Abstract

In this modern era of the Internet, Social Media Marketing is the most crucial part for any business to generate sales in the competitive market. There are hundreds of tools available online for the sole purpose of aiding the process of Social Media Marketing, however the problem with all the available tools is that they specialize in a few particular tasks only, for example, some tools can schedule posts and allow bulk posting of content while others can give you top trending tags related to your area of interest and some can write catchy captions for your post. The unique selling point of our Project is that it provides all the available tools plus a lot of new tools - for example, Description Optimizer using LLM, Advanced Market research using Scraping, Sentiment Analysis on Post and Post Engagement Analytics - under a single umbrella. This would be very beneficial for Businesses and Influencers who can use all the amazing tools on a single platform with a single subscription, without having to manage multiple subscriptions and jumping between websites to optimize their social media posts.

Executive Summary

In this digital age, social media plays an important role in the marketing strategies of businesses as well as influencers. However, managing social media accounts efficiently is time-consuming and complex and it usually requires specialized skills. Social Mind is a web-app designed to simplify and optimize social media management. By utilizing AI-powered tools, Social Mind helps users engage with their target audience by enhancing the visibility of social media posts, and it automates repetitive tasks like auto post-scheduling and content optimization.

Instagram, Facebook, and LinkedIn are the platform we are prioritizing for now, and we will potentially integrate other platform in the future.

Following are the main tools and features of Social Mind:

1. Smart post scheduling based on optimal engagement times
2. AI-optimized content description generator
3. Finding trending hashtags in a particular niche
4. Analysis of audience engagement to improve content strategy
5. Statistics of public engagement on user's accounts
6. A unified dashboard to manage multiple accounts

Social Mind is developed with modern technologies for front-end and back-end: Laravel and Vue.js respectively, while the AI-related operations are implemented in Python. The platform is hosted on cloud which makes it scalable and reliable. Also, there is a use of GitHub for version control, enabling collaboration and ensuring smooth development.

This project not only fulfills the gap of optimizing social media management but also pushes for innovation in digital marketing. Thus, Social Mind provides businesses and influencers with an easy and automated tool to improve their online presence even if they are not a social media expert. The platform enables users to easily manage all there social media platforms and utilize a suite of cutting-edge tools for content optimization and engagement boosting, in a single platform.

In conclusion, Social Mind aims to provide a complete user-friendly package to overcome the complexities of social media marketing, empowering users to stay competitive in the digital world.

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Chapter 1 Introduction

In this modern era of internet, marketing online on social media platforms is crucial for the survival and growth of any company. Previously, marketing was done through newspapers, radio and television, however, these modes are outdated and are no longer effective since people have switched to the internet for work, entertainment and other purposes. Unlike the previous methods of advertisement, advertising online has a lot of complications and usually requires a team of social media marketing experts to run successful marketing campaigns to reach the targeted audience. Social Mind aims to optimize and improve the process of marketing online by providing a suite of crucial tools. It will allow a layman to market online without knowing about all the technicalities and it will optimize the post using AI, in order to reach the correct target audience. By using the smart tools provided by Social Mind the user will be able to reach their target audience and boost their content visibility and interaction by a big margin.

1.1 Purpose of this Document

The purpose of the document is to provide all the relevant details about our FYP, Social Mind. It includes the Project Vision, the value it is bringing to online marketing, a detailed analysis of our competitors and how our product is better than the available tools, the software requirements specifications and design diagrams showcasing the ins and outs of our product.

1.2 Intended Audience

The intended audience for this report is a group of academic evaluators who will read and evaluate it. Besides, this report is also meant for any potential investor since we are developing a complete product for the use of public.

1.3 Definitions, Acronyms, and Abbreviations

Important definitions, acronyms, and abbreviations used in this document.

