

Tribhuvan University

Faculty of Humanities and Social Sciences

**A Project Report on**

**“Blog Webapp”**

**Submitted to**

**Department of Computer Application**

**Kathmandu College of Technology**

***In partial fulfillment of the requirements for the Bachelors in Computer***

***Application (BCA 4th semester)***

Submitted by

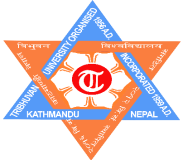
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**1st April 2024**



**Tribhuvan University**

**Faculty of Humanities and Social Sciences**

**Kathmandu College of Technology**

**Supervisor’s Recommendation**

I hereby recommend that this project prepared under my supervision by “**Sushanka Karki** and **Sujina Kc**” entitled “**Blog Webapp”** in partial fulfillment of the requirements for the degree of Bachelor of Computer Application is recommended for the final evaluation.

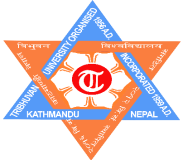
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**Tribhuvan University**

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**LETTER OF APPROVAL**

This is to certify that this project prepared by Sushanka karki and Sujina Kc entitled “**Blog Webapp”** in partial fulfillment of the requirements for the degree of bachelor’s in computer application has been evaluated. In our opinion it is satisfactory in scope and quality as a project for the required degree.

|  |  |
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# ACKNOWLEDGEMENT

We extend our heartfelt gratitude to all those who generously contributed their time and support to help us achieve success in our project work. Special thanks are due to Kathmandu College of Technology for providing us with the opportunity to undertake and complete this project. We owe a tremendous debt of gratitude to our Project Guide, Mr. Susan Risal, whose invaluable knowledge, timely guidance, cooperation, and encouragement were instrumental in the successful completion of this endeavor. Additionally, our sincere appreciation goes to the Head of Department and project supervisor Mr. Prashant Gautam, Mr. Susan Risal for their assistance, insightful comments, and willingness to share their expertise with us throughout the project duration.

We are immensely grateful to our friends for their continuous inspiration, encouragement, guidance, and supervision, which played a pivotal role in the completion of our project. We also wish to acknowledge the IT staff for providing us with sufficient information and support, contributing significantly to our project's successful completion.

Lastly, we express our heartfelt gratitude to our parents, whose unwavering support and encouragement served as a constant source of inspiration throughout this journey.

# ABSTRACT

This report presents the culmination of efforts in the development of a Blog Web Application as part of the bachelor’s in computer application (BCA) program at Kathmandu College of Technology. The primary objective of this project was to create a platform where users can publish and share online articles conveniently. The Blog Web Application offers an intuitive interface for users to compose, publish, and manage their blog posts efficiently. It incorporates modern technologies to ensure a seamless user experience. The frontend of the application is built using HTML5, CSS3, and JavaScript, with React.js framework providing dynamic and interactive elements. On the backend, Node.js along with Express.js framework is employed to handle server-side operations, while MongoDB serves as the database management system to store and retrieve data efficiently.

Keywords: Blog app, HTML, CSS, Nodejs, Reactjs

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# LIST OF ABBREVIATIONS

API: Application Programming Interface

Apps: Application

CSS: Cascading Style Sheet

DFD: Data Flow Diagram

ER-diagram: Entity Relationship Diagram

HTML: Hypertext Markup Language

JS: JavaScript

SAD: System Analysis and Design

UI: User Interface

# CHAPTER 1

## INTRODUCTION

### Introduction

A web blog app is a software tool or platform that allows users to create, publish, and manage their own blogs on the internet. It provides users with an interface to write posts, add images or multimedia content, and customize the design and layout of their blog.

With intuitive user authentication, seamless post creation, and management tools, users can easily create, edit, categorize, and share their content. Our application's innovative features, including category filtering and interactive user engagement options, ensure a seamless and enriching blogging experience. Join us in exploring the endless possibilities of expression and connection within our vibrant digital community.

### Problem Statement

Existing web blog applications often lack user-friendly interfaces and comprehensive features, hindering bloggers' ability to create, manage, and share content effectively. There's a need for a more intuitive and feature-rich platform that prioritizes user empowerment and community engagement while simplifying content creation and organization. This highlights the challenge of developing a robust web blog application that offers a seamless and enriching blogging experience, fostering creativity and meaningful interactions within a digital community.

### Objectives

Our website focuses on providing quality services for the customers. The main aim of the blog app is listed below.

* Develop a user-centric web blog application with an intuitive and easy-to-use interface.
* Implement comprehensive features for seamless content creation, editing, and categorization.
* Enhance user experience through efficient category filtering for easy navigation and discovery of content.

### Scope and Limitations

Every website has its own unique features and its limitations. The blog Website offers the following scope and lacks following things.

#### Scope

* Users will be able to edit, delete, and categorize their posts for better organization and navigation.
* The app will be designed to be responsive, ensuring seamless user experience across different devices and screen sizes.
* The blog app will allow users to create and publish blog posts easily, with options for text formatting, image insertion, and multimedia embedding.

#### Limitations

* The app may lack advanced features such as real-time collaboration, advanced analytics, or integration with third-party services.
* The app may face scalability challenges in handling many users or posts, leading to potential performance issues.
* While the app will offer basic customization options, such as post categorization and filtering, it may not provide extensive customization capabilities for users to tailor the app to their specific needs.

### Report Organization

This report document contains five chapters, including this chapter. Chapter two defines and describes the background study and provides an overview of related existing systems, along with their pros and cons. Chapter three presents the system analysis and design, including requirement analysis and feasibility analysis. Chapter four explains the implementation, testing, and debugging processes. In chapter five, conclusions, limitations, and future enhancements are briefly explained.

# CHAPTER 2

## BACKGROUND STUDY AND LITERATURE REVIEW

### Background Study

Blogging has emerged as a prominent medium for individuals and organizations to share ideas, opinions, and experiences on various topics ranging from personal anecdotes to professional insights. In recent years, numerous web blog applications have entered the market, each offering distinct features and functionalities to cater to the diverse needs of bloggers. These existing systems vary in terms of user interface design, content management capabilities, and community engagement features.

