Content Management System for Blogs

Major project report submitted in partial fulfillment of the requirement for the degree of Bachelor of Technology

in

Computer Science and Engineering/Information Technology

By

SHIVANSH SAIGAL (191209)

UNDER THE SUPERVISION OF

Dr. Pradeep Kumar Gupta
to

Department of Computer Science & Engineering and Information Technology

Jaypee University of Information Technology, Waknaghat, Solan-173234, Himachal Pradesh

DECLARATION

I hereby declare that this project has been done by me under the supervision of (Dr Pradeep Kumar Gupta, Associate Professor, Deptt. Of CSE & IT), Jaypee University of Information Technology. I also declare that neither this Project nor any part of this Project has been submitted elsewhere for the award of any degree or diploma.

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CERTIFICATE

This is to certify that the work which is being presented in the Project report titled "**Content Management System for Blogs**" in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science & Engineering** and submitted to the Department of Computer Science & Engineering, Jaypee University of Information Technology, Waknaghat is an authentic record of work carried out by "Shivansh Saigal (191209)" during the period from August 2022 to May 2023 under the supervision of Dr. Pradeep Kumar Gupta, Department of Computer Science and Engineering, Jaypee University of Information Technology, Waknaghat.

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LIST OF ABBREVIATIONS

CMS	Content Management System
SPA	Single Page Application
API	Application Programming Interface
DBMS	Database Management System
UI	User Interface
UX	User Experience
CRUD	Create, Read, Update, Delete
HTML	Hypertext Markup Language
CSS	Cascading Style Sheets
JS	JavaScript
MEAN	MongoDB, Express.js, AngularJS, Node.js
JWT	JSON Web Token
CDN	Content Delivery Network
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
DNS	Domain Name System
SSL	Secure Sockets Layer
TLS	Transport Layer Security
SEO	Search Engine Optimization
SMTP	Simple Mail Transfer Protocol

ABSTRACT

The project's goal is crafting an efficient Content Management System (CMS) tailored to bloggers' needs using the MEAN stack. We aim to create an easy to use platform which enables users without technical expertise in content creation, administration and publication.

To achieve this goal I begin by conducting a comprehensive literature review exploring evidence based trends in CMS development including platforms comparison analysis User Interface design principles as well as performance optimization strategies. Relying on those findings I apply best practices in designing a resilient system.

The resulting CMS features an intuitive interface supported by customizable templates and themes catering for diverse preferences while supporting text editing capabilities like image or video insertion plus incorporation of SEO tools contributing towards higher SERPs rankings provided by search engines.

In addition the platform connects seamlessly with social media channels streamlining creators interactions with their audiences. The section which concentrates on experiments and analyzing results will record the process of testing and validating the CMS.

The final summary will encompass the discoveries made during the project while assessing its triumphs. Additionally, it will enumerate any constraints experienced within the project and propose avenues for supplementary study and growth.

Chapter 01: INTRODUCTION

1.1 INTRODUCTION

With digital advancements permeating every aspect of life blogging has become widespread as individuals leverage it to communicate with others worldwide while monetizing their efforts. However, managing blogs presents unique difficulties such as organizing content publication and promoting it effectively regardless of the perceived ease associated with blogging.

Maintaining an engaging online presence through regular blog posts can entail significant effort from any blogger serious about their craft. Juggling research time with formatting demands often leads to inconsistencies in layout or subpar output quality which may impact readership engagement negatively over time. A reliable solution is using a content management system (CMS) which streamlines your work processes—enabling you as the blogger to focus on producing high-quality pieces without getting bogged down by tedious maintenance tasks.

The essential goal at hand entails constructing a robust blog content management system (CMS) utilizing the strengths endemic within the MEAN stack- encompassing MongoDB database software; Express -a flexible JavaScript framework; AngularJS-a versatile front-end framework & Node.js as its runtime environment. The highly scalable nature coupled with its inherent adaptability and ease-of-use makes employing this technology-stack pragmatic when developing web applications across any domain or industry. Our motive aims at carving out a comprehensive solution germane for bloggers to implement customizations effortlessly.

The conventional method of blog management involves manually creating content using text editors. While this is still widely practiced, its not without its drawbacks. One major challenge is the potential for errors that could result in inconsistent formatting and layout. Additionally managing multiple contributors without a CMS can make it considerably harder to track changes maintain content quality and ensure consistency across pieces.

Our objective is to develop a CMS targeted at bloggers, comprising various features that facilitate efficient content management. The system's intuitive interface ensures effortless creation and editing of content. In addition, it will accommodate multiple contributors, enabling bloggers to collaborate with other writers and editors. The content management system will monitor revisions, making it simple to review and approve content changes and uphold content quality standards.

The scope of this project is to create a CMS for blogs that can serve to the requirements of individual bloggers and their readers. The system will be created to be highly scalable, allowing it to expand as the blogger's audience grows. The CMS will be adaptable to satisfy the requirements of bloggers in a variety of industries, including fashion, lifestyle, technology, and others.

The initiative presupposes that bloggers will have fundamental knowledge of web development, including HTML and CSS. The CMS is responsive as bloggers may use a variety of devices for using the CMS, such as desktops, laptops, tablets, and smartphones.

The system will present bloggers with an effective and user-friendly tool for managing and publishing their content, allowing them to focus on producing excellent content and engaging with their audiences.

1.2 PROBLEM STATEMENT

This project tackles the issue associated with the absence of an efficient and easy-to-use content management system specifically designed for blogs. Several CMS platforms available today are created primarily for general websites which makes them lack critical features required for managing a blog effectively. As a result, many bloggers have no choice but to use several tools and plugins just so they can reach their desired functionalities—making it very time-consuming and difficult. What's more—some CMS platforms may not provide scalability or flexibility essential in accommodating a blog's growth over time thus increasing its limitations further down the line[2]. In essence; this project seeks out creating a content management system that would address these issues by catering directly towards what bloggers need—a holistic solution that seamlessly integrates content publishing with tracking analytics data plus engagement with readership whilst also providing monetization options tailored explicitly towards blogging needs. The end-result should be intuitive yet customizable so as it can adapt accordingly to different blogging requirements.

1.3 OBJECTIVES

The aims of this project are:

1. To design and develop a Content Management System (CMS) for blogs.
2. To implement an user-friendly interface that allows the bloggers to easily create, manage, and publish blog posts.
3. To develop a robust database schema that can handle a large volume of blog content, including text, images, and multimedia.
4. To integrate essential features into the CMS such as search, comments, tags, categories, and social media sharing.
5. To optimize the CMS for search engine optimization (SEO) to increase blog visibility and reach.

1.4 METHODOLOGY

In creating the content management system for blogs an Agile methodology approach was chosen. This software development life cycle allows incremental and iterative product delivery thus increasing efficiency as well as adaptability when compared to rigid Waterfall methodology. Agile methodology is executed through sprints which typically last between two to four weeks and focused on delivering specific working product increments; this step follows an initial planning meeting where goals and objectives are established. To track progress throughout each sprint daily stand-up meetings are held.

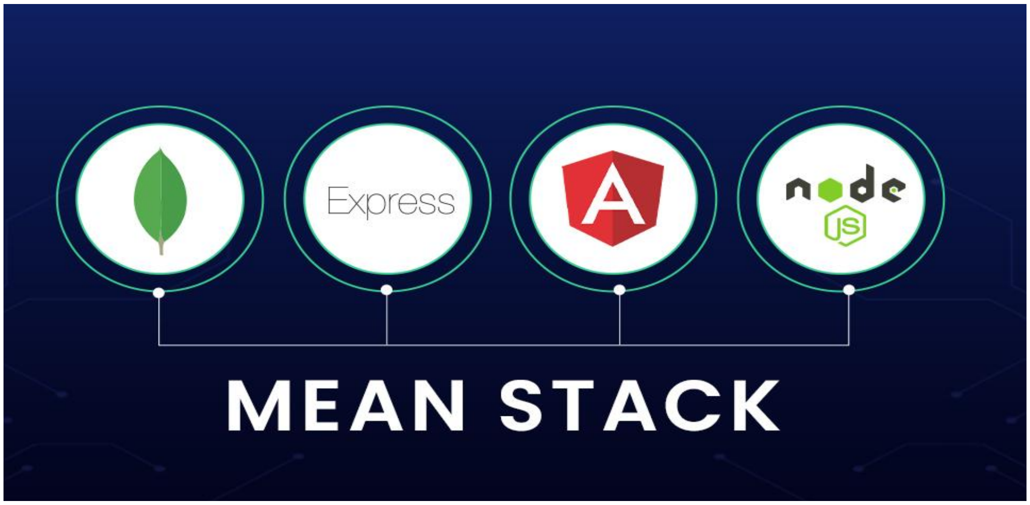


Fig 1.4.1 MEAN Stack Illustration[2]

This project utilized MEAN stack - as a full stack JavaScript framework – consisting of MongoDB, Express.js, Angular, and Node.js technology to develop scalable web applications at a faster pace while ensuring quality control standards were adhered to. The initial requirements-gathering process marked the start of this particular development cycle with emphasis placed on effective needs assessment through analysis and prioritization.

Developing complex software applications efficiently requires breaking project requirements down into smaller independent features called user stories which can be developed in one single sprint by prioritizing them based on their complexity & importance. The dev team then goes ahead with writing code while integrating testing parallelly; daily stand-ups help track progress & address any issues/roadblocks effectively & promptly conducted throughout the development process.

The end of each sprint brings stakeholder feedback which gets used to improve the product for the next sprint; this is where the Agile methodology's flexibility brings added benefits. For single-page web application development, choosing the MEAN stack for its scalability, speed, and ease of use provides an additional advantage, resulting in a streamlined content management system for blogs thanks to efficient management via Agile methodology.

1.5 ORGANIZATION

1.5.1 HTML

To create online content such as web pages or multimedia materials; developers rely on Hypertext Markup Language (HTML). This standard programming language is fundamental in defining the structure and layout for web page elements like text or images using customization through CSS or JavaScript. With new technological developments in modern website development continually emerging; HTML has evolved into various versions over time - including more advanced capabilities like those available with HTML5. For instance: better multimedia functionality , improved form functionality among others .

Thus; playing a significant role in building robust web applications using MEAN Stack technology that are responsive , speedy ,and user-friendly.

1.5.2 CSS

Web developers have long relied on Cascading Style Sheets (CSS) to elevate their website design capabilities significantly. The stylesheet language provides complete control over how HTML or XML documents appear online through its layout options and aesthetics features- including fonts, color schematics among others. Notably, what makes CSS stand out is its ability to separate style from content; this allows designers to build unique layouts without tampering with underlying structures' core elements- it makes workflow more manageable! Moreover, with its inherent responsive design capabilities enabling adjustments for various screen dimensions- desktops computers vs mobile devices– professionals creating contemporary-looking websites find innovative ways not possible previously using alternative methods.

1.5.3 MongoDB

MongoDB, the NoSQL document oriented database platform that stores information using JSON like documents with dynamic schemas tailored for maximum developer flexibility. Perfectly suited for web applications requiring high levels of scalability and lightning fast performance; users typically rely on this solution when working with information of the semi structured/ unstructured variety such as user profiles, blog posts and comments.

1.5.4 Express

Node.js developers seeking speedy yet customizable web application solutions need look no further than the versatile toolkit offered by Express. Thanks to its impressive feature set encompassing everything from convenient routing options to middleware building blocks to intuitive template engines – all optimized for maximum flexibility – this framework has become an industry favorite among both novice coders and seasoned veterans alike. Its compatibility with numerous HTTP request/response methods only sweetens the deal when it comes to developing complex applications[3].

1.5.5 Angular

Angular was created by Google back in 2010 Angular has been gaining immense popularity as an open source front end web development framework for dynamic web application projects. Its wide range of features makes it an exceptional choice for developing Single Page Applications (SPAs) due to its reusable components easing efforts during development while reducing development time significantly using Typescript as a programming language improving code quality among other benefits

Angular breaks down your application into smaller components following its component based architecture which makes the management process smoother along with seamless implementation of services through dependency injection as well as routing support simplifying testing processes too.

One significant factor contributing to Angular's high productivity level is attributed to its vast ecosystem offering various pre-built modules alongside libraries that can be easily integrated within your project allowing quicker outcomes. Further promoting these applications' productivity is due to the active community whose ongoing contributions enhance the framework as they continuously provide adequate support.

1.5.6 Node.js

Node.js offers developers an incredibly powerful toolset for constructing highly performant and scalable applications on the server side using JavaScript code — a language well known in front end development circles but less often associated with back end functionality. With its unique combination of an event driven architecture alongside non blocking I/O mechanisms this platform excels at facilitating real time app development tasks requiring speedy data processing capabilities. As such it has become increasingly popular among developers looking to create modern web based apps on the back end or explore microservice oriented architectures as their preferred programming approach.