SDG: Sustainable Development Goal

FYP: Final Year Project

MVP: Minimum Viable Product

UI: User Interface

UX: User Experience

LLM: Large Language Model

NLP: Natural Language Processing

AI: Artificial Intelligence

API: Application Programming Interface

1.4 Conclusion

In conclusion, this report contains all the relevant details of our project Social Mind, and it is meant to be read academic evaluators and potential investors. The goal of our project is to optimize and improve social media marketing while making it accessible to the layman. Business owners and social media influencers can use our platform to boost the visibility of their accounts and engage with more target audience. Besides, they can analyse their performance through stats provided by out platform.

Chapter 2 Project Vision

For each related work provide a paragraph of introduction and at the end, a paragraph of conclusions. Give a page break after the chapter ends. This chapter is mandatory. Clearly specify the goals and objectives of the project along with the scope of the project. (You can make sub-heading of goals and objectives and the scope of the project).

2.1 Problem Domain Overview

Our project covers the domain of Social Media, making Social Media Marketing easier and more effective, its main feature is content optimization using AI and LLMs for creating posts that attract the right people to you social media account, ultimately improving engagement. Social Mind offers several helpful features:

- Post your content at the best times on Instagram, Facebook, and LinkedIn. (Smart Scheduling)
- Use LLM to write better post descriptions and add the right hashtags. (Content Optimization)
- Study how people react to your posts. (Sentiment Analysis)
- Allow Post Scheduling and Bulk Posting of content
- Make niche-related suggestion for potential improvement

Instead of you having to do everything by hand, Social Mind uses AI to:

- Make your content easier to find.
- Connect with the right people.
- Make sure your posts reach people who are actually interested in your niche.

Basically, Social Mind is like your personal smart assistant for your social media accounts.

2.2 Problem Statement

In today's world, businesses need to be on social media to succeed, but managing social media well is hard, time-consuming and a complex task overall.

Most businesses and influencers can't afford to hire social media experts, and doing everything manually is not possible for the layman. This is where Social Mind helps - it's a complete package of AI tools that makes managing social media easier and more effective by automating many tasks that normally need an expert.

2.3 Problem Elaboration

Social media marketing is crucial for businesses today, but it comes with many challenges:

1. **Standing Out is Hard**

   Too many businesses are competing for people's attention on social media.

2. **Algorithms Keep Changing**

   Social media platforms often change how they show posts to users, making it hard to keep up.

3. **Content Optimization**

   Businesses need to create interesting posts regularly, use the right hashtags, and write tailored descriptions, ensuring that you reach the right audience.

4. **Time-Consuming Process**

   Managing social media properly (posting, checking results, answering comments) eats up a lot of time.

5. **Making Ads Work**

   Paid advertising is important but tricky - you need to know how to target the right people and get good results for your money.

6. **Customer Engagement**

   It's hard to know how to keep your audience engaged with your content and build a healthy relationship with them.

2.3.1 Sub-Problems to Address

1. **Post Scheduling and Timing**

   Getting your social media posts seen by more people depends heavily on when you share them. But finding the right posting time is complex - you need to think about which platform you're using, when your audience is online, and how time zones affect viewing. Social Mind makes this simple by using artificial intelligence to pick the best posting times and schedule everything automatically.

2. **Content Optimization with Tags and Descriptions**

   Standing out on social media takes more than eye-catching visuals. Your posts need two more key things to be found easily: good descriptions and the right hashtags. Social Mind handles this automatically - its AI writes engaging descriptions and picks trending hashtags that connect with the people you want to reach.

3. **Audience Sentiment Analysis**

   Seeing how people feel about a post helps businesses make better content. But looking at all the comments, likes, and shares by hand takes too long. Social Mind does this job automatically. It figures out if people like the content or not. This helps businesses quickly understand what people think and make changes if needed.

4. **Reducing Manual Effort**

   Managing many social media accounts by hand is hard work. You have to plan when to post and keep track of how well your posts do. Social Mind makes this easier by doing a lot of the work automatically. This lets businesses handle their social media accounts better without spending as much time on it themselves.

