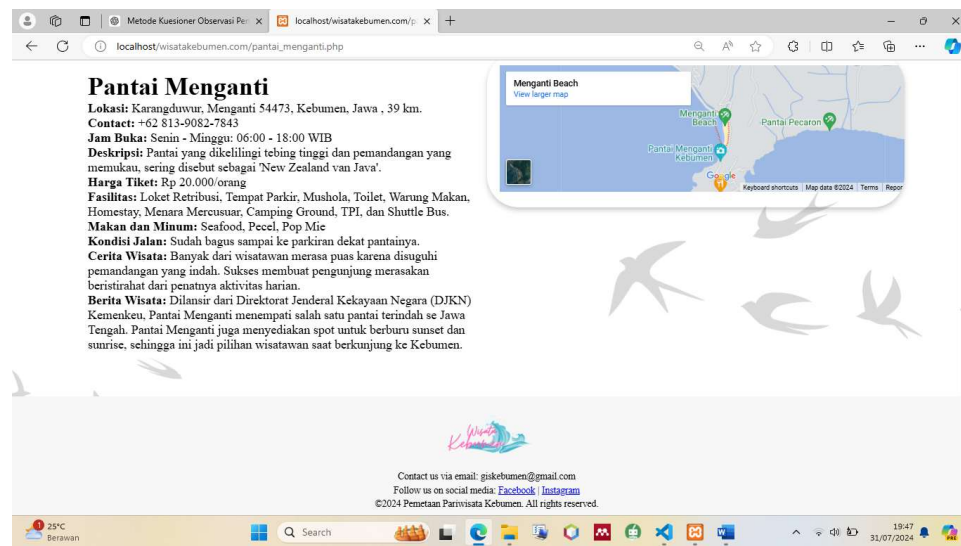


Figure 9. Website Footer / Supporting Interface

DISCUSSION

The results show that the website addresses the main information problem identified in the study: tourism information for Kebumen can be concentrated in a single web-based source focused specifically on Kebumen. The combination of destination descriptions and location guidance makes the information more practical for visitors than a source that only provides descriptive information. This design is consistent with the role of GIS in representing geographic information and with the use of web technologies for accessible information delivery [1–4].

From the system development perspective, the Waterfall model provides a clear sequence from requirements analysis through maintenance. The original design explicitly defines the activities performed at each stage, which makes the development process easier to organize when the system requirements have been identified at the beginning. The resulting interface is divided into an introduction, top destinations, destination listings, an About page, and individual destination pages, giving the system a straightforward navigation structure.

The DFD further clarifies the interaction between visitors, the Home Page process, and destination data. A visitor requests the Home Page; the system loads the required destination data; and the processed information is returned to the visitor. Thus, the design links the information needs identified in the analysis phase with the website functions implemented in the development phase. The original study, however, does not report quantitative usability, performance, or user-satisfaction measurements, so the effectiveness of the system is discussed here based on its implemented functions rather than statistical evaluation.

CONCLUSION

The study produced a web-based Geographic Information System for mapping tourism destinations in Kebumen. The system is designed as an alternative focused source of tourism information and integrates destination information with Google Maps for location guidance. The development uses the Waterfall method through analysis, design, development, testing, implementation, and maintenance. The resulting website provides an introductory home page, top destinations, a tourism destination list, an About page, and individual destination information pages. Its main advantage is the concentration of Kebumen tourism information in an accessible web interface, while its limitation is that the original study does not provide quantitative testing results for usability, performance, or user satisfaction. Future evaluation can therefore complement the functional implementation with measurable user and system performance indicators.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest related to this study.

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