1.5.7 VS Code

Visual Studio Code (VS Code) has emerged as the editor of choice for developing and debugging the MEAN stack web application used in this project due to its prowess as a source code editor. As an all-encompassing tool designed to streamline coding tasks while at the same time providing several advanced features such as syntax highlighting capacity alongside comprehensive debugging capability. Built-in support for programming languages which include Angular , Node.js framework make downloading Plugins hassle-free across different languages which makes coding seamless . Thanks to Vs codes simplistic interface , developers can tweak it with customizable extensions tailored towards enhancing their workflow towards maximum efficiency speedily . This powerful platform offers programmers unmatched versatility when working on projects.

1.6 DELIVERABLES OF THE MAJOR PROJECT

- Blogging Platform: This project revolves around crafting a cutting edge blogging platform that enables users to effortlessly create and share their blogs online. To accomplish this feat our primary objective involves devising an intuitive user interface that simplifies all aspects surrounding post generation, modification and publication.

- Content Management System : Given its importance in effective content management systems (CMSs) managing one's digital assets should be straightforward and seamless. This involves enabling users to perform tasks such as adding new material or removing/editing existing blog posts with minimal effort or confusion. A well designed CMS should support this kind of intuitive approach by streamlining how requests for data are made across different types of digital media formats available on the platform in question.

- User Authentication and Authorization : The success of the platform hinges on its ability to implement a robust user authentication and authorization component. This feature acts as a safeguard that regulates access to select functionalities according to each individual's unique role assignment. Thus, it delivers maximum protection by permitting only those with proper clearance to utilize certain aspects of the system while restricting unauthorized entry.

- Responsive Web Design : To ensure accessibility across various devices including desktop computers, tablets and smartphones it is important that the platform is designed with responsiveness as a key feature.

Chapter 02: LITERATURE SURVEY

2.1 Introduction to Content Management Systems

Managing digital content such as video, images, or texts on websites today is everyday practice for many businesses globally thanks to Content Management Systems (CMS). With these software applications at hand, managing can be seamless making it possible for people without coding knowledge or technical expertise to maintain effective websites efficiently.

The benefits of using CMSs are vast! They offer flexible workflow processes allowing multiple users to work together on creating top-notch web pages while simplifying everything else from website organization structures down to editing new content within seconds.

One outstanding example of excellent results from utilizing a CMS is WordPress. It was initially designed for bloggers but has over time developed into an all-inclusive CMS supported by several plugins devised by competent developers across the world[4].

Other widely used customizable options include Drupal or Joomla which cater more to larger sites with complex requirements. Nonetheless, you will agree that all three options help improve your overall experience when working towards organizing your digital assets whilst facilitating efficient management processes every day. If you're building or managing a website today chances are you've heard about or are already using a content management system(CMS).

While these tools offer valuable SEO benefits through optimizing web pages for search engine algorithms -there are also some possible pitfalls worth considering. One factor to keep in mind when working with a CMS is how resource intensive they tend to be compared to traditional static HTML sites; this means they may require more server resources resulting in slower loading times if not properly managed over time.

Another issue regards cybersecurity as all software solutions face vulnerabilities that can put your site at risk. In CMSs, this is usually due to the complexity and sophistication of the systems, which can attract more cyber criminals attempting to hack into them. So while CMSs empower non-technical users to create and manage website content more efficiently than ever before it's critical to assess carefully their potential upsides and downsides.
It's also essential to ensure your site has adequate security measures in place that help maintain its integrity over time.

2.2 History of Content Management Systems

For more than thirty years now - Content Management Systems (CMS) have played an indispensable role in shaping how we create and maintain online platforms. Its inception dates back to 1990 when Tim Berners Lee created the very first CMS known then as WorldWideWeb Platform, later rebranded Nexus. Today a plethora of different variations exists all catered around varying requirements.

There are four crucial types of CMS categorized by experts: web content management (WCM) digital asset management(DAM) document management(DM)and enterprise content management(ECM). Each variant is built with optimal functionality aimed at strengthening online publishing and streamlining user experiences.
Web content Management Systems for instance are developed explicitly for creating sites with provisions that simplify these various tasks: content creation publishing it on the server and tracking performance analytics. Popular examples of WCM include Joomla, Drupal and WordPress. Managing digital assets such as images or videos is one primary function of digital asset management (DAM) CMS.

DAM provides simplified storage protocols that offer optimal retrieval solutions from integrated data channels such as Adobe Experience Manager or Bynder. Effective document management (DM) is key for businesses today who need to handle documents like contracts,invoices and reports at scale.Multiple functionalities provided by DM system like version control ,access control ,and search capabilities make them an essential tool.SharePoint ,Box ,Dropbox are among the highly popular DM systems these days. Enterprise wide content management(ECM) systems come handy when the task demands handling massive volumes of data spread across various departments.Most sophisticated ECM products house multiple features like document management ,records management etc.Alfresco ,IBM FileNet & OpenText are some top examples when it comes to reliable ECM products[5].

The world has been producing more digital content than ever due in no small part due vast online space.Digital content repository is now an absolute necessity making Content Management System(CMS) more important than ever.A cloud based CMS solution is now seen as indispensable since it offers greater scale and flexibility of resources at cheaper prices than traditional on-premise solutions.

2.3 Benefits of Content Management Systems

The efficiency offered by Content Management Systems (CMS) in managing digital content has made them increasingly popular in recent years. Through a CMS all information can be handled, stored and published from one centralized location without unnecessary exertion or expenditure. In order to better understand these benefits presented by CMS systems we will conduct an extensive literature review on the subject matter.

- Improved Efficiency: One of the most significant advantages of adopting a Content Management System (CMS) is improved productivity levels with streamlined workflows. Using this system enables users to generate content seamlessly by creating it within one system inclusive of editing options and publishing features - all without needing additional tools or software programs which can consume valuable time resources and heighten chances for mistakes due to such complexity requirements alone. According to surveys carried out by the reputable research firm The Content Marketing Institute - who conducted statistical analyses on how often marketing professionals leverage this technology - revealed that around seventy-two percent reported noticeable improvements in their work efficiency once using such software systems like CMS.

- Enhanced Collaboration: To promote efficiency within their workplace organizations must prioritize effective communication and cooperation between team members. Implementing a CMS is one way of achieving this goal - it allows multiple users to edit a single document at once without worrying about version control or file sharing issues. This streamlines content creation and publishing processes while promoting teamwork among colleagues. As reported by McKinsey businesses that prioritize robust collaboration practices are more likely than others to achieve high levels of success in their industry.
- Improved Content Quality: Efficient handling and structuring - two integral aspects required by any successful content creator- are readily achievable through maintaining viable use of CMS tools within one's workflow. With access to such resources at hand when creating digital works; there's no doubt about generating top-notch output assuredly free from errors or inconsistencies.In addition, it provides users unique windows for enhancing overall content strategy development thus leading steadily towards profound audience engagement with every release created via these methodologies.

- Increased Security: Digital content can be securely managed by a CMS. It restrains unapproved users and allows authorized ones into its system which mitigates any potential risks caused by data leakage. What's more; frequent security updates on CMS platforms ensure the highest possible level of protection against evolving threats in the online sphere[6].

2.4 Open-Source vs. Proprietary CMS

- Benefits of Open-Source CMS:
  Open Source Content Management Systems (CMS) have gained immense popularity in recent times and businesses must consider its advantages when choosing between proprietary and open source solutions. Companies have various reasons to choose Open Source CMS over proprietary solutions; a significant reason being its zero cost licensing model. The convenience of installation is another significant advantage where enterprises benefit greatly as they do not require expert assistance or intensive training. Moreover Open Source CMS provides users with Control over their code enabling them to make necessary changes to suit business processes effectively.

- Benefits of Proprietary CMS:Proprietary CMS undoubtedly surpasses Open Source alternatives in various ways. The first advantage lies in its unrivaled security measures - due to its proprietary code access is granted solely to authorized personnel which guarantees top notch protection for all users. Furthermore customers benefit from comprehensive support services enabled by the platforms intuitive interface that eases communication with dedicated help desk teams around the clock. Another asset found with Proprietary CMS is its vast assortment of features such as plugins and templates which go through rigorous testing thus ensuring their seamless integration within existing workflows without compromising performance or functionality[7]. Lastly Proprietary CMS excels at managing significant data loads while maintaining optimal performance levels across all fronts thanks to an advanced scalable architecture.

- Comparison between Open-Source CMS and Proprietary CMS:
  Various comparisons between Open-Source CMS versus its competing counterpart have produced noteworthy findings regarding each system's strengths and challenges. Through Dries Buitaert's analysis, it emerged that Open-source content management offers higher market shares due to high degrees of customization flexibility in addition to support from its strong community base. Meanwhile, Proprietary CMS models excel in providing secure mechanisms and premium customer support.

> Additionally, CMS Critic studies have shown that small and medium-sized firms lean toward open-source content management options as they typically offer more flexibility and a more extensive network of developers compared to the restricted corporate environs of proprietary solutions, which are preferred by large-scale conglomerates who prioritize ROI as well as robust customer service.

2.5 Blogging Platforms and their CMS

The rise of blogging platforms has transformed online communication channels allowing individuals and businesses alike to share information within their respective communities while facilitating deeper audience engagement at scale via digital channels. At the heart of these versatile tools lies a robust content management system (CMS) which serves as a central point for creating new blog posts or pages managing existing content as well as publishing them online without any hassle.

For bloggers seeking unrivaled CMS capabilities WordPress is the go to option. Its open source system offers access to an array of cutting edge features including custom themes and plugins search optimization tools and integrations with an extensive range of social media platforms.

On the other hand while Bloggers proprietary CMS offers basic functionality such as blog post creation and comment management it falls short when compared to advanced options like WordPress. Meanwhile Mediums intuitive CMS interface caters to writers' needs by providing a simple yet powerful environment focused solely on content generation. Ghost is an up and coming blogging platform admired by writers who prefer a simple interface that doesn't overwhelm them with design choices or features they may never use.

Its open source CMS permits the creation of posts and pages while enabling users to customize themes and plugins according to their preferences. Moreover Ghost has built in SEO tools that promote higher search engine rankings for blog content creators looking for more visibility online. Nevertheless its worth noting that customization options are limited when using this platform compared with more well established ones out there on the market today.

Chapter 03: IMPLEMENTATION

3.1 Requirements Gathering and Analysis

Every worthwhile journey commences with cautious planning which starts from catering to unique stakeholder needs. Our content management system (CMS) venture initiated its journey by focusing on requirement gathering ,which helped us identify, analyze & plan more effectively. The purpose behind starting in such a manner was to ensure stakeholder questions were answered clearly so that confusion could be minimized - thereby promoting transparency between all parties.

The exploration period comprised unique techniques such as brainstorming sessions, surveys, and interviews coupled with an analysis of existing systems and processes to ascertain potential gaps for improvement. Subsequently we managed every component of the gathered information into meaningful chunks facilitating easier processing during subsequent phases .
Having gathered a plethora of data points - we ensured comprehensive analysis in order to understand feasibility, impact on project deliverables plus any costing implications[8].

It proved beneficial prioritizing tasks based on their importance from stakeholders' perspectives against factors like costs and time available keeping in mind quality standards

In order to maintain transparency throughout development - We produced an exhaustive document detailing functional/non-functional requirements , user stories/use cases resulting in worthy acceptance criteria; This document remained at the heart of requirements fulfilment throughout subsequent phases as well. Ascertaining the necessary conditions during the requirement gathering stage, several key prerequisites were identified. These include:

- User Administration: The system must support user registration, logon, and authentication. Users should be granted varying levels of access based on their responsibilities.

- Content Creation and Management: The system should enable users to create, edit, and publish articles, images, and videos, among other forms of content. Categories and tags should be used to organize the content for simple retrieval.

- Search and Filtering: The system should have a robust search feature that enables users to search for content with keywords, categories, and identifiers. Additionally, filtering options should be provided to restrict search results.

- Responsive Web Design: The system should have a responsive design that is compatible with a variety of devices, including desktops, laptops, tablets, and mobile phones.

- Performance and Security: The system should be optimised for performance and equipped with the necessary security measures to prevent unauthorised access and data breaches.

3.2 System Architecture

At its core System Architecture refers to how various software elements fit together into a well structured whole - clarifying relationships between components and enabling better functioning systems overall. For us this translates into designing a robust web based content management platform using MEAN (MongoDB, Express.js, Angular, Node.js) technology stack recognized for delivering high performance scalable web applications at scale[9].

Our specific use cases involve MongoDB serving as our database management system; Express. JS acting as our web app framework; Angular handling front end interactions whilst Node.