2.4 Goals and Objectives

Goals:

- **Make Social Media Easier**: Help businesses manage their social accounts without the hassle, so they can focus on what they do best.
- **Get More Eyes on Posts**: Use smart tech to make posts on Instagram, Facebook, and LinkedIn get seen and liked more.
- **Do the Boring Stuff Automatically**: Take care of repetitive tasks like scheduling and analyzing posts, saving businesses time and effort.

Objectives:

- **Smart Posting Times**: Figure out when to post for the most views, automatically.
- **AI-Powered Post Help**: Use AI to write better post descriptions and suggest popular hashtags.
- **Understand Audience Reactions**: Track how people feel about posts to help businesses improve their content.
- **One Place for All Accounts**: Manage Instagram, Facebook, and LinkedIn from one easy-to-use dashboard.
- **Beat the Algorithms**: Use smart tactics to make posts more likely to show up in people's feeds.
- **Simple to Use**: Create a tool that's easy for anyone to use, even if they're not tech-savvy.

2.5 Project Scope

We're building a complete website Application for businesses and individuals to handle their social media better. It will work with Instagram, Facebook, and LinkedIn, more platforms will be added in future.Our Web-App would be offering these main features:

1. **Automated Post Scheduling**

   Schedule posts when the platform traffic is high, specifically when traffic which is related to our niche is active, Posts at that time are most likely to be seen and liked.

2. **AI-Generated Content Optimization**

   Use AI to help write catchy post descriptions and suggest trending hashtags extracted by scrapping the data from the particular platform.

3. **Audience Feedback Tracker**

   See how people react to posts, helping businesses understand what works. This is done by AI, more specifically a sentiment analysis model.

4. **All-in-One Dashboard**

   Manage all social media accounts in one place. Add multiple accounts of the same platform or different platforms.

5. **User-Friendly Interface**

   Create a simple interface that anyone can use, even if they're not tech-savvy.

We'll build this using common web tools like HTML, CSS, JavaScript, and possibly React or Angular. The app will talk to a database using a RESTful API. We'll use Agile and SCRUM to keep the project on track.

Project Deliverables:

- A working website for social media management
- Instructions on how to use the app
- Technical details about how we built it

Exclusions from Project Scope:

- Making a Desktop Application
- Making a smartphone app for android/ios
- Providing Social Media Marketing Experts

This plan will guide us as we build *Social Mind*, making sure we stick to what's important.

2.6 Sustainable Development Goal (SDG)

Figure 2.1: This figure represents SDG 8 and SDG 9. SDG 8 refers to deccent work and economic growth while SDG 9 is about industry, innovation and infrastructure

The Social Mind project targets SDG 8: Decent Work and Economic Growth and SDG 9: Industry, Innovation, and Infrastructure.

Social Mind helps reach the goal of better jobs and stronger economies (SDG 8). It does this by giving small and medium businesses an easy way to handle their social media marketing. This helps these businesses get noticed more online, which can lead to more sales and growth. By doing the repetitive social media work automatically, Social Mind frees up business owners to focus on running their companies. This can lead to new ideas and more jobs. The tool also makes it easier for smaller businesses to reach customers online, helping them compete with bigger companies. In the end, Social Mind supports steady and fair economic growth. It helps create good jobs for more people by giving businesses, especially smaller ones, a better chance to succeed in today's digital world.

Moreover, the goal is about building strong infrastructure, supporting businesses to grow sustainably, and encouraging innovation (SDG 9). Social Mind utilizes innovative and emerging technologies in the field of AI like LLM and Sentiment Analysis to optimize the marketing of businesses and individuals.

By helping them adopt new tech, Social Mind encourages innovation and sustainable growth.