However, despite the availability of these established platforms, there are still challenges and limitations that users encounter. Issues such as complex user interfaces, limited customization options, and lack of seamless integration with social media platforms often hinder the blogging experience for users.

Recognizing the need for a user-centric and feature-rich solution, the development of a new web blog application aims to address these challenges and provide users with a seamless and enriching blogging experience. By leveraging modern technologies and incorporating intuitive design principles, the new blog app seeks to streamline the process of content creation, management, and community engagement for users.

Through a comprehensive background study of existing systems and their pros and cons, this report aims to identify key areas for improvement and outline the objectives and scope of the new web blog application. By understanding the current landscape of web blogging platforms, we can better tailor our solution to meet the evolving needs and preferences of bloggers in the digital age.

### Literature Review

The literature surrounding web blog applications encompasses a diverse range of topics, including user experience design, content management systems, and online community engagement. Several studies have explored the evolution of blogging platforms and their impact on communication, information dissemination, and digital culture.

One key aspect of web blog applications is user experience design. Research by Norman (2013) emphasizes the importance of intuitive user interfaces and seamless navigation in enhancing user engagement and satisfaction. By adopting principles of usability and human-centered design, web blog applications can provide users with a more enjoyable and efficient blogging experience.

In terms of content management systems (CMS), WordPress remains one of the most widely used platforms for creating and managing blogs. Studies by Siibak (2010) and Rieder and Simon (2012) highlight the versatility and extensibility of WordPress, with its vast array of themes, plugins, and customization options. However, researchers have also identified limitations in terms of usability and accessibility, particularly for novice users.

Furthermore, online community engagement plays a crucial role in the success of web blog applications. Research by boyd (2006) and Ellison and boyd (2007) underscores the significance of social interaction and networked publics in shaping online communities. Features such as comments, likes, and sharing options facilitate user engagement and foster a sense of belonging within digital communities.

Despite the abundance of research on web blogging platforms, there is still a need for more user-centric and inclusive solutions. By synthesizing insights from existing literature, this study aims to inform the design and development of a new web blog application that prioritizes usability, customization, and community engagement. Through a comprehensive literature review, we can identify best practices and emerging trends to guide the creation of a more innovative and user-friendly blogging platform.

# CHAPTER 3

## SYSTEM ANALYSIS AND DESIGN

### System Analysis

In the development of a blog app, selecting the appropriate system analysis model is crucial for ensuring the success of the project. System analysis models provide a structured approach to understanding, designing, and implementing complex systems. In this section of the project report, we will discuss various system analysis models, evaluate their suitability for our blog app project, and ultimately select the most appropriate model.

* The Waterfall approach: Sequential approach with distinct phases: requirements, design, implementation, testing, deployment, and maintenance.
* Agile model: Iterative and incremental development approach with frequent releases. Emphasizes customer collaboration and responsiveness to change.
* Spiral Model: Incorporates elements of both waterfall and iterative development. Iteratively builds prototypes while addressing risks throughout the project.

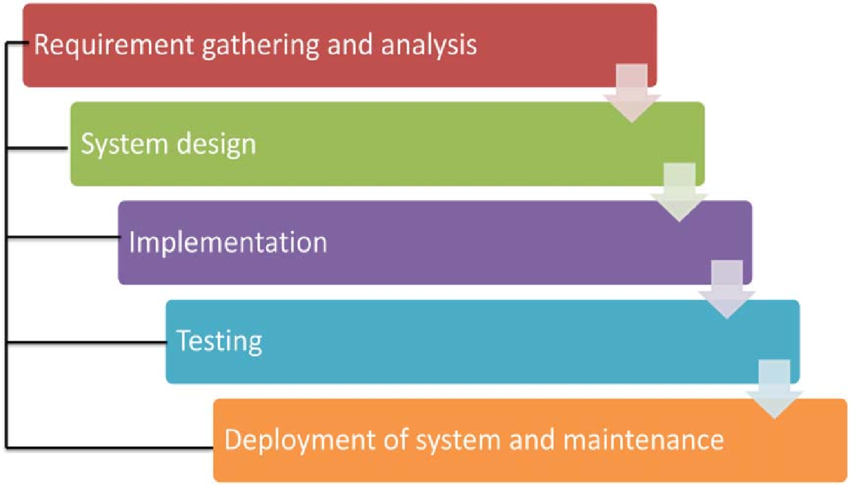
Considering the nature of our blog app project, where requirements are relatively stable and there's a need for a clear, structured approach, the Waterfall Model presents itself as a suitable choice. By adopting this model, we aim to streamline development processes, ensure thorough documentation, and achieve project objectives efficiently.

However, it's crucial to acknowledge potential drawbacks such as limited flexibility for accommodating changes, which may require careful planning and risk management throughout the project lifecycle.

This model requires the following stages to be followed.

* Requirement Analysis
* System design
* Implementation
* Integration and testing
* Deployment of system
* Maintenance

This process has been illustrated below on figure showing top-down development.

****

*Figure 1: Water software development model.*

#### Requirements

Requirement analysis is typically conducted at the beginning of a software development project, during the initial planning and discovery phase. It sets the foundation for the entire development process. It is categorized into two main parts.

* **Functional requirements**
* **Non-functional requirements**

For any system, there are functional and non-functional requirements to be considered while determining the requirements of the system. Functional requirements specify what the system should do or accomplish, focusing on the behavior and functionality of the system from the user's perspective. For example, features such as authentication for account creation and login, ability to create, edit, and publish. On the other hand, nonfunctional requirements are requirements that describe how the system does what it is supposed to do. For example, Usability, Reliability & Availability, security, and maintainability.

1. Functional requirement: The requirement that has been used in the project as the functional requirement generally includes the functionality such as inputs, the processing, and the final output. The functional requirements in the project are mentioned below.
2. User Module

* Users can register and login to the system.
* Users can log out from the system.
* Users can get posts details after uploading each post.

1. Admin Module

* Admin can login to the system.
* Admin can add, edit, and delete posts.
* Admin can logout from the system.

1. Non-Functional requirements: The non-functional requirement specifies how the system works. The non-functional requirement included in the project are:
2. The system uses different databases for storing the attributes for each entity.
3. Users can see all the posts in detail.