Js maintaining run time serverside processes. Importantly - these separate elements work together seamlessly via clearly defined interfaces so that even when we need to make changes or update individual components – there is no impact on the greater whole of our well designed System Architecture.

To meet expectations on creating responsive dynamic yet sophisticated user interfaces Angular takes dominance over this app's front-end design procedure. This framework offers two-way data binding alongside component-based architecture which paves way for building feature-rich web applications with ease on top of being able to inject dependencies into workflows promptly. Additionally, providing intuitive usage was primary during UI creation thus delivering an immersive experience.

For backend development we had considered Node.js combined with Express.js since they provided scalability advantages making it possible to handle incoming requests from clients at high rate speeds. Plus, the solution is modular and extendable to accommodate new feature implementations.

3.2.1 Data Flow Diagram Level-0

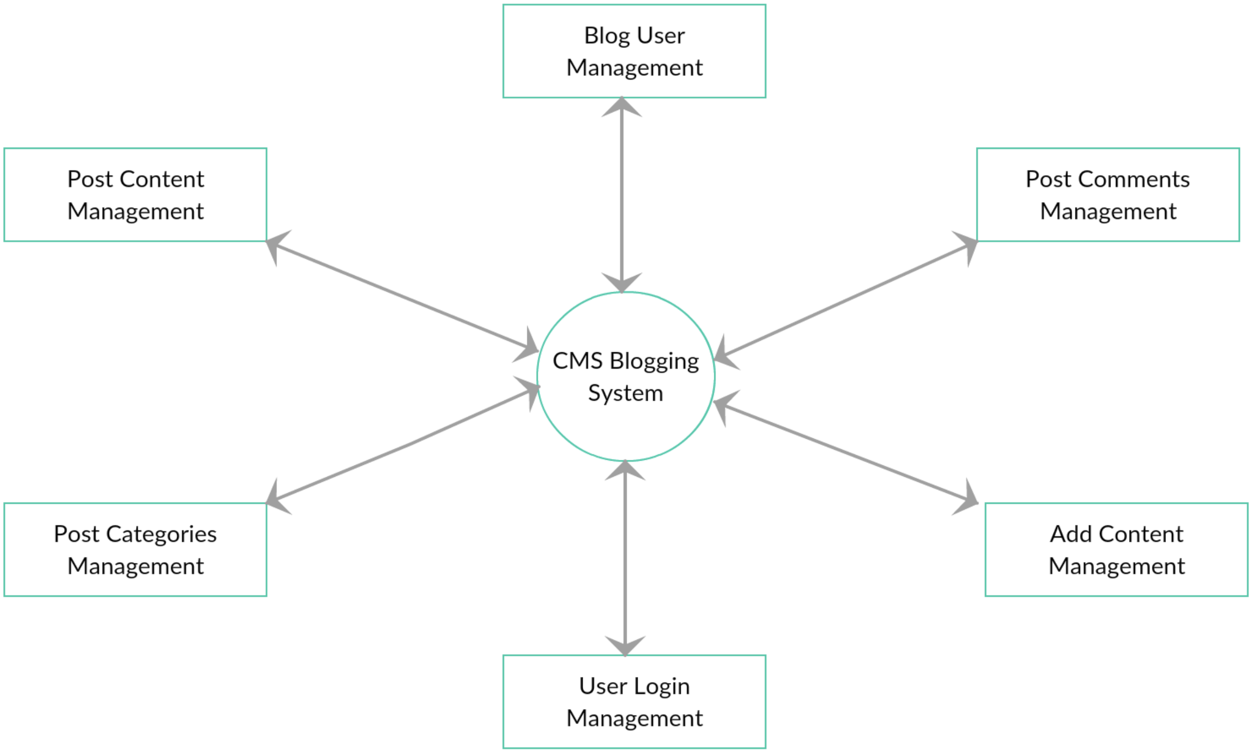


Fig 3.2.1.1 CRM Level-0 Data Flow Diagram

3.2.2 Data Flow Diagram Level-1

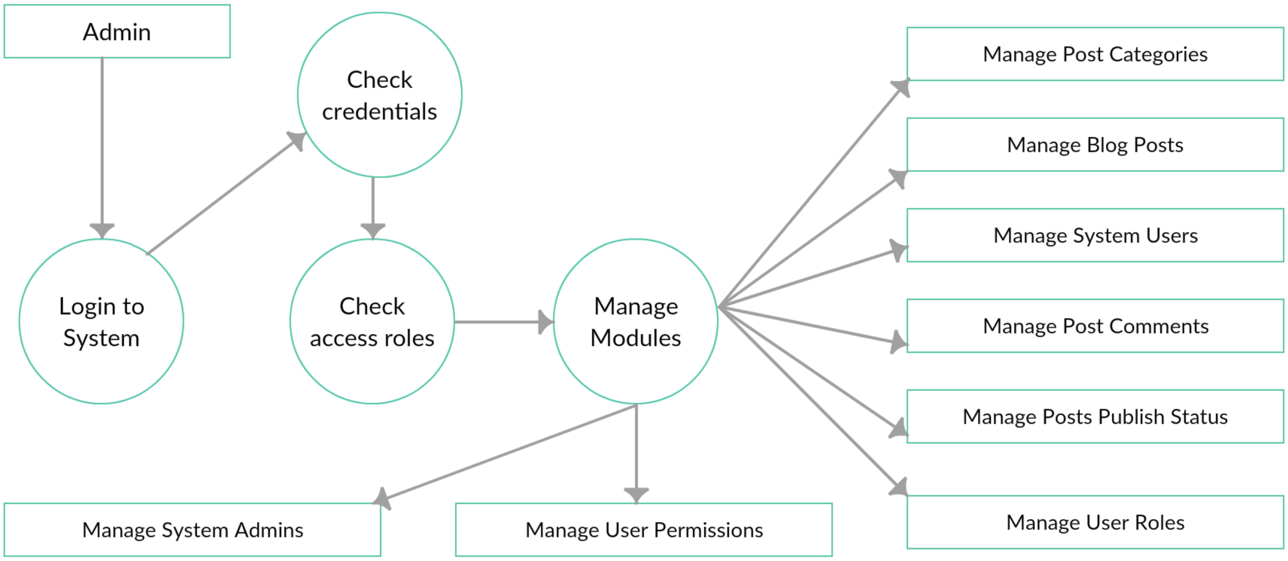


Fig CMS Level-1 Data Flow Diagram

3.2.3 Use Case

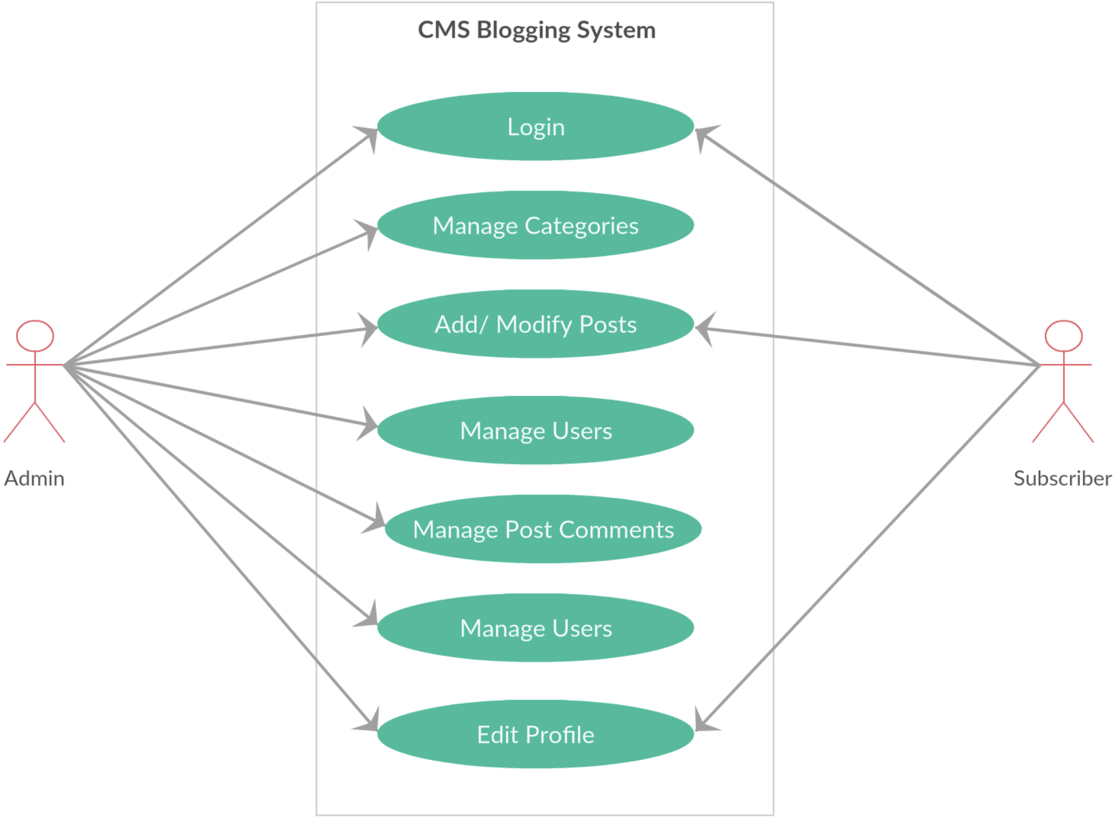


Fig 3.2.3.1 CMS Use Cases

3.3 Database Design

In order to run a successful web application like our blog management system it is critical to have an efficient database design in place; one that organizes data appropriately for easy accessibility by users. Within this section lies an exploration into how our own blog management system's databases are structured; encompassing vital components such as entities (authors/categories/tags/parents), each requiring unique fields catering to their designated roles in the applications functionality.

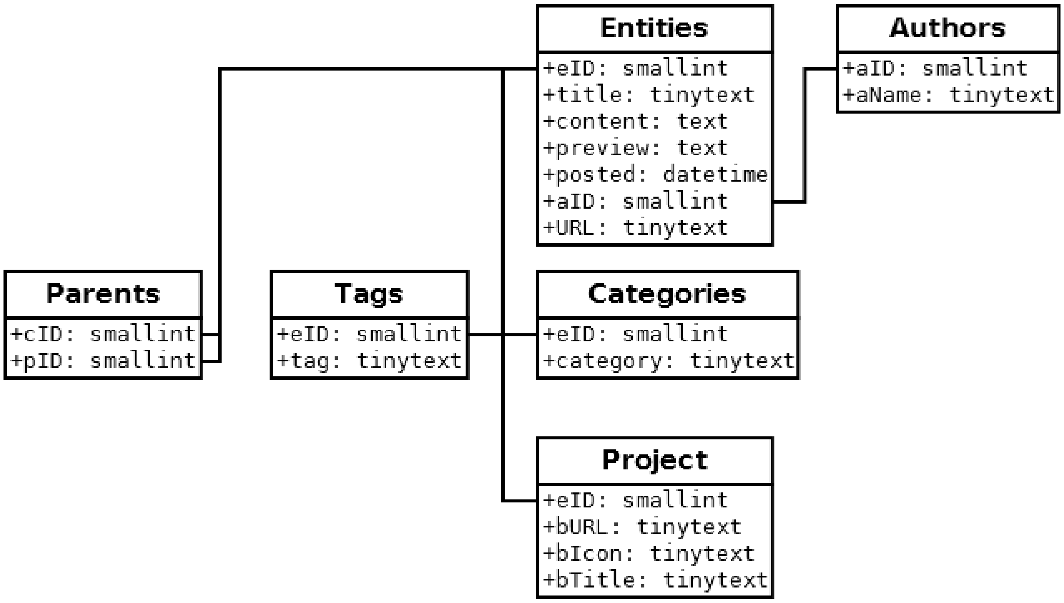


Fig 3.3.1 Database Design for CMS[10]

- Entities: This component of our database is the most vital. It includes all of the blog inner page data, including posts, remarks, and metadata. The entity component includes attributes like ID, title, body, created date, and modified date.

- Authors: The author component contains basic information about the person It includes sections name and ID. The author ID is used as a foreign key in the entity component to associate each post with its respective author.

- Categories: This component holds data relating the various categories to which blog posts can be assigned. It contains categories like ID and name. The use of categories to organize and group related blog posts makes it easier for users to navigate and locate relevant content.

- Tags: This component contains data regarding the various tags that can be assigned to blog posts. It contains categories like ID and name. Tags are comparable to categories in that they help organize and group content, but they are more specific and granular.

- Parents: This component is used to establish hierarchical relationships between different entities. A blog post may, for example, have a parent entity that represents a series or compilation of related blog posts. This contributes to the development of a more structured and organized method for administering blog content.