2.7 Constraints

Here are some key constraints for the *Social Mind* project:

1. **Platform Limitations**: The project will be limited to managing social media platforms including Instagram, Facebook, and LinkedIn. Adding other platform would require registering as a developer, to get API, with that platform.
2. **No Mobile App Development**: The project will only focus on building a Web-application. Standalone Android/IOS apps will not be developed, mobile users will be able to use our platform using mobile browsers.
3. **No Desktop App Development**: As we are only focusing on building a Web-App, developing a standalone desktop app is outside the scope of our project.
4. **Data Dependency on Social Media APIs**: Social Mind's ability to post, schedule content posting and bulk posting depends on access to the respective social media platform APIs. Any changes in API access may hinder functionality.
5. **Time and Budget Constraints**: Since the project is being developed in a limited time frame and with limited budget, the performance of AI models used may not be optimised to the full potential.

2.8 Business Opportunity

Social Mind is designed with businesses as the main focus. It a an advanced suite of tools capable of replacing Social Media Marketing experts and saving business huge amount of time and capital. Besides businesses, Social Mind can be very beneficial for Social Media Influencers and Individual who want to increase their presence and engagement on Social Media. Our Model is subscription based (thus it can generate capital) allowing the users to get the marketing done much cheaper and quicker as compared to hiring a Social Media Manager. Moreover, Social Media Managers can utilize our tools to improve and optimize their workflows.

2.9 Stakeholders Description/ User Characteristics

The major stakeholders of Social Mind would be all those individuals willing to boost their social media profiles for personal branding or business marketing, plus the Admin.

2.9.1 Stakeholders Summary

1. **Small & Medium Sized Businesses (SMBs)** – Operating companies who want to manage their social media marketing the right way.
2. **Individual or Social Media Influencers** – Those users who wish to do personal branding and enhance social media visibility.
3. **Digital Marketing Agencies** – Potential users who can use the platform to manage numerous clients' accounts easily, digital marketing experts or agencies for example.
4. **Software Development Team** – To develop the platform and also make sure that it satisfies user requirements.

2.9.2 Key High-Level Goals and Problems of Stakeholders

1. **Small and Medium Businesses** want to improve their online presence but struggle with limited resources and know-how.
2. **Social Media Influencers** want to grow their personal brand but face tough competition and content creation challenges.
3. **Digital Marketing Agencies** need to manage multiple clients efficiently but find it hard to keep up with social media changes.
4. **Software Developers** want to create a good social media tool but face challenges in balancing features, budget, and security.

2.10 Conclusion

Chapter 2 gives us an overview of project's vision, problem domain overview, problem statement, elaboration and sub-problems to address. Moreover, it deals with our goal and objectives, project scope, constraints and highlights the business opportunity it presents. This chapter lays the foundation of comprehensive exploration of SocialMind development and implementation in the upcoming chapters.

Chapter 3 Literature Review / Related Work

This chapter includes the detailed analysis of related work, including the analysis of our competitors, what are their strengths, where they lack, and how we compete with them.

3.1 Definitions, Acronyms, and Abbreviations

RSS: Refers to Really Simple Syndication, a web feed format used to publish frequently updated content such as blog entries, news headlines, and podcasts.

RAG: It stands for Retrieval-Augmented Generation. It is an approach that combines traditional retrieval techniques with generative models, enabling the generation of responses based on both retrieved documents and learned knowledge.

3.2 Detailed Literature Review

This chapter explores the existing software applications strategies that become the influence the creation of SocialMind. After a thorough investigation of earlier work done in social media marketing it became a need to introduce an integrated system that binds together all the pieces together in one single system. We hope to expand upon and improve the ideas of the following works.

3.2.1 Related Research Work 1: Dlvr.it

3.2.1.1 Summary of the research item

Dlvr.it is a social media automation tool designed to streamline content distribution across multiple social media platforms, including Facebook, LinkedIn, and Instagram. The platform enables users to automate their posting schedules, curate content from RSS feeds, and monitor performance through basic analytics. Dlvr.it aims to make social media management more efficient by offering features such as bulk scheduling, URL shortening, and the ability to post to multiple accounts simultaneously from a centralized dashboard. It primarily serves small businesses, individual influencers, and digital marketing agencies.