#### Feasibility Analysis

#### Technical Feasibility

* The UI of our project is very simple.
* Users will require internet browser and internet to use it.
* It will run on many existing web browsers with the latest versions and even on smart phones.

|  |  |  |
| --- | --- | --- |
| Sr no. | Hardware Used | Specification |
| 1. | Monitor | LCD 15.5” screen |
| 2. | Hard drive | 64 GB |
| 3. | RAM | 8 GB |
| 4. | Processor | Intel i3 11th gen |
| 5. | Graphics | On board graphics card |

*Table 1 : Table of Recommended Hardware*

**Recommended software**

The following software is used for the development of the system.

* VS code
* Postman
* MongoDb

windows 11 is used as an operating system as it is the latest and faster compared to other operating systems.

#### Operational Feasibility

The proposed system demonstrates operational feasibility across various dimensions, including reliability, maintainability, usability, and supportability. It ensures reliability for users of all skill levels, regardless of their familiarity with computers. Additionally, the system is suitable for implementation in organizations of varying sizes, ranging from small-scale to large-scale enterprises. With its straightforward user interface, the system offers simplicity and ease of use, contributing to its operational feasibility.

#### Economic Feasibility

The project falls within the cost estimation of the organization, requiring minimal financial investment. It entails low operational expenses as it does not necessitate expensive hardware or software components. Moreover, the platform necessary for its development is open source, further reducing costs. Thus, the project is economically feasible, presenting no significant financial burden to the organization.

#### Schedule Feasibility

The system that we developed is scheduling feasible as it does not require more time for the development phase. To facilitate effective project management, a Gantt chart was utilized to visualize and track progress across the project phases. This chart provided a comprehensive timeline of tasks, milestones, and deadlines, enabling stakeholders to monitor project progress and identify any potential delays or bottlenecks. By incorporating the Gantt chart into our project management approach, we were able to effectively allocate resources, manage dependencies, and adjust timelines as needed to ensure timely completion of the blog app development. In our project, we used excel for developing the Gantt chart which is shown below in the figure.

|  |  |  |  |
| --- | --- | --- | --- |
| No of Task | Start Date | End Date | Task |
| 1 | 1/10/2024 | 1/13/2024 | Requirement Analysis |
| 2 | 1/13/2024 | 1/19/2024 | Design |
| 3 | 1/19/2024 | 2/2/2024 | Development |
| 4 | 2/2/2024 | 2/7/2024 | Implementation |
| 5 | 2/7/2024 | 2/10/2024 | Testing |
| 6 | 2/10/2024 | 2/15/2024 | Maintenance |

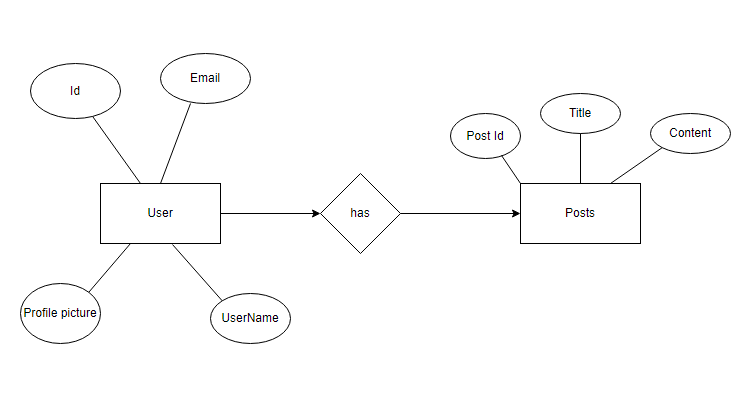
*Table 2: Table of Gantt chart.*

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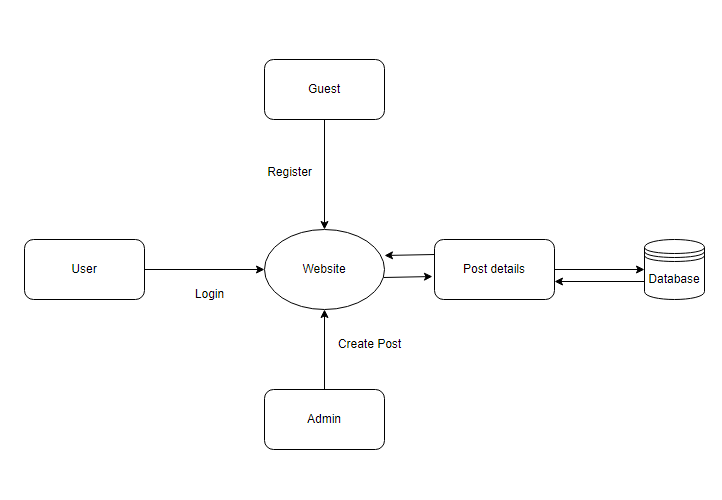
*Figure 2: Gantt chart for blog website.*

#### Data Modeling (ER-Diagram)

In our database system entities are represented by collections which contain documents and attributes are represented by fields in documents. Each field holds a specific piece of data about the entity instance. The overall relationship between the entities is shown in the ER diagram below.

*Figure 3: Entity relationship diagram for blog website.*

#### Process Modelling (DFD)

****A Data Flow Diagram (DFD) provides a visual representation of data movement within a system, illustrating processes, data stores, and external entities. In the case of a blog application, a Level 1 DFD outlines key functionalities such as user interactions, content management, and data storage. This diagram simplifies system complexities into easily digestible components, fostering understanding across various stakeholders. By mapping data flow, the Level 1 DFD serves as a roadmap for system design, ensuring clarity on the fundamental operations of the application.