Above mentioned database design described was selected to provide flexibility and scalability to the platform.The document-oriented design of MongoDB makes it simple to store and retrieve complex data structures, making it an ideal choice for a blogging platform containing a wide variety of data attributes. The use of categories and tags helps in organizing the journals and making them more discoverable to users. Moreover, the parent-child relationship between categories facilitates the future management and expansion of categories.

Using the Mongoose ODM (Object Data Modelling) library for Node.js, the database design was implemented in this example. Mongoose provides a schema-based solution to model application data and provides a straightforward mapping to MongoDB documents. Hence, this allowed for simple integration of the database with the Node.js server and simplified the development process.

3.4 Front-end Development

In designing web applications' user interfaces (UI) users' experience enhancement is fundamental in front end development. The core objective is to make the UI visually pleasing while also making it simple for users to interact with different application elements seamlessly. This specific project relied on Angular as its preferred framework for developing dynamic web app interfaces efficiently.

Angular provides developers with reusable components management tools that promote robustness in handling application states effortlessly. Furthermore, ideal features like bidirectional data binding or dependency injection supports larger scale app development in TypeScript- a superset of JavaScript- providing an efficient way of managing large scale projects within a unified language context.

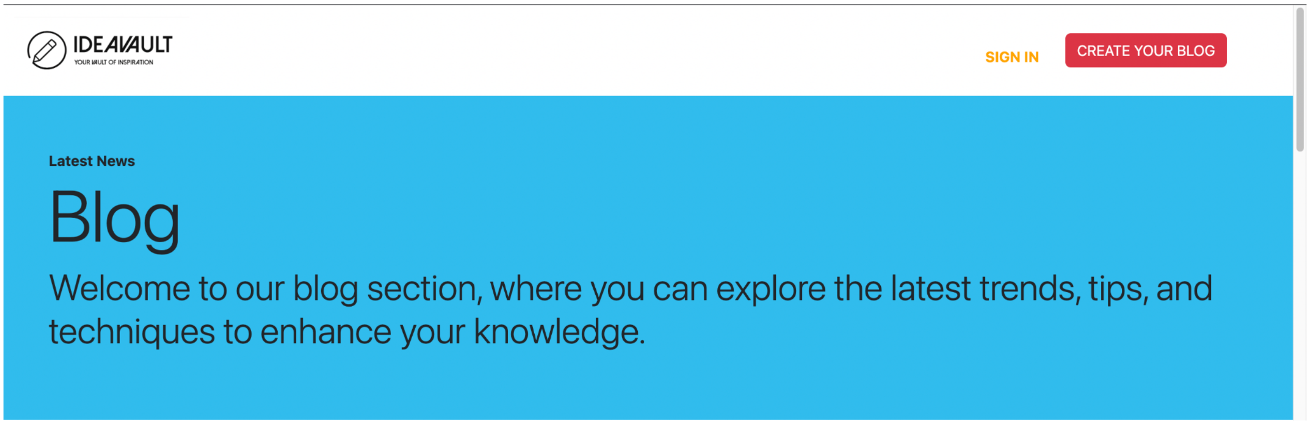
To implement this frontend system effectively HTML (for web page structure combines with CSS (for layout design). With these languages' synergy bolstered by Angular's flexibility through its component modules, even more complex interactive features such as menus or forms can be rendered easily using less code architecture.

In addition a mobile responsive feature based designing was integrated as a stand out feature of the blog websites front end. This was done to ensure that it can be accessed easily on desktops, tablets or mobile phones alike. With optimal speed and high-performance as top priorities for website design optimization –the aim is ensured fast-load times even when using slow network connections- thoughtful consideration characterized decision-making around selecting suitable frontend designs intended primarily towards enhancing users' experiences by enabling smooth site navigation coupled with effortless access to relevant information amidst different pages.

Integrating mentor feedback throughout the developmental process provided assurance the final output aligns with the end-users' needs. The project prioritized creating a visually attractive, user-friendly, and responsive web application to enhance overall user experience.

Here are the snippets of the different components prepared, which are reusable throughout the Program:

- Header : It is the top most section of the page, it has necessary information required for the user to navigate in the website. In this case it has a homepage link, create new blog link, signup link.



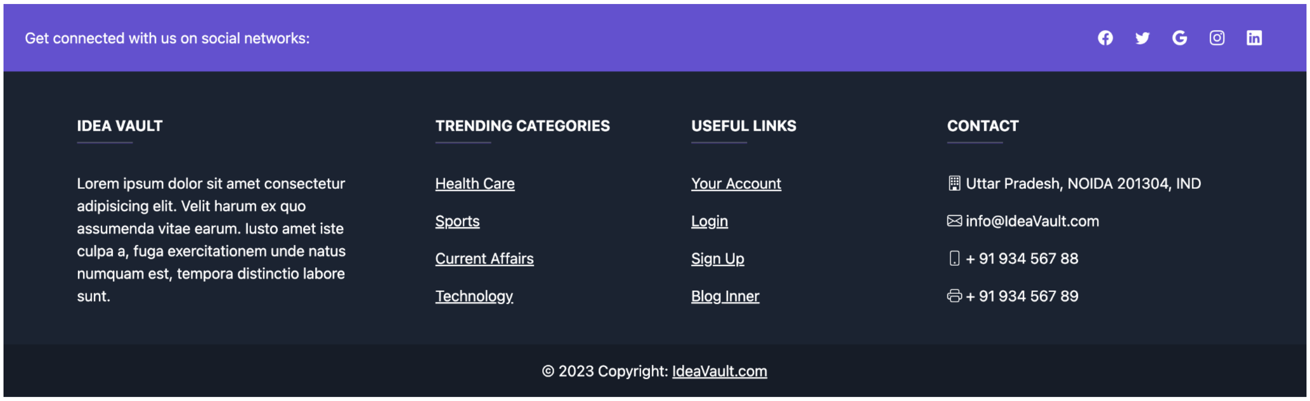
Latest News

Blog

Welcome to our blog section, where you can explore the latest trends, tips, and techniques to enhance your knowledge.

Fig 3.4.1 Header Component

- Footer : It is the bottom most section of the page, it generally has a lot of information for the user to navigate in the website, contact the website owner, etc. In this case it has a about the company, social links, useful links, contact details.



Get connected with us on social networks:

IDEA VAULT

Lorem ipsum dolor sit amet consectetur adipisicing elit. Velit harum ex quo assumenda vitae earum. Iusto amet iste culpa a, fuga exercitationem unde natus numquam est, tempora distinctio labore sunt.

TRENDING CATEGORIES

Health Care
Sports
Current Affairs
Technology

USEFUL LINKS

Your Account
Login
Sign Up
Blog Inner

CONTACT

Uttar Pradesh, NOIDA 201304, IND
info@IdeaVault.com
+ 91 934 567 88
+ 91 934 567 89

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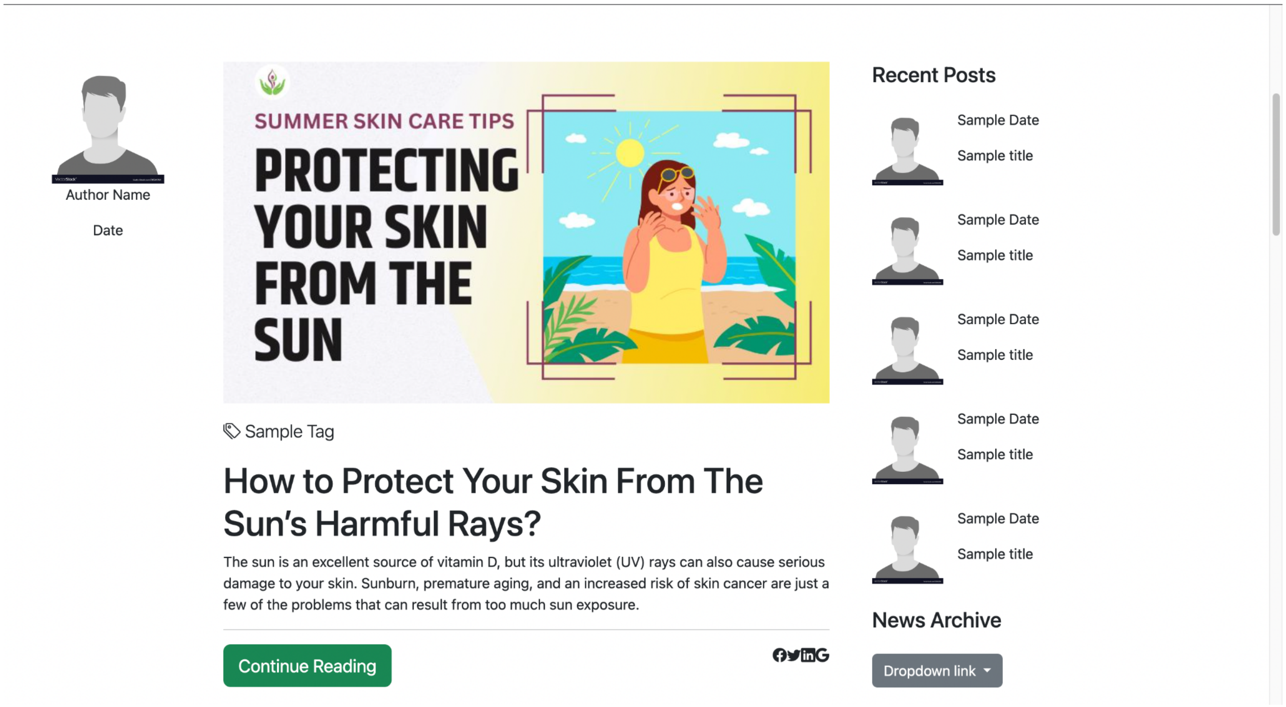
Fig 3.4.2 Footer Component

- Blog Outer View: Blog exterior view is the homepage that displays a summary of all blogs. It includes the blog's title, a concise summary, the author's name, the publication date, and a thumbnail image.

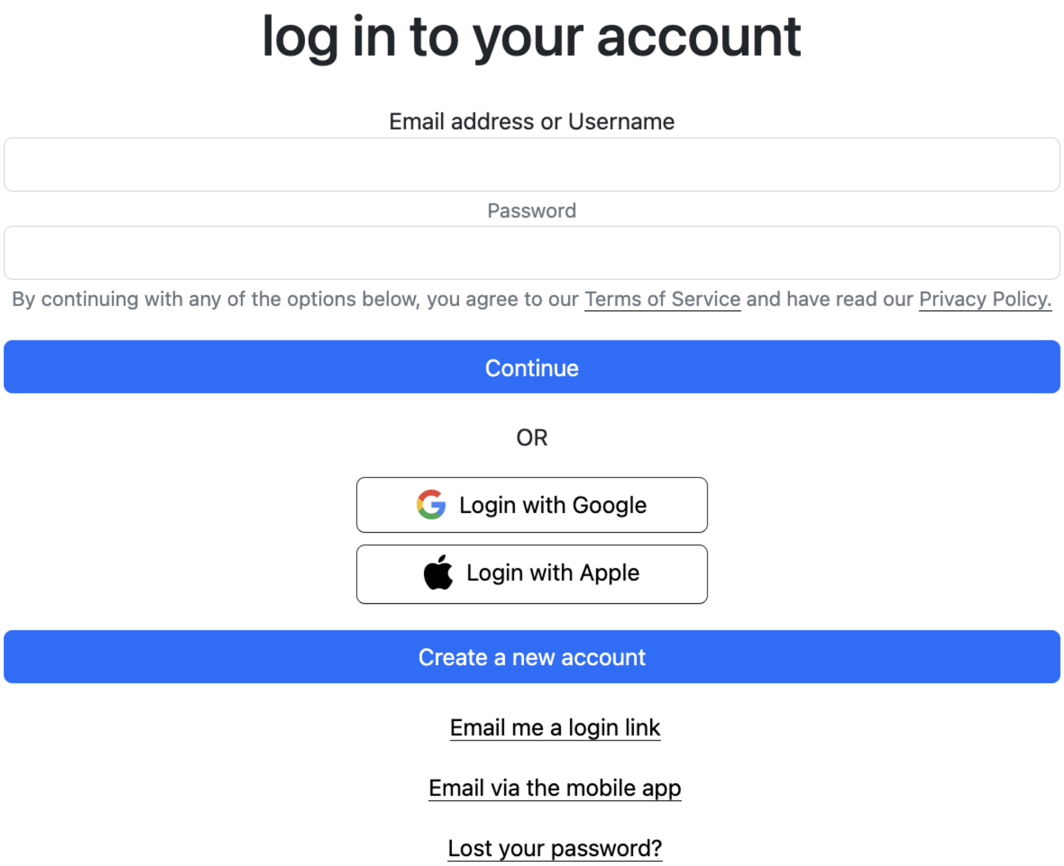


How to Protect Your Skin From The Sun’s Harmful Rays?