3.2.1.2 Critical analysis of the research item

Dlvr.it excels in automating the publishing process, allowing users to schedule posts in advance, with the posts delivered as consistently and timely as possible. One of the most useful features of this particular feature is to allow for the good stead supply of relevant posts, without the need of manual work, as

someone has to find and create the content. One of the best things about Dlvr.it is just how intuitive it is — users of all skill levels can use it and generate enhanced descriptions. While Dlvr.it's automation is impressive, it doesn't really have advanced AI capabilities to optimize your post content (yet). For example, it does not have writing tools for high involvement descriptions or the trending hashtags to magnify reach and interaction. Additionally, Dlvr.it has analytics features, but they're not very sophisticated and lack real insight into your social media strategy's performance. This can be a place limitation for folks searching for detailed analytics to encourage and refine their content strategy.

3.2.1.3 Relationship to the proposed research work

The Social Mind project also serves a similar market, automating social media management to save users time and effort, just like Dlvr.it does. But Social Mind wants to expand on the features that Dlvr.it has created by incorporating cutting edge AI tech. Use of LLMs for picking up content choice of Social Mind to go previously described area of the social network — posting descriptions or detection trend ones hashtags is a substantial step forward. Also, sentiment analysis on audience feedback in the proposed system goes deeper into user engagement and Social Mind promises to focus on returning with fast inference by use of RAG, which the current Dlvr.it lack. Since social media management remains a gap to be filled, Social Mind tries to provide a more intelligent and complete solution under one umbrella.

3.2.2 Related Research Work 2: Later

3.2.2.1 Summary of the research item

Later is a primarily visual based platform for scheduling Instagram, Facebook, Twitter and Pinterest social media. The user can schedule and plan a post, and then publish it, using a drag and drop calendar interface. Later also provides visual content management, media library organization and the basic analytics and tracking to monitor what's happening with your posts.

3.2.2.2 Critical analysis of the research item

Users love drag-and-drop calendars to schedule and manage their posts, especially for visual content, which is what later provides. and If you run a business or are an influencer seeking to maintain an appealing visual branding, the platform provides solid tools for the organization and management of the resources. It supports out of the box multiple social media platforms and provides a single dashboard view to manage social media accounts easily. On the other hand, Later is great at scheduling and media management, but doesn't offer any advanced AI functionality to optimize post content, like using better

descriptions or finding trending hashtags. While the analytics they provide are pretty basic, they don't seem to be powerful enough for digging deep into audience engagement and post performance.

3.2.2.3 Relationship to the proposed research work

One of the key features of this proposed Social Mind project focuses on simplifying the scheduling process for visual content, and later focuses on simplifying the scheduling process for visual content. Still, Social Mind differs in that it comes with powerful AI powered functionalities. While Later is strong in how intuitive it is to manage media and create a user schedule, Social Mind takes it further by leveraging the power of AI to get the best out of your posts' descriptions and hashtags to promote the highest levels of post visibility and engagement. It also means that Social Mind's sentiment analysis capability goes further than Later's basic analytics to give you deeper insights into audience reactions. Social Mind combines these advanced AI features with scheduling to provide a more complete solution in terms of social media automation as well as content optimization efforts.

3.2.3 Related Research Work 3: Sprinklr

3.2.3.1 Summary of the research item

Sprinklr is a complete customer experience management solution, with powerful social media management, plus sentiment analysis. It is a platform which has tools that help you plan, publish, and analyze the social media content for variety of channels. Advanced sentiment analysis is one of Sprinklr's best features, as it deploys AI to analyze public opinion and emotional reaction, for example brands, campaigns and individual posts. An analysis like this aids the organizations in estimating the audience sentiment and engagement, which can be used to boost an organization's social media strategy and enhance the direct relationship between the organization and customer.