*Figure 4: DFD level zero diagram for blog website.*

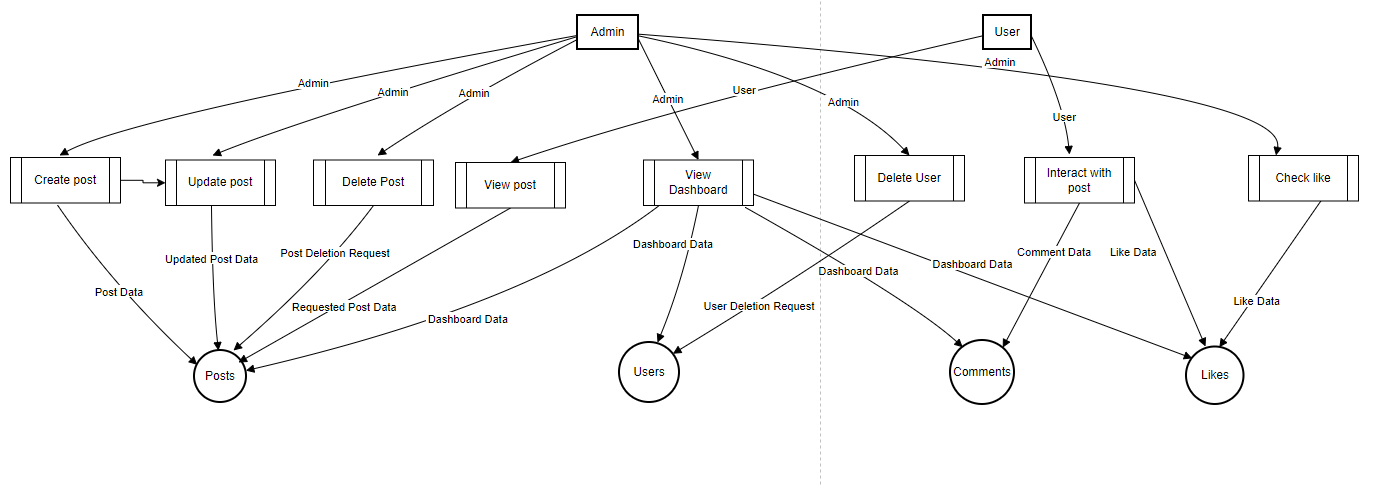


Figure 5: DFD level one diagram for blog website.

### System design

#### Architecture Design

In the blog website, users interact with the system through a simple user interface. The blog app uses three tier architecture. The data is collected from the user and stored in the database through which the server provides post and other details to the user. In order to create a post, the system uses different documents called posts, the user has a unique number which makes them different from other users. In this way our system architecture

A diagram of a computer program

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*Figure 6: 3 Tier architectural design for the blog website.*

#### Database Schema

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*Figure 7: Database schema design for the blog website.*

#### Activity Diagram

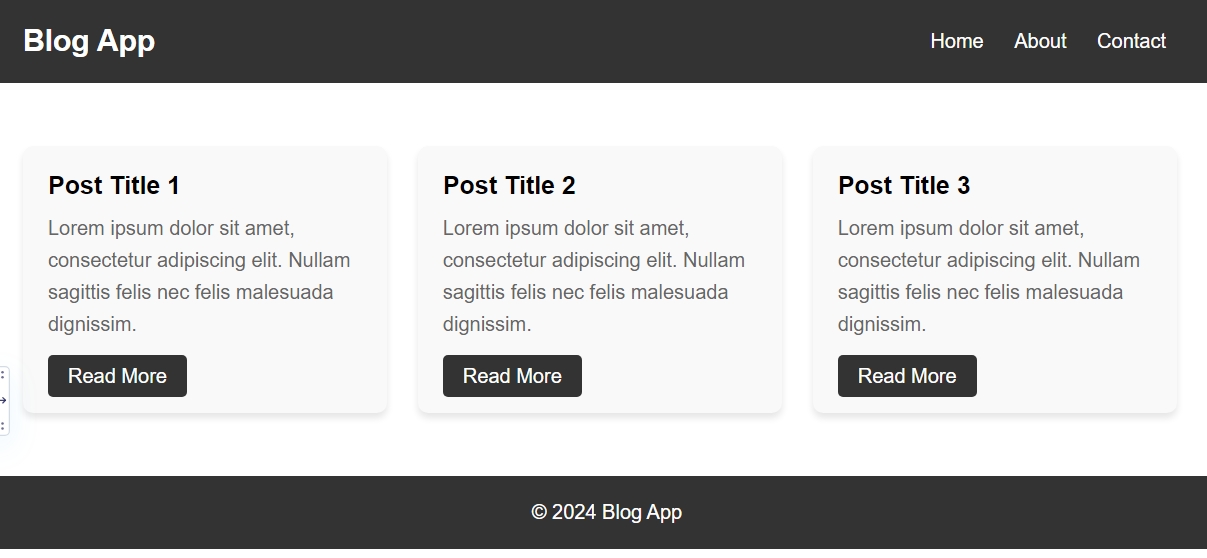
A diagram of a login

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*Figure 8: Activity Diagram for the blog website.*

#### Interface Design (UI Interface / Interface Structure Diagrams)

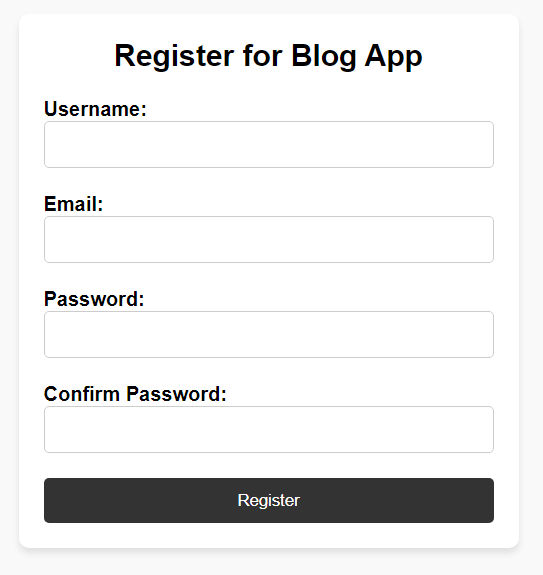
**A screenshot of a computer

Description automatically generated**Before implementing the actual design of the project, a few user interface designs are constructed to visualize the user interaction with the system during registration, login, and post creation processes. The user interface design aims to reflect the functionality outlined in our system's requirements. The initial designs of the webpages are illustrated below.