The sun is an excellent source of vitamin D, but its ultraviolet (UV) rays can also cause serious damage to your skin. Sunburn, premature aging, and an increased risk of skin cancer are just a few of the problems that can result from too much sun exposure.

Fig 3.4.3 Blog Outer Component

- Login Component : Login component allows registered users to enter their credentials and log in to their accounts. The component includes username/email and password.



log in to your account

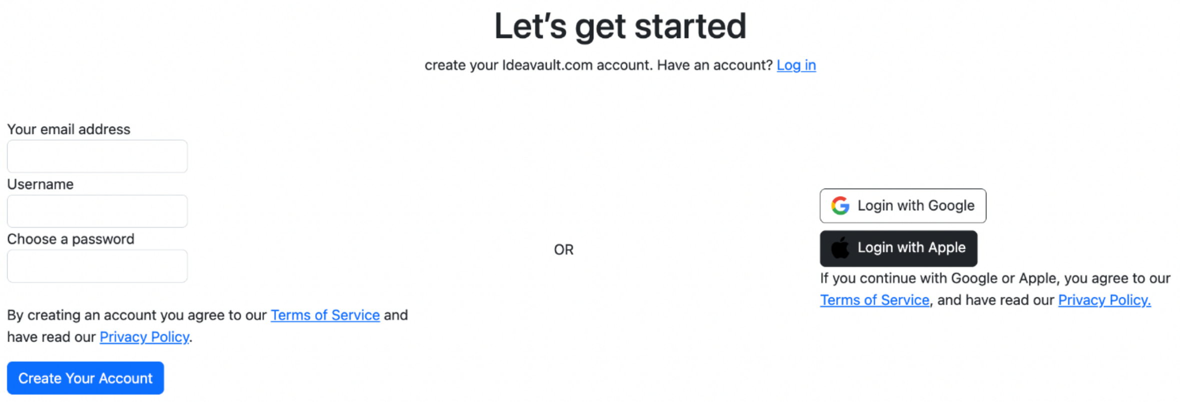
Email address or Username

Password

By continuing with any of the options below, you agree to our Terms of Service and have read our Privacy Policy.

Fig 3.4.4. Login Component

- Signup Component : Signup component enables new users to register and create a blog account. It includes fields for user name, email address, password, and confirmation.



Let’s get started

create your Ideavault.com account. Have an account? Log in

Your email address

Username

Choose a password

By creating an account you agree to our Terms of Service and have read our Privacy Policy.

Create Your Account

OR

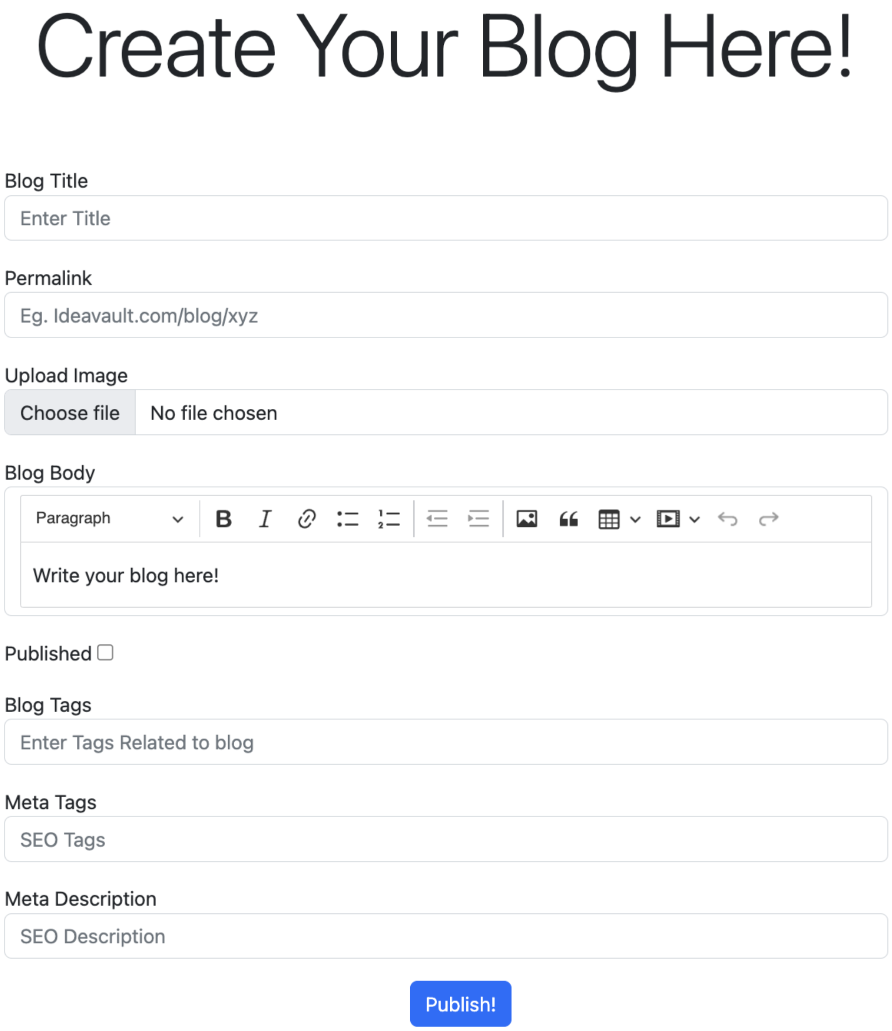
Login with Google

Login with Apple

If you continue with Google or Apple, you agree to our Terms of Service, and have read our Privacy Policy.

Fig 3.4.5 Signup Component

- Create Blog Component: The "create a new blog" component enables registered users to compose and publish their blog entries. It includes title, content, category, keywords, and a featured image.



Create Your Blog Here!

Blog Title

Enter Title

Permalink

Eg. Ideavault.com/blog/xyz

Upload Image

Choose file No file chosen

Blog Body

Write your blog here!

Published □

Blog Tags

Enter Tags Related to blog

Meta Tags

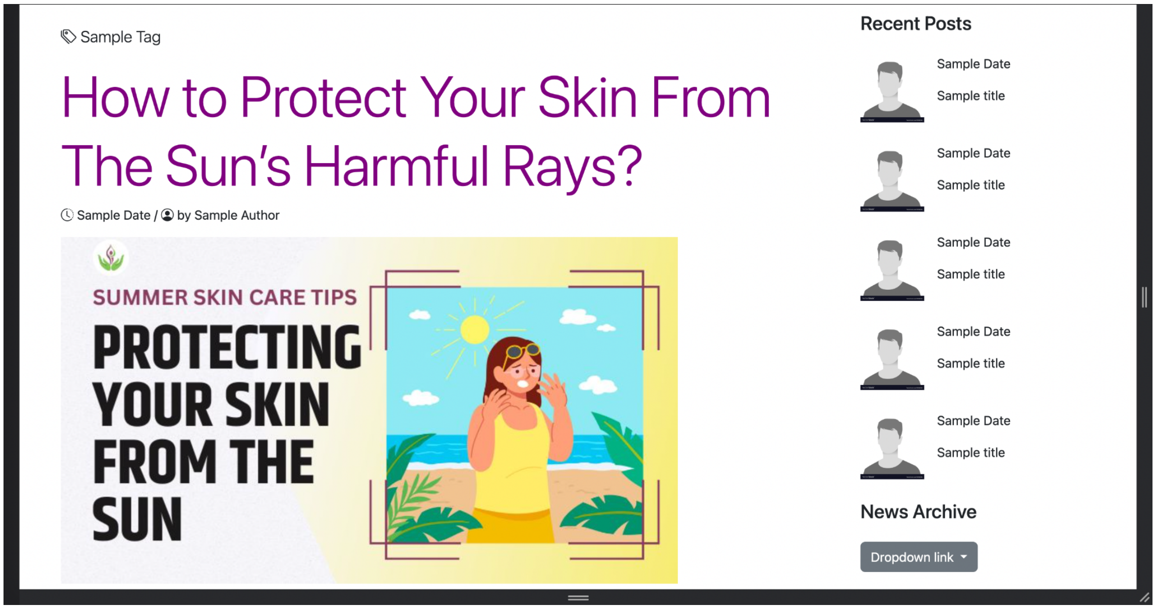
SEO Tags

Meta Description

SEO Description

Fig 3.4.6 Create Blog Component

- Blog Inner Component : Blog inner view is the page that displays the entire blog, including its title, author, publication date, comprehensive content, and comments section.



Sample Tag

How to Protect Your Skin From The Sun's Harmful Rays?

Sample Date / by Sample Author

Recent Posts

Sample Date
Sample title

Sample Date
Sample title

Sample Date
Sample title

Sample Date
Sample title

Sample Date
Sample title

News Archive

Fig 3.4.7 Blog Inner Component

3.5 Back-end Development

The intricacies behind managing and processing data on a website consist of several components including server side scripting, APIs, and databases.

We went with Node.js as our choice for building our back end architecture in order to power up its efficiency potential while also making it easily scalable thanks to features like its capability in enabling robust server side programming. Additionally we leveraged Express.js–a compact yet powerful web framework–for further streamlining our concepts during development. As far as selecting an appropriate database option goes MongoDB proved itself more than worthy thanks to its NoSQL based platform designed to provide maximum flexibility in addition to scalability through storage mechanisms based on storing documents rather than tables per se.

Faced with protecting against security threats throughout client to server communications via private networks or even public ones such as over internet connection channels? No worries here: Our implementation of HTTPS encryption enabled SSL/TLS protocols which ensure that all transmitted data between client and server is safe through encryption.

Furthermore we developed APIs featuring an array of functionalities ranging from the creation, editing and deletion of blog posts to authentications as well as authorization functionalities for user accounts. Our team employed RESTful architecture during API development to achieve desirable scalability levels and seamless front-end integration.

To put it concisely,the back-end portion of our blogging website relied on Node.js, Express.js,MongoDB,and RESTful APIs to optimize data management as well as information exchange between both ends while ensuring high-level efficiency and security.

3.6 Testing

The testing phase of the software development life cycle (SDLC) is one of the most crucial. The majority of extant system flaws can be revealed through testing. Therefore, provides a method for reducing system defects. Multiple levels of testing are performed to assure the quality of the software. The user tests the system to ensure that the specified system function has been implemented. After verification, the system is available for use by end users.

To achieve this goal, a series of testing steps, including unit testing, validation testing, and system testing, are planned and carried out. Unit and integration testing focused on validating a module's functionality. The modules are subsequently incorporated into the overall structure of the programme.

Phase	Guiding Document	Test type
Development phase	Technical design	Unit testing
System and Integration Phase	Functional design	System testing and Integration testing
User acceptance phase	Business requirements	User acceptance testing
Implementation phase	Business case	Product verification test
Regression Testing applies to all Phases		

Table 3.6.1 Types of Testing

3.6.1 Unit Testing

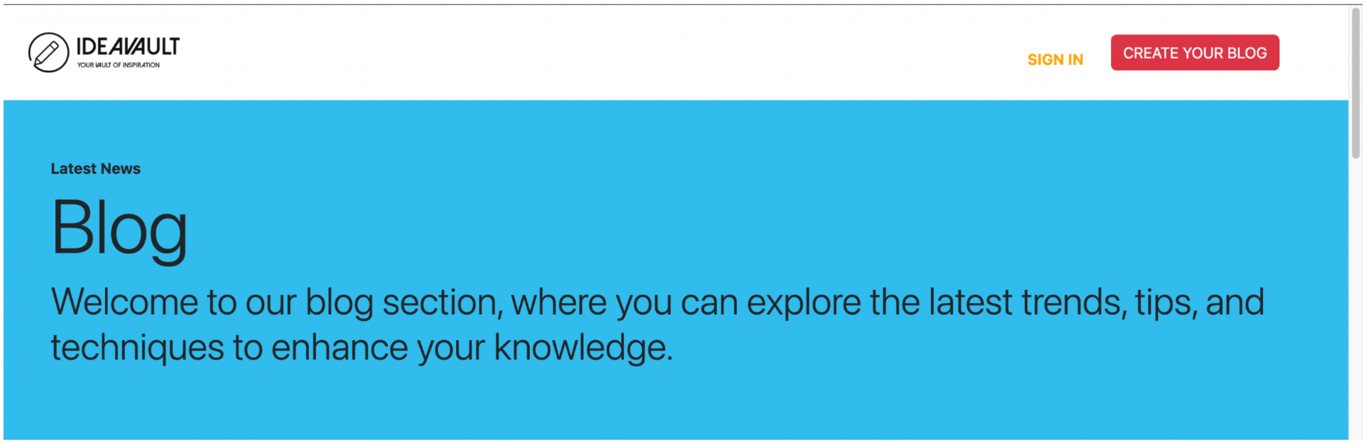
Sr. No.	Test Cases	Data Input	Expected Output	Actual Output	Pass/ Fail
1	Registration module	Enter user details	If user already exists then alert that message else registered successfully	If user already exists then alert that message else registered successfully	Pass
2	Login module	Enter username and password	Login successful	Login successful	Pass
3	Edit profile module	Complete your profile information	When clicked update, profile information is successfully updated	When clicked update, profile information is successfully updated	Pass
4	Add post module	Add a new post	New post showed up in the blog home page as the latest post.	New post showed up in the blog home page as the latest post.	Pass
5	Manage posts module	Edit/Delete a Post	The post info is changed or the post is removed from the blog home page	The post info is changed or the post is removed from the blog home page	Pass
6	Add comment module	Add a comment on a post	The comment goes to admin for approval	The comment goes to admin for approval	Pass