*Figure 9: Homepage prototype.*

*Figure 10: Create post prototype.*

**A screenshot of a login

Description automatically generated**

*Figure 11: Register/ Login page prototype.*

# CHAPTER 4

## IMPLEMENTATION AND TESTING

### Implementation

Implementation is the crucial phase where the system is constructed based on the information gathered, studied, and analyzed. It is fundamental in any project’s lifecycle, involving the development of a functioning system for users. Implementation typically encompasses coding, testing, installation, documentation, training, and support. This phase converts system design specifications into working software. The tools and technologies used in system development are discussed in earlier chapters. The primary goal is to ensure that the system meets the specified requirements and operates effectively for its intended users.

#### Tools Used

The various system tools that have been used in developing both the front-end and back-end of the project are being discussed in this chapter.

**Front-end**

HTML5, CSS3, and JavaScript are used for developing the front-end.

**HTML (Hypertext Markup Language)**

It defines the elements and layout of the user interface, including headings, paragraphs, images, forms, and more.

**CSS (Cascading Style Sheets)**

CSS is used to style the HTML elements, defining the appearance, layout, and design aspects of the web pages.

**JavaScript (JS)**

JavaScript is a versatile programming language used for adding interactivity and dynamic behavior to web pages. It allows developers to create interactive features such as form validation, animations, and event handling, enhancing the user experience.

**Back-end**

The backend is implemented using NodeJS, ExpressJS, and MongoDB.

**Node.js**

Node.js is a runtime environment that allows developers to run JavaScript on the server-side. It provides an event-driven, non-blocking I/O model, making it well-suited for building scalable and high-performance web applications.

**Express.js**

Express.js is a minimalist web application framework for Node.js, providing a robust set of features for building web servers and APIs. It simplifies the process of handling HTTP requests, routing, middleware integration, and more. Express.js is known for its flexibility, simplicity, and extensibility.

**MongoDB**

MongoDB is a NoSQL database management system that stores data in a flexible, schema-less format known as BSON (Binary JSON). It offers scalability, high availability, and fast performance, making it suitable for handling large volumes of data in modern web applications. MongoDB's document-oriented model allows for seamless integration with JavaScript-based applications, making it an ideal choice for Node.js development.

### Implementation Details of Modules

After finalizing the design and addressing any challenges encountered during the design phase, the focus shifted towards the implementation of the application. Due to the scale of the project, substantial resources were required. While a comprehensive overview of the implementation process is beyond the scope of this paper, key aspects of the implementation will be outlined. The blog website consists of several modules, some of which are listed below:

* Header: It displays the header with the logo of the website social media or the login. It is used in the navbar of the homepage. It is used to provide links to different pages of websites.
* Register Form: The register form includes fields for the user's name, email, password, and password confirmation, with validation ensuring data integrity. Users receive immediate feedback for errors and confirmation of successful registration.
* Login Form: The login form has fields for email and password, validating credentials against stored data. Users receive feedback for incorrect credentials and guidance for recovery. Security measures protect login information during transmission and storage.
* Create Blog Page: The create blog page provides a rich text editor for writing and formatting posts, with fields for the title, category, and tags. Validation ensures required fields are completed. Users receive feedback on successful submission or errors, enhancing the blogging experience.
* User Module: The user module allows users to view and edit their profiles, tracking their blog posts and comments. It ensures secure updates and validates changes before saving. User data privacy and security are maintained throughout the platform.
* Admin Module: The admin module offers tools for managing users, moderating content, and configuring site settings. Admins can edit profiles, approve, or reject posts and comments, and control access to administrative tasks. Logging and reporting features ensure transparency.
* Comment Section: The comment section enables users to leave, like, reply to, and report comments on blog posts. Validation checks maintain comment quality and adherence to guidelines.

### Testing

Testing is done to check the behavior of a complete and fully integrated software product based on the software requirement specification document. For the application or website to be deployed it must be tested. Hence test cases will be written to test this application. There are many types of tests to be carried out on a web application form performance, functionality, database loading time, response time, server time handling, user’s actions, and many others. We will not carry out all types of tests for the application considering the time scale to present this project. Hence performance check related to upload time, memory usage will be part of future test, we will focus the test case on functionality, security, and performance. So various types of testing procedures were performed to check the working mechanism and correctness of the system. Some of the types of testing that were performed are described below:

1. Verify that all the specified fields are present on the registration page.
2. verify that for better user interface dropdowns, radio buttons and checkboxes, etc fields are displayed wherever possible instead of just textboxes.
3. Verify that clicking the submits button after entering all required fields, submits the data to the server.
4. Verify that not filling in the optional fields and clicking the submit button will still send data to the server without any validation error.
5. Check validation on the date and email fields (only valid email ids should be allowed.)
6. Verify that users can successfully create new blog posts.
7. Verify that users can delete their blog posts and that the posts are removed from the database.
8. Verify that users can view a list of all blog posts and that each post displays correctly.
9. Verify that search functionality works and users can search blogs by typing the title on search bar.

## Test Case for System Testing

### Register page test case.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ID | Test Case  Description | Test Data | Expected Result | Actual Result | Pass/  Fail |
| 1 | Admin enters an invalid  email | Email: [random@gmail.com](mailto:random@gmail.com)  Password: 123456 | Display message  \*\*Email format is not valid.\*\* | As  expected | Pass |
| 2 | Admin enters  a wrong  password. | Email: [sushanka@gmail.com](mailto:sushanka@gmail.com)  Password: hello123 | Display message  \*\*Invalid password.\*\* | As  expected | Pass |
| 3 | Admin do not  Enter user  Name and  password | Username:  Email:  [Kathmandu@gmail.com](mailto:Kathmandu@gmail.com)  Password: | Display message  \*\*Please fill out  All fields\*\* | As  Expected. | Pass |

Table 3: Register page test case.

### Login page Test Case

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ID | Test Case  Description | Test Data | Expected Result | Actual  Result | Pass/  Fail |
| 1 | Admin enters a wrong email | Email; [1234@gmail.com](mailto:1234@gmail.com)  Password: 1233 | Display message  \*\*The user not  Found\*\* | As  expected | Pass |
| 2 | Admin enters  a wrong  password | Email: [sushanka@gmail.com](mailto:sushanka@gmail.com)  Password: sushanaka567 | Display message  \*\*Invalid password\*\* | As expected | Pass |
| 3 | Admin enters  Valid email  And password | Email: [rachana@gmail.com](mailto:rachana@gmail.com)  Password: rachana123 | Logged into  Home page | As expected | Pass |

Table 4: Login page test case.

### Create blog Test Case

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ID | Test Case  Description | Expected Result | Actual  Result | Pass /  Fail |
| 1 | Adds title,  Image, description | Add blog to the blogs section. | As expected | Pass |
| 2 | Doesn’t provide  Post title and  Image. | Display Message  \*\*Please provide all  the fields\*\* | As expected | Pass |
| 3 | If user is not an  Admin | Display Message  \*\*You are not allowed  To create a post\*\* | As expected | Pass |

Table 5: Create blog test case.

### User and Post management Test case

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ID | Test Case  Description | Expected Result | Actual  Result | Pass /  Fail |
| 1 | Press Delete post  Button. | Remove the post from database. | As expected | Pass |
| 2 | Press Edit post  Button. | Edit option  Opens. | As expected | Pass |
| 3 | Press Delete User  Button | Removes specific  Account from  Database. | As expected | Pass |

Table 6:User and post management test case.

## CHAPTER 5

# CONCLUSION AND FUTURE RECOMMENDATION

### Lesson Learnt / Outcome

When this project is completed, the users will be able to create, update, delete blogs from our website. After filling in the registration form, users can view and interact with different blogs online. Users can easily read posts, add comments and like the post.

### Conclusion

Following the successful deployment of our blog website, users now have the opportunity to interact with blogs seamlessly online. Throughout the development process, we remained committed to fulfilling all predetermined objectives. While we adhered strictly to the initial specifications, we also iteratively enhanced certain features as necessary to ensure optimal functionality and user experience. Challenges were encountered, particularly in backend development, where ensuring consistent API responses proved to be a significant endeavor.

The decision to employ React for this project was strategic, owing to its ability to streamline the development process effectively. Leveraging React allowed us to compartmentalize code into smaller, more manageable components, and facilitated efficient data flow management. Its status as a leading JavaScript framework underscored its suitability for our project needs. As we approach the project's conclusion, it's evident that despite our achievements, there are numerous avenues for further improvement and refinement.

As we reflect on the journey of this project, it's clear that there are opportunities for continued enhancement and evolution. Feedback from user testing and internal discussions has generated valuable insights into potential areas for improvement. While we prioritized adhering to the established specifications within the allocated timeframe, we acknowledge that ongoing development iterations could incorporate additional enhancements to enrich the application further. This iterative approach ensures that our blog app remains responsive to user needs and continues to evolve in tandem with technological advancements and user expectations.

### Future Recommendation

Here is what can be added in the future on this website to increase its usability, user experience and portability of the website. There is a lot to be done hence this application can be considered as a starting point for something big to come. It will need more time and resources for all this to be done but it is still realistic and possible to achieve.

* Addition of new blog categories.
* Addition of more features in admin dashboard.
* Improve responsiveness of the website.
* Improve performance.
* Advanced search functionality.

### REFERENCES

### APPENDICIES

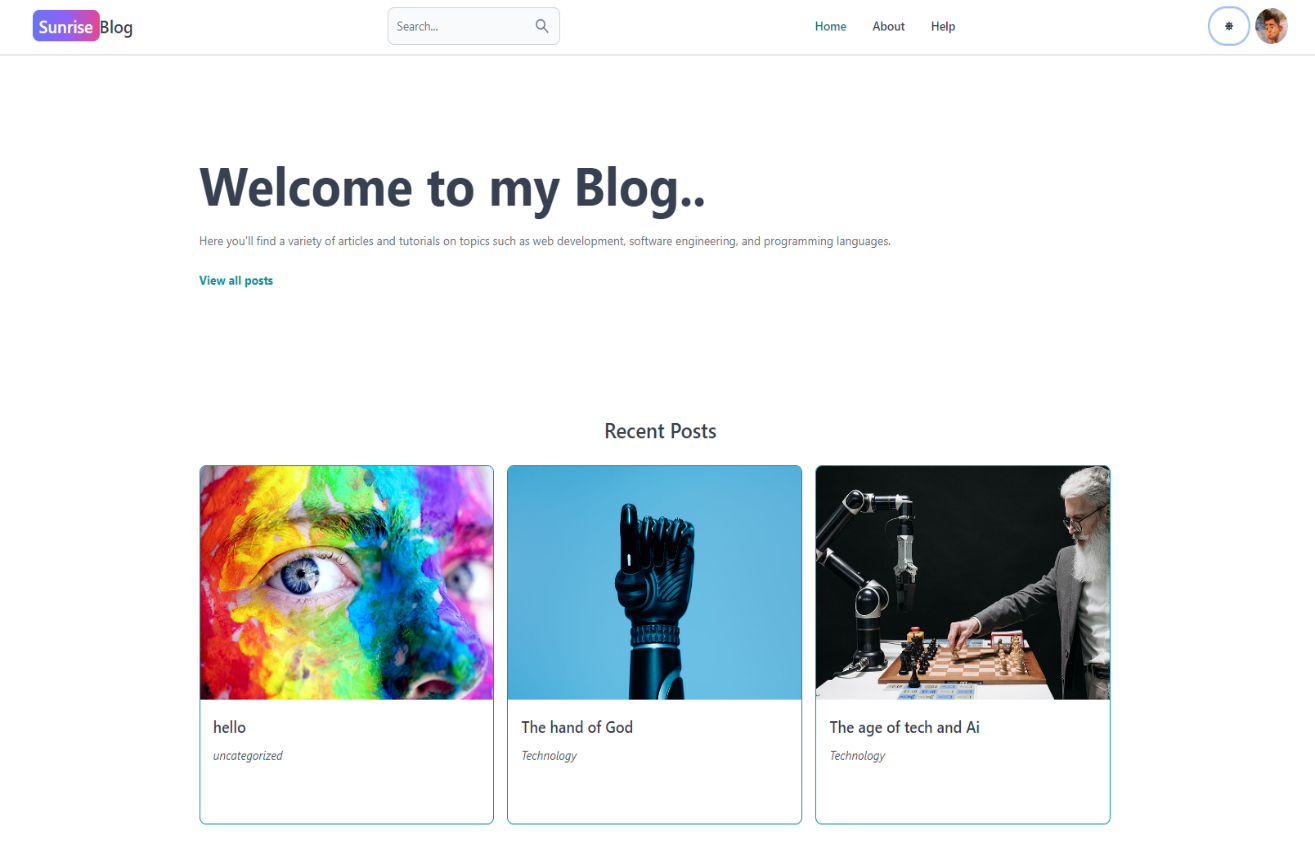


Figure 12 : Home page section.