Table 3.6.1.1 Testing Results

Chapter 04: RESULTS

4.1 Responsive Design

- Responsive Header for 3 breakpoints :

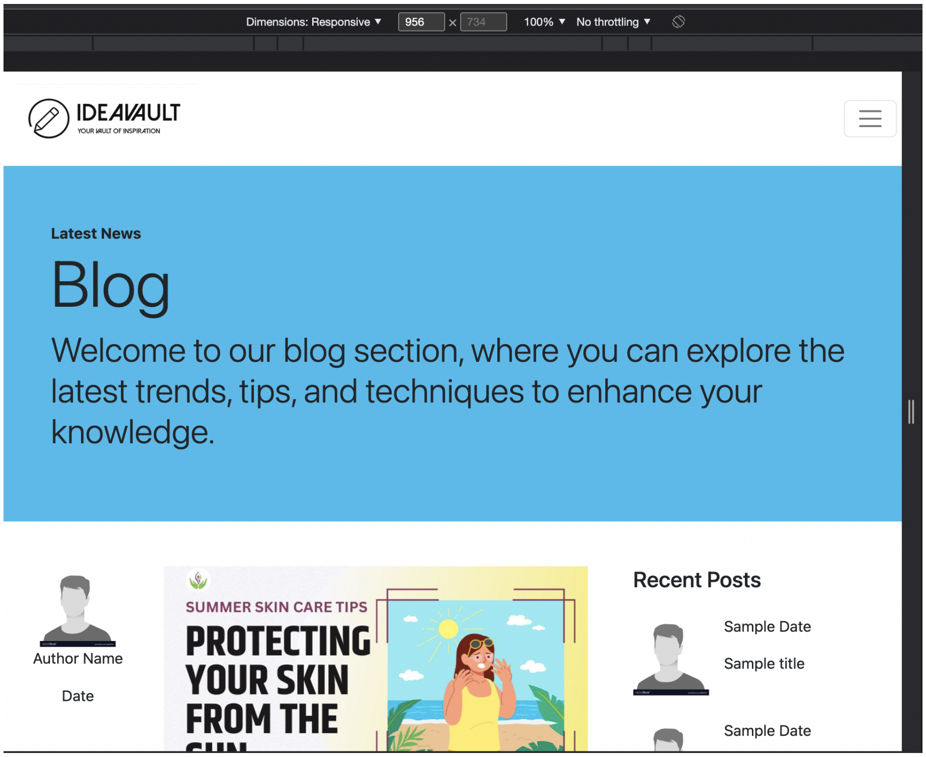


Latest News

Blog

Welcome to our blog section, where you can explore the latest trends, tips, and techniques to enhance your knowledge.

Fig 4.1.1 Header Lg View


Dimensions: Responsive ▾ 956 × 734 100% ▾ No throttling ▾

Latest News

Blog

Welcome to our blog section, where you can explore the latest trends, tips, and techniques to enhance your knowledge.

Author Name

Date

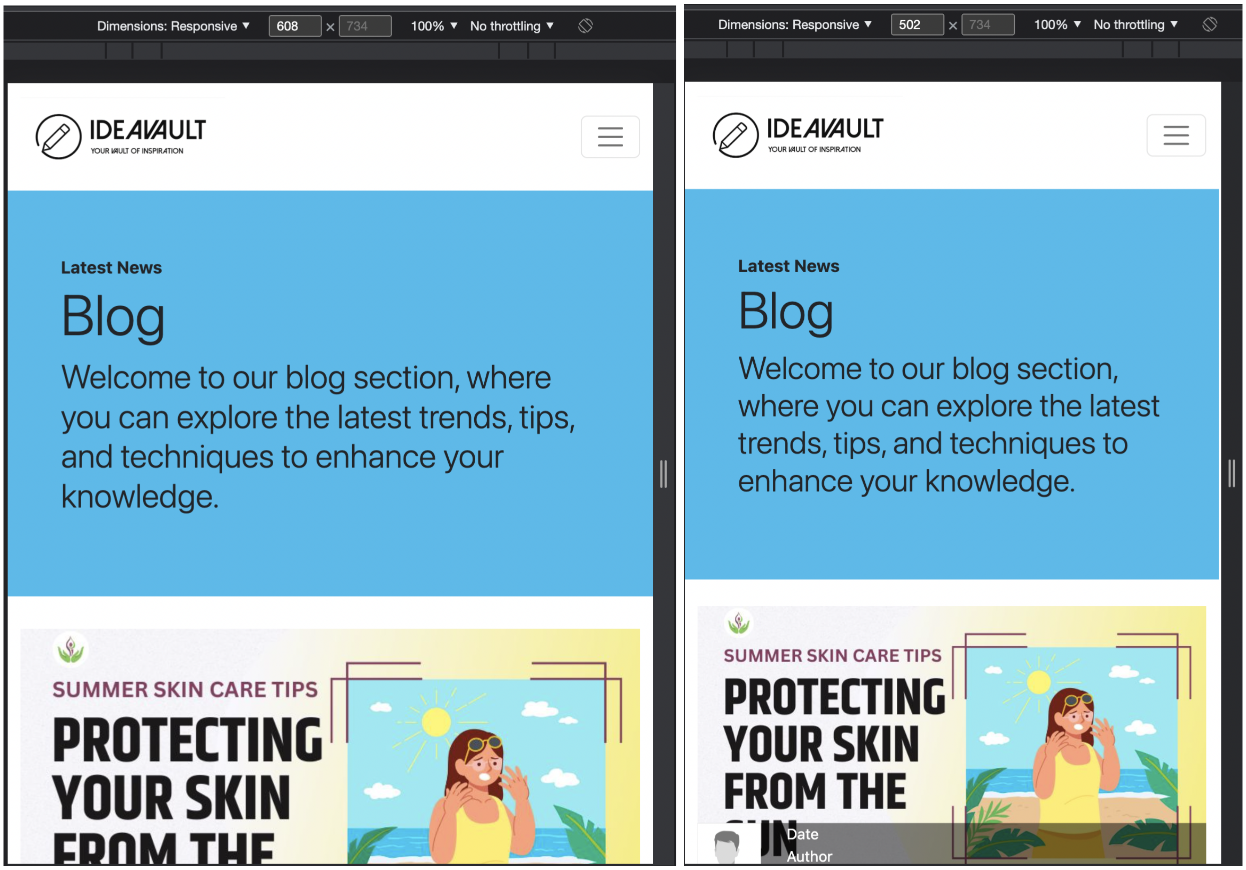
Recent Posts

Sample Date

Sample title

Sample Date

Fig 4.1.2 Header Md View



Dimensions: Responsive ▾ 608 × 734 100% ▾ No throttling ▾

Latest News

Blog

Welcome to our blog section, where you can explore the latest trends, tips, and techniques to enhance your knowledge.

Dimensions: Responsive ▾ 502 × 734 100% ▾ No throttling ▾

Latest News

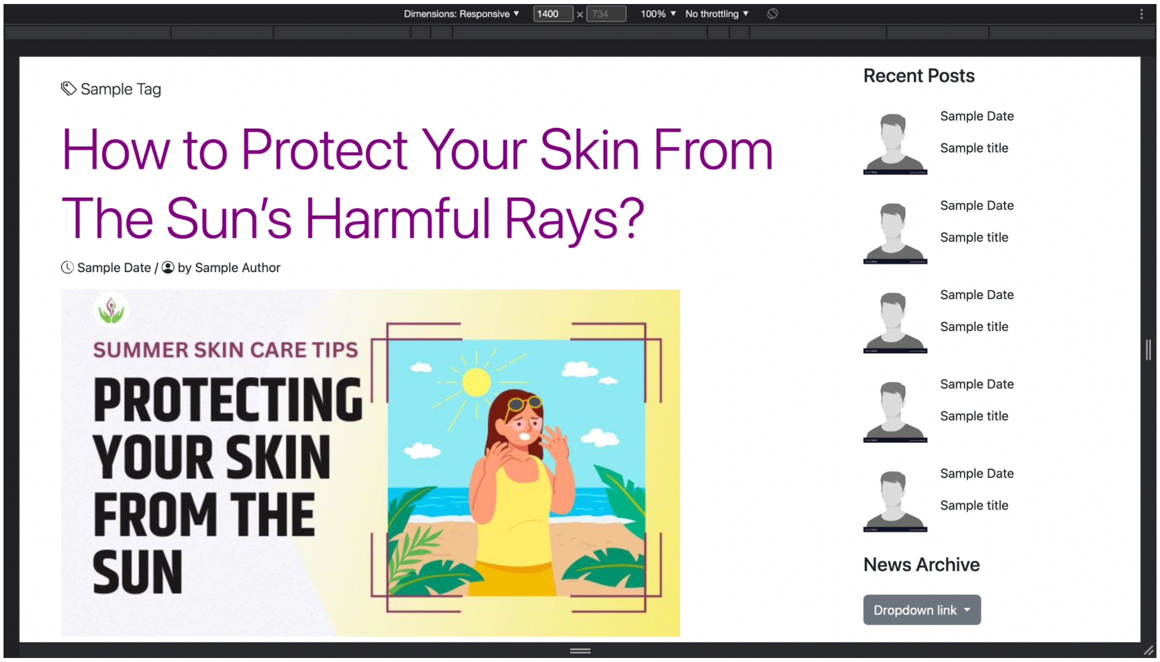
Blog

Welcome to our blog section, where you can explore the latest trends, tips, and techniques to enhance your knowledge.

Date
Author

Fig 4.1.3 Header Xs & S View

- Responsive Inner Page for 3 breakpoints :



Sample Tag

How to Protect Your Skin From The Sun's Harmful Rays?