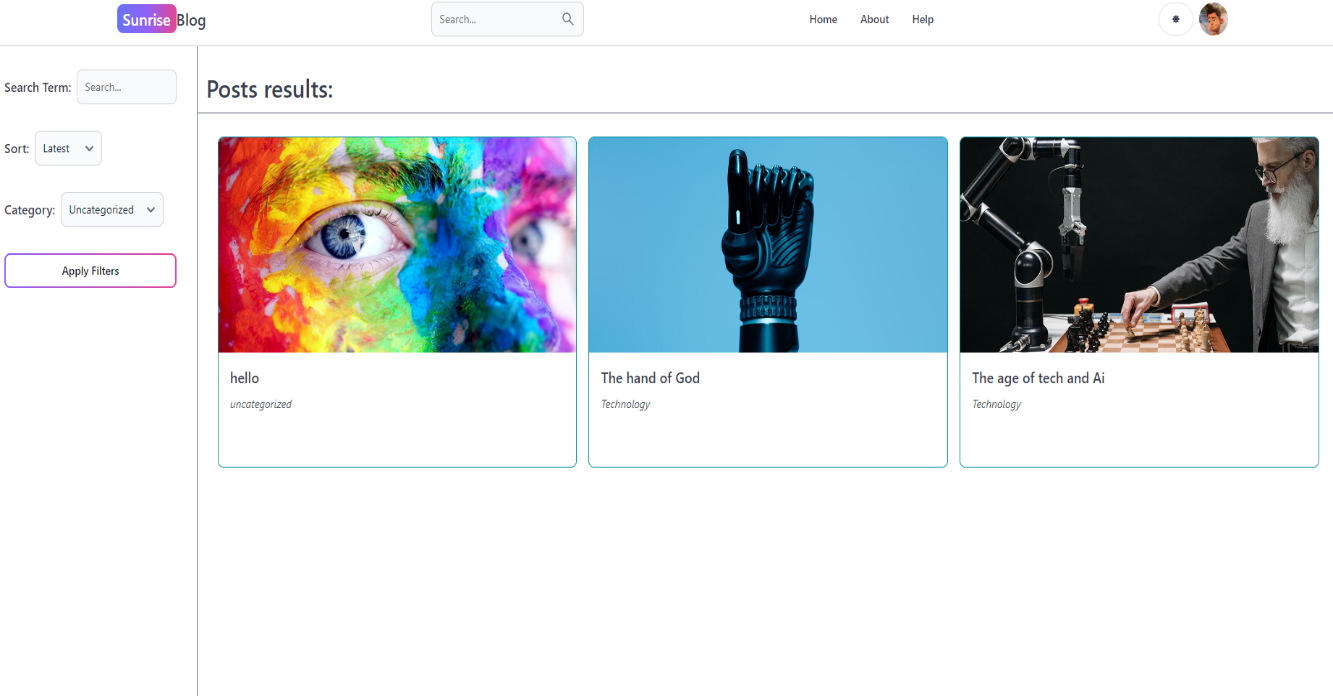


Figure: All posts / Search Section

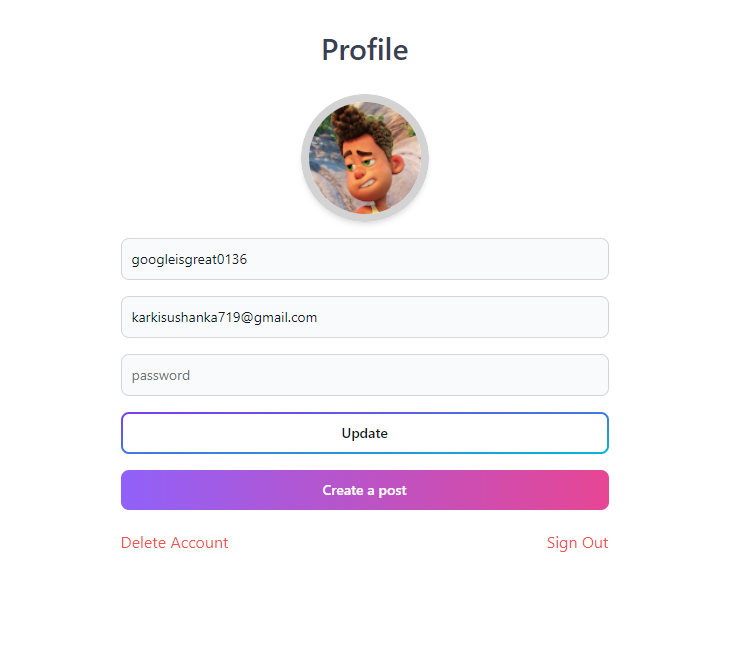


Figure 13: Users profile section.

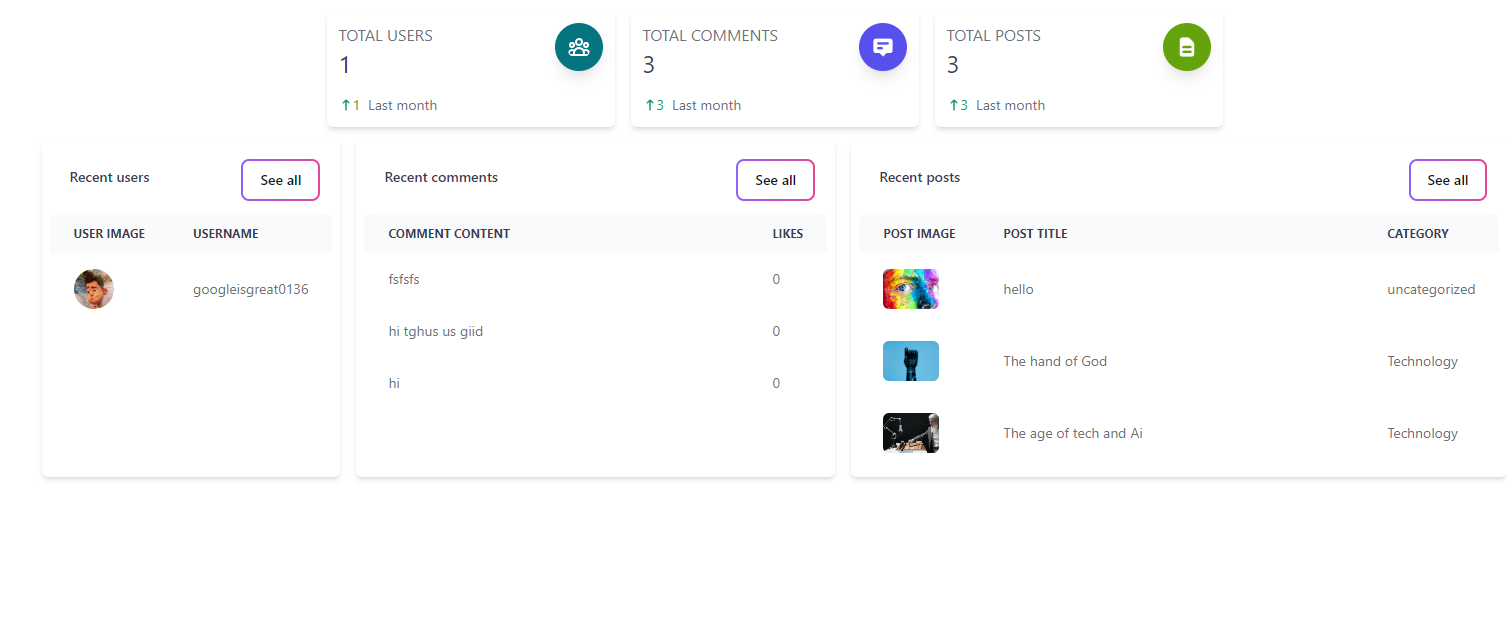


Figure: Admin Dashboard section.

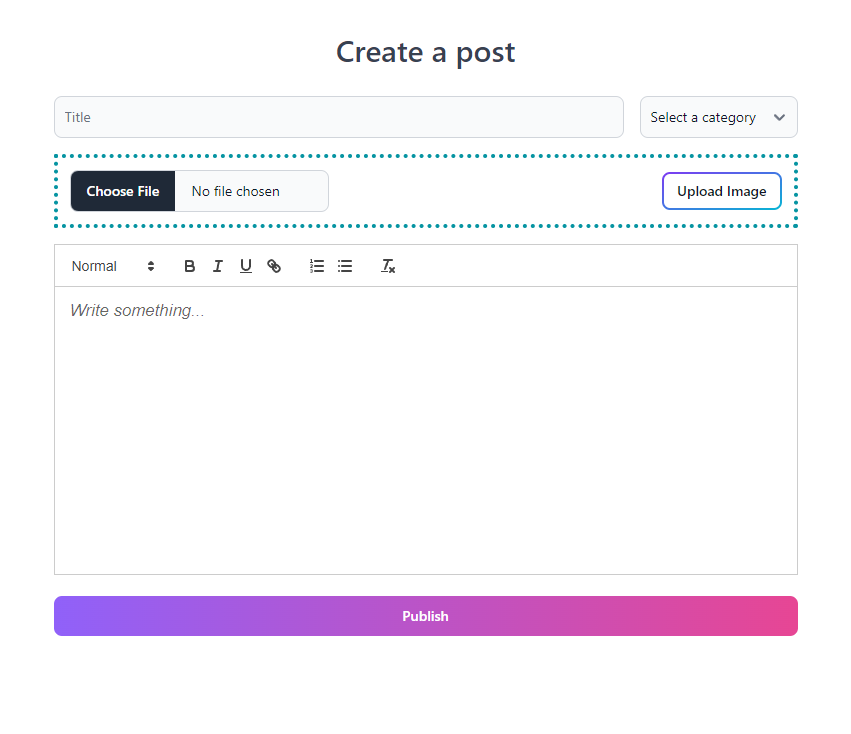


Figure: Create post section.

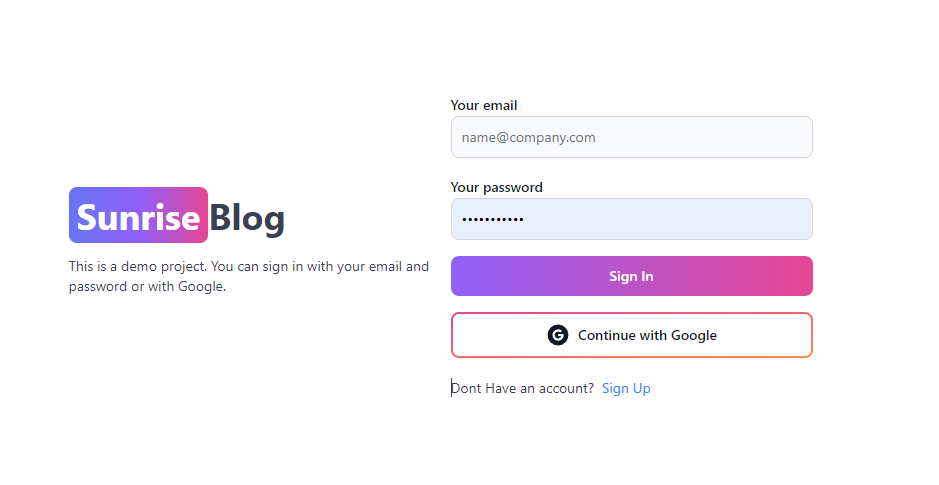


Figure: Login / Signup section.