Sample Date / by Sample Author

Recent Posts

Sample Date
Sample title

Sample Date
Sample title

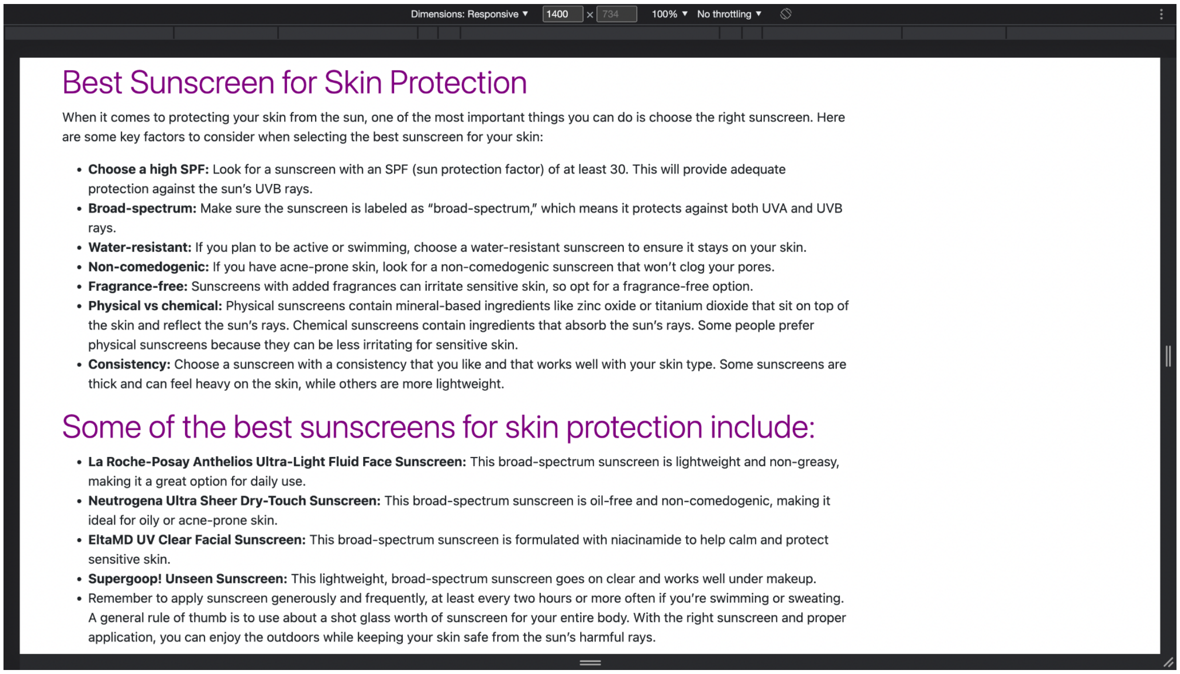
Sample Date
Sample title

Sample Date
Sample title

Sample Date
Sample title

News Archive

Fig 4.1.4 Blog Inner Page lg view -1



Best Sunscreen for Skin Protection

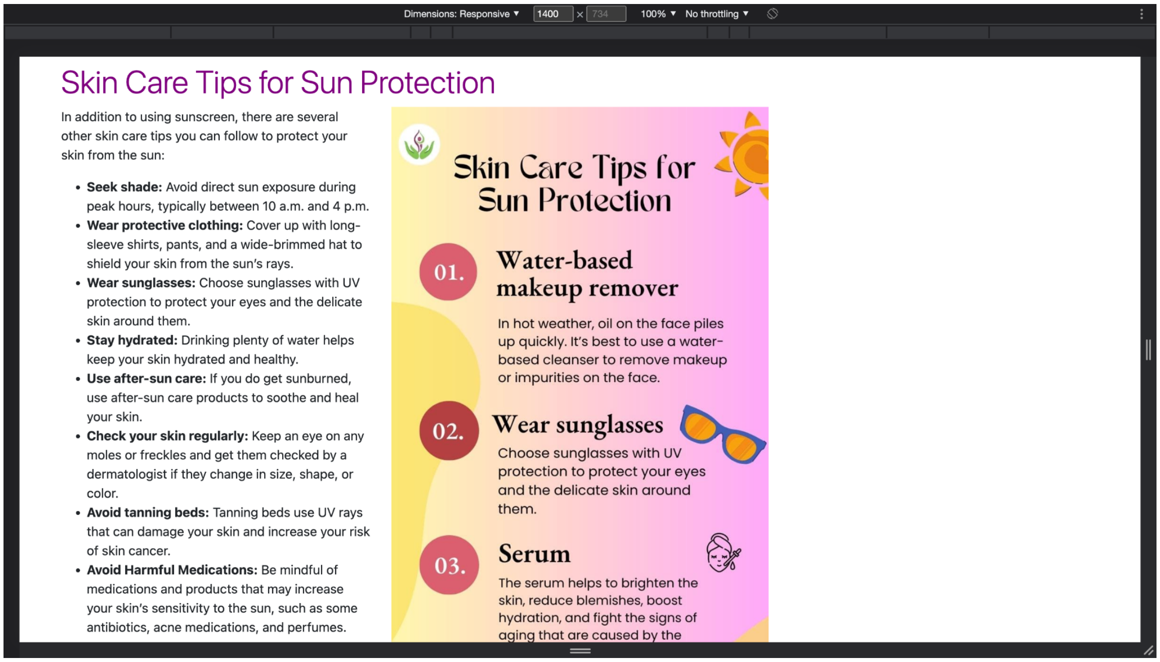
When it comes to protecting your skin from the sun, one of the most important things you can do is choose the right sunscreen. Here are some key factors to consider when selecting the best sunscreen for your skin:

- **Choose a high SPF:** Look for a sunscreen with an SPF (sun protection factor) of at least 30. This will provide adequate protection against the sun's UVB rays.
- **Broad-spectrum:** Make sure the sunscreen is labeled as "broad-spectrum," which means it protects against both UVA and UVB rays.
- **Water-resistant:** If you plan to be active or swimming, choose a water-resistant sunscreen to ensure it stays on your skin.
- **Non-comedogenic:** If you have acne-prone skin, look for a non-comedogenic sunscreen that won't clog your pores.
- **Fragrance-free:** Sunscreens with added fragrances can irritate sensitive skin, so opt for a fragrance-free option.
- **Physical vs chemical:** Physical sunscreens contain mineral-based ingredients like zinc oxide or titanium dioxide that sit on top of the skin and reflect the sun's rays. Chemical sunscreens contain ingredients that absorb the sun's rays. Some people prefer physical sunscreens because they can be less irritating for sensitive skin.
- **Consistency:** Choose a sunscreen with a consistency that you like and that works well with your skin type. Some sunscreens are thick and can feel heavy on the skin, while others are more lightweight.

Some of the best sunscreens for skin protection include:

- **La Roche-Posay Anthelios Ultra-Light Fluid Face Sunscreen:** This broad-spectrum sunscreen is lightweight and non-greasy, making it a great option for daily use.
- **Neutrogena Ultra Sheer Dry-Touch Sunscreen:** This broad-spectrum sunscreen is oil-free and non-comedogenic, making it ideal for oily or acne-prone skin.
- **EltaMD UV Clear Facial Sunscreen:** This broad-spectrum sunscreen is formulated with niacinamide to help calm and protect sensitive skin.
- **Supergoop! Unseen Sunscreen:** This lightweight, broad-spectrum sunscreen goes on clear and works well under makeup.
- Remember to apply sunscreen generously and frequently, at least every two hours or more often if you're swimming or sweating. A general rule of thumb is to use about a shot glass worth of sunscreen for your entire body. With the right sunscreen and proper application, you can enjoy the outdoors while keeping your skin safe from the sun's harmful rays.

Fig 4.1.5 Blog Inner Page lg view -2



Skin Care Tips for Sun Protection

In addition to using sunscreen, there are several other skin care tips you can follow to protect your skin from the sun:

- **Seek shade:** Avoid direct sun exposure during peak hours, typically between 10 a.m. and 4 p.m.
- **Wear protective clothing:** Cover up with long-sleeve shirts, pants, and a wide-brimmed hat to shield your skin from the sun's rays.
- **Wear sunglasses:** Choose sunglasses with UV protection to protect your eyes and the delicate skin around them.
- **Stay hydrated:** Drinking plenty of water helps keep your skin hydrated and healthy.
- **Use after-sun care:** If you do get sunburned, use after-sun care products to soothe and heal your skin.
- **Check your skin regularly:** Keep an eye on any moles or freckles and get them checked by a dermatologist if they change in size, shape, or color.
- **Avoid tanning beds:** Tanning beds use UV rays that can damage your skin and increase your risk of skin cancer.
- **Avoid Harmful Medications:** Be mindful of medications and products that may increase your skin's sensitivity to the sun, such as some antibiotics, acne medications, and perfumes.

Skin Care Tips for Sun Protection

01. Water-based makeup remover

In hot weather, oil on the face piles up quickly. It's best to use a water-based cleanser to remove makeup or impurities on the face.

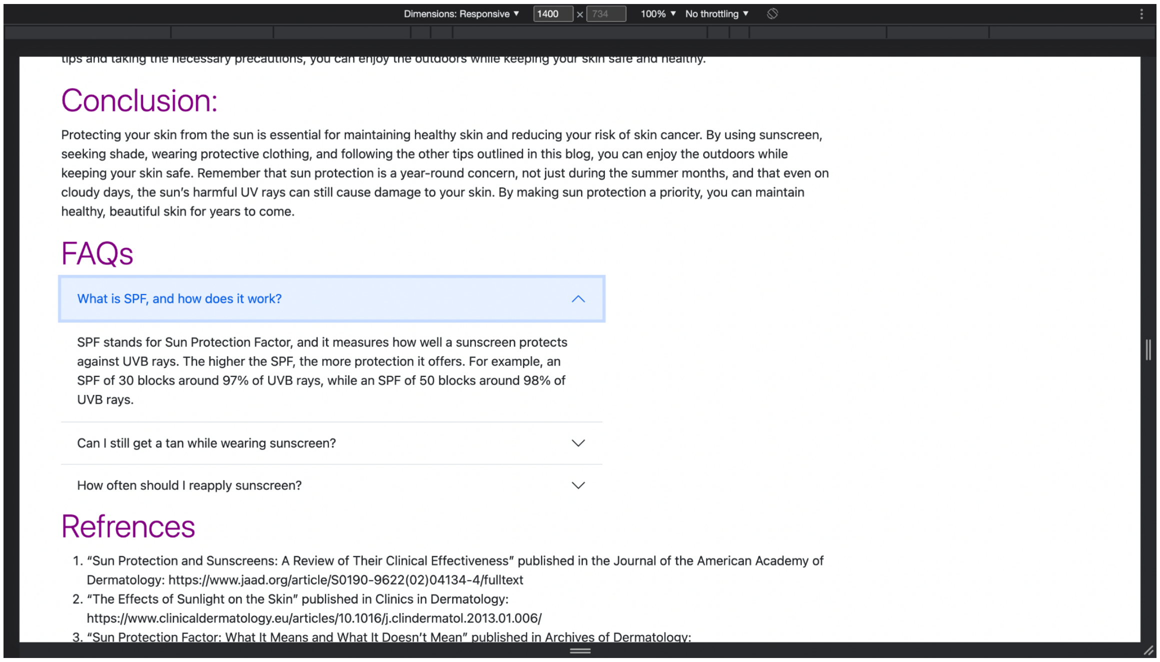
02. Wear sunglasses

Choose sunglasses with UV protection to protect your eyes and the delicate skin around them.

03. Serum

The serum helps to brighten the skin, reduce blemishes, boost hydration, and fight the signs of aging that are caused by the

Fig 4.1.5 Blog Inner Page lg view -3



tips and taking the necessary precautions, you can enjoy the outdoors while keeping your skin safe and healthy.

Conclusion:

Protecting your skin from the sun is essential for maintaining healthy skin and reducing your risk of skin cancer. By using sunscreen, seeking shade, wearing protective clothing, and following the other tips outlined in this blog, you can enjoy the outdoors while keeping your skin safe. Remember that sun protection is a year-round concern, not just during the summer months, and that even on cloudy days, the sun's harmful UV rays can still cause damage to your skin. By making sun protection a priority, you can maintain healthy, beautiful skin for years to come.

FAQs

What is SPF, and how does it work?

SPF stands for Sun Protection Factor, and it measures how well a sunscreen protects against UVB rays. The higher the SPF, the more protection it offers. For example, an SPF of 30 blocks around 97% of UVB rays, while an SPF of 50 blocks around 98% of UVB rays.

Can I still get a tan while wearing sunscreen?

How often should I reapply sunscreen?

Refrences

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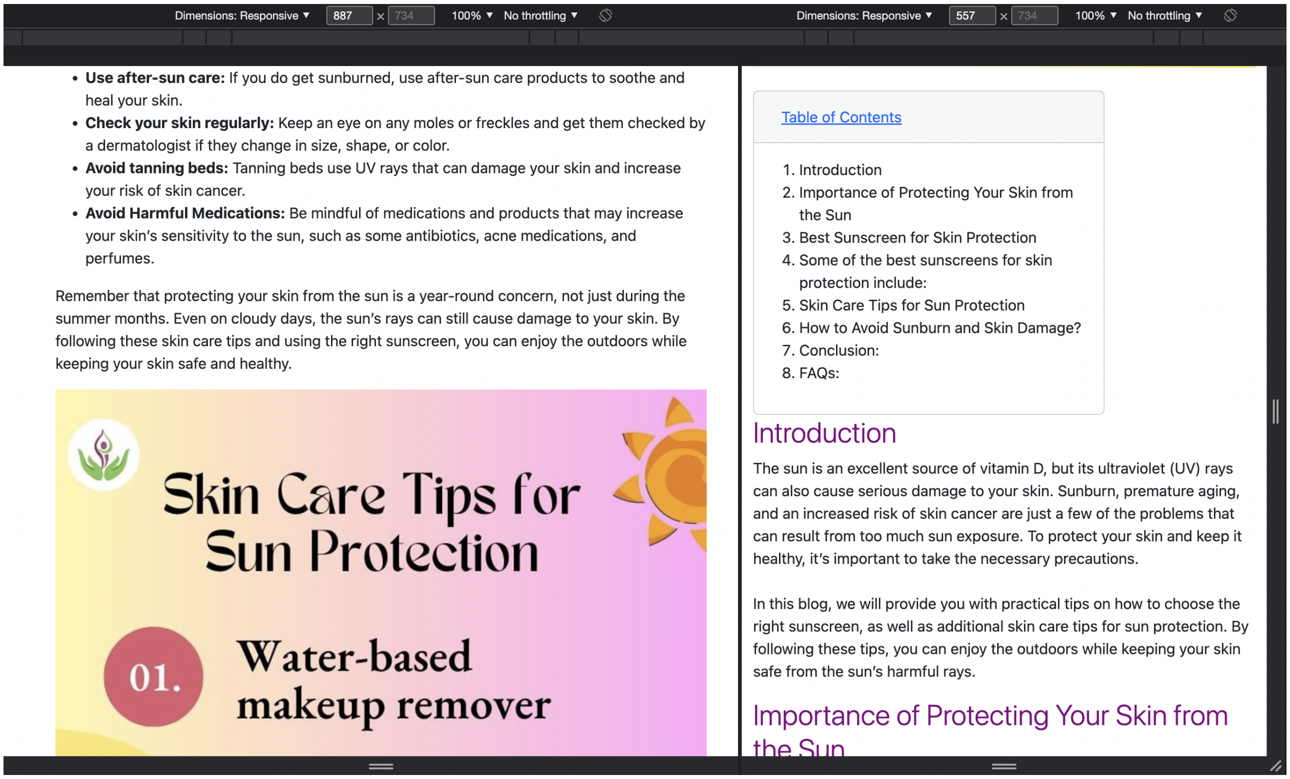
2. "The Effects of Sunlight on the Skin" published in Clinics in Dermatology: https://www.clinicaldermatology.eu/articles/10.1016/j.clindermatol.2013.01.006/
3. "Sun Protection Factor: What It Means and What It Doesn't Mean" published in Archives of Dermatology:

Fig 4.1.6 Blog Inner Page lg view -4



Dimensions: Responsive ▾ 887 × 734 100% ▾ No throttling ▾

- **Use after-sun care:** If you do get sunburned, use after-sun care products to soothe and heal your skin.
- **Check your skin regularly:** Keep an eye on any moles or freckles and get them checked by a dermatologist if they change in size, shape, or color.
- **Avoid tanning beds:** Tanning beds use UV rays that can damage your skin and increase your risk of skin cancer.
- **Avoid Harmful Medications:** Be mindful of medications and products that may increase your skin's sensitivity to the sun, such as some antibiotics, acne medications, and perfumes.

Remember that protecting your skin from the sun is a year-round concern, not just during the summer months. Even on cloudy days, the sun's rays can still cause damage to your skin. By following these skin care tips and using the right sunscreen, you can enjoy the outdoors while keeping your skin safe and healthy.

Dimensions: Responsive ▾ 557 × 734 100% ▾ No throttling ▾

Table of Contents

Introduction

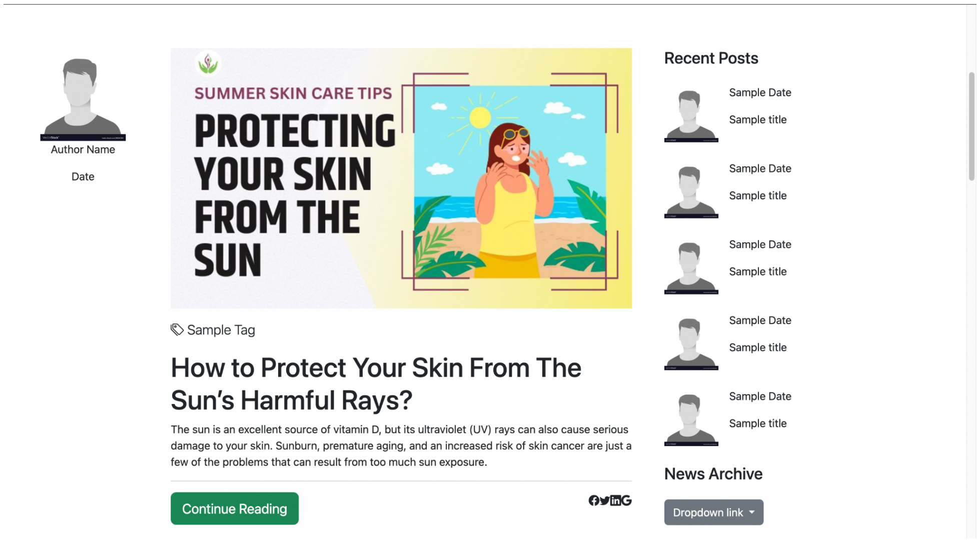
The sun is an excellent source of vitamin D, but its ultraviolet (UV) rays can also cause serious damage to your skin. Sunburn, premature aging, and an increased risk of skin cancer are just a few of the problems that can result from too much sun exposure. To protect your skin and keep it healthy, it's important to take the necessary precautions.

In this blog, we will provide you with practical tips on how to choose the right sunscreen, as well as additional skin care tips for sun protection. By following these tips, you can enjoy the outdoors while keeping your skin safe from the sun's harmful rays.

Importance of Protecting Your Skin from the Sun

Fig 4.1.7 Blog Inner Page xs view -1 and 2

- Responsive view of blog outer with 3 breakpoints



Author Name

Date

Sample Tag

How to Protect Your Skin From The Sun’s Harmful Rays?

The sun is an excellent source of vitamin D, but its ultraviolet (UV) rays can also cause serious damage to your skin. Sunburn, premature aging, and an increased risk of skin cancer are just a few of the problems that can result from too much sun exposure.

Continue Reading

Recent Posts

Sample Date
Sample title

Sample Date
Sample title

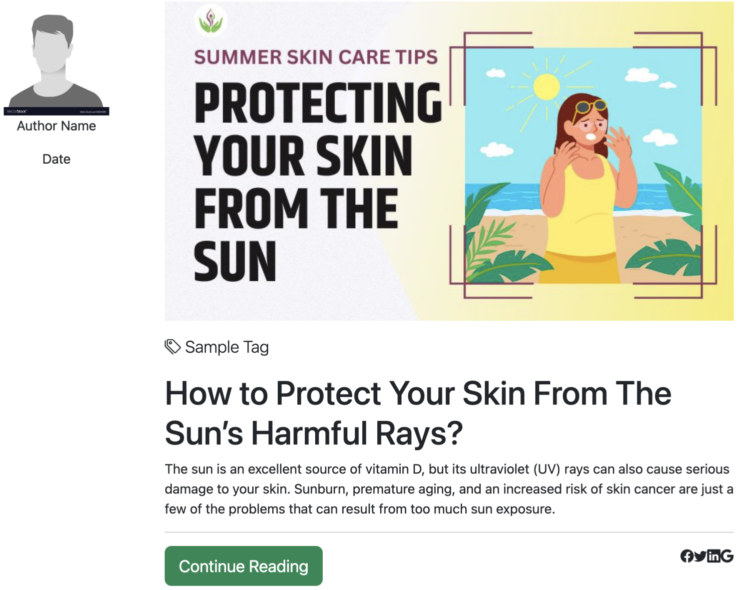
Sample Date
Sample title

Sample Date
Sample title

Sample Date
Sample title

News Archive

Dropdown link ▾



Author Name

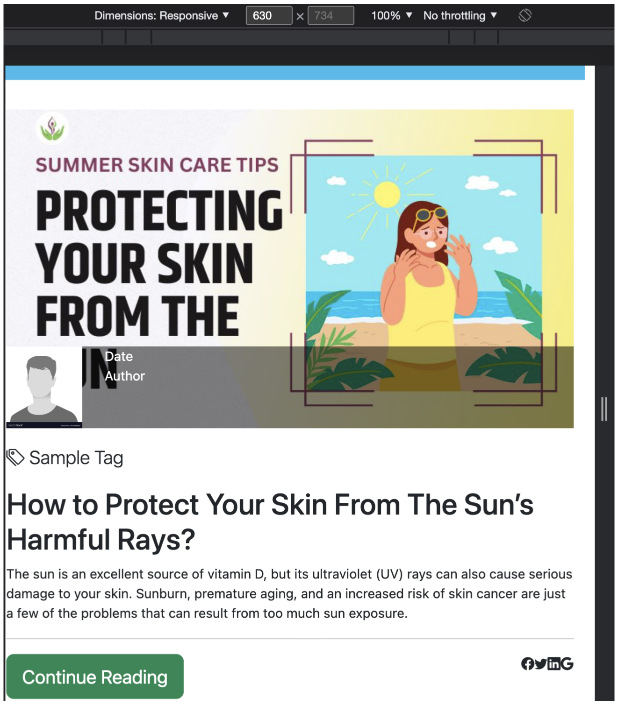
Date

Sample Tag

How to Protect Your Skin From The Sun’s Harmful Rays?

The sun is an excellent source of vitamin D, but its ultraviolet (UV) rays can also cause serious damage to your skin. Sunburn, premature aging, and an increased risk of skin cancer are just a few of the problems that can result from too much sun exposure.

Continue Reading



Date
Author

Sample Tag

How to Protect Your Skin From The Sun’s Harmful Rays?

The sun is an excellent source of vitamin D, but its ultraviolet (UV) rays can also cause serious damage to your skin. Sunburn, premature aging, and an increased risk of skin cancer are just a few of the problems that can result from too much sun exposure.

Continue Reading

Fig 4.1.8 Blog Outer Page xs view -1 ,2 and 3

4.2 Results and Findings

The final part presents the project's conclusion and discusses the outcomes of implementing the CMS for the blogging website. The outcomes are compared to the project goals and specifications outlined in Chapter 3.1, Requirements Collection and Evaluation.

Meeting its objectives excellently is the outcome of developing an effective content management system for this project. By designing its architecture with high scalability and adaptability standards kept in mind, administering as well as updating web content became easy using it. Moreover, database layout implementation effectively enables storing along with retrieving blog data to meet design specifications. User-friendly front-end development resulted in a responsive website according to requirements while integrating all features seamlessly into back-end development was executed precisely.

A rigorous validation process for the CMS involves significant amounts of testing for functionaliyty across several key areas: performance under varying conditions, integration capabilities with other systems in place as well as ensuring seamless operation throughout different user scenarios. Comprehensive evaluations were conducted during various phases to guarantee full operability across every aspect on this system.

An analysis conducted during our trial phase showed that response times on the CMS were impressively short with little delay in processing requests. Based on this performance assessment, we can confidently state that this system's high level of responsiveness enables efficient management even under heavy traffic loads. Furthermore, careful scrutiny revealed no vulnerabilities in its security measures thus affirming their effectiveness against potential threats.

In general, the implementation of the CMS has yielded successful results, as all objectives and requirements have been met. The CMS is user- and administrator-friendly, providing a seamless user experience. The website's performance is quick and efficient, reaching the standards for a contemporary blogging website.

The work has been effectively completed, and the developed CMS can serve as a model for other blogging websites. Effective implementation of the system architecture, database design, front-end development, and back-end development has resulted in a high-performing and responsive CMS. Future enhancements and modifications can be made to the CMS to increase its functionality and performance.

Chapter 05: CONCLUSION

5.1 CONCLUSION

Successfully developed a remarkable content management system using the MEAN stack. The solution provides an efficient interface with impressive user-friendliness; it allows seamless management of website content. The adoption of agile methodology facilitated timely delivery within budget estimates.

Invested heavily in researching various CMSs histories, benefits and types which came handy while creating one that meets our projects' requirements perfectly. The CMS prides itself with features like a customizable Inner Blog Pages for users to manage their web contents efficiently; it also offers support for multiple media types coupled with role-based access control is another notable feature on-boarded into it. Finally, scalability and maintainability are core attributes as the CMS accommodates future feature upgrades.

5.2 APPLICATION OF MAJOR PROJECT

This project entailed the development of an adaptable content management system suitable for use across various websites seeking efficient and flexible management solutions. The resulting product boasts customization capabilities that cater specifically towards the diverse needs presented by different clients - regardless of whether they are smaller entities or larger organizations. Our decision to utilize the popular MEAN stack offers assurance in terms of future maintenance or upgrades as it is backed up with ample support resources from developers worldwide.

5.3 LIMITATIONS

The project faces noteworthy limitations concerning its limited scope as a significant obstacle. While I have created an extensive CMS toolset, clients might still find it inadequate for their needs' fulfillment. More importantly, proper training is essential as content management processes play a crucial role in determining the effectiveness of our system's application.

Relying heavily on third-party libraries and APIs further compounds limitations as such dependencies carry risks associated with erroneous functioning aside from introducing potential compatibility issues.

5.4 FUTURE WORK

The path ahead means that there are several points that must be considered in light of future development regarding this project - such considerations include feature expansion - such as supporting multi-language content & increasing our abilities regarding search analytics - alongside optimizing UX/UI elements which will improve usability across our platform & services.

Additionally however there is a required ongoing maintenance and updates to ensure the system remains secure, adhering to the latest tech implementations. Nevertheless, it's worth emphasizing this content management system's effectiveness at managing website content for clients - with an adaptable nature that can be customized to individual needs.

Agile methodology in tandem with the MEAN stack has allowed our team to efficiently engineer a scalable & maintainable solution for the future.

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