3.2.3.2 Critical analysis of the research item

With AI powered sentiment analysis and its ability to gain deep insights to audience emotions and opinions, Sprinklr helps businesses make data driven decisions around their content, marketing, and customer service. With such an extensive suite of content creation, calendar, engagement and analytics tools the platform makes it suitable for large organizations with complex social media requirements. and you can maintain a single lifeline for each channel you choose, providing centralized management and strategy execution across multiple social media platforms. Because of so many features, a harder more expensive and less accessible thing to small (small businesses) and medium (medium businesses) businesses, perhaps even individuals. This is because the scope of features can be discouraging for new users, and it can take quite a bit of learning before people get off to the full extent of the platform.

3.2.3.3 Relationship to the proposed research work

Social Mind promises to be a sophisticated suite of tools for social media management and sentiment analysis, targeted at small and medium sized businesses and individual influencers, while Sprinklr offers a social media management platform encompassing all of these features for all sizes of businesses. Users with limited resources are especially dependent on optimizing post content with AI driven suggestions and scheduling during peak engagement times; Social Mind addresses these challenges. In contrast, Sprinklr works with big organizations and offers a comprehensive, though possibly too much for most companies as they are just focusing on different types of analyzers and sentimental analysis algorithms to track users engagement. Social Mind aims to fill a market niche by highlighting the ease of use, with targeted AI functionalities and audience feedback analysis, to generate a boundless and much easier social media presence and engagement platform.

3.2.4 Related Research Work 4: Anyword

3.2.4.1 Summary of the research item

Anyword is an AI-driven content generation platform that specializes in creating social media posts and marketing copy. The platform uses natural language processing to generate content based on user input and desired tone. Anyword focuses primarily on optimizing the writing process for social media marketers by suggesting effective copy variations and formats designed to increase engagement. Users can quickly produce multiple versions of social media content, making it easier to test and refine messaging for different audiences.

3.2.4.2 Critical analysis of the research item

It's no secret that Anyword shines when it comes to producing engaging social media copy effectively and quickly, and it's even better at creating several variations to help you find the right one for your audience. So the platform makes use of AI algorithms, that spot improvements as well as variations of what's said in best practices and suggests what's best for the users to write on posts so that they score well among their target audience. It's made to be as easy to use as possible, so anyone from those who don't have much technical knowledge to the more tech savvy can use it to create social media content. A comprehensive social media strategy for any business consists of more than content generation, and therefore all the other features which are essential for a company's social strategy, posting and scheduling posts, analyzing audience sentiment, scheduling posts, etc. are not part of Anyword. While the platform does not provide tools for tracking audience engagement or feedback, so they do not know how generated content performs in real world scenarios.

3.2.4.3 Relationship to the proposed research work

Yes, Anyword provides an effective social media content engine, but what anyword lacks from a holistic perspective is what social mind strives to offer. Being Social Mind has a lot of 'advanced features' like automated scheduling according to peak times of engagement, sentiment analysis to see how audiences respond, as well as guard rails to prevent unsafe and compliant content creation. Integrating this functionality not only allows Social Mind users to build optimized social media posts, but also provides them with the tools to manage their entire social media strategy more efficiently. This is a total solution for small and medium businesses and individual influencers to create more robust platform than by Anyword's content generation approach aimed towards this.

3.2.5 Related Research Work 5: Easy-Peasy.AI

3.2.5.1 Summary of the research item

The easy-peasy.ai site offers user-friendly platform for social media post generation. It enables users to enter basic information like post topics, keywords, and tone to get quick social media content that is optimized for that topic. As a marketer or a content creator, you can use the platform to customize your copy and make it a good fit for you to create posts easily. The primary focus of this is to speed up the content generation process, save time, and generate AI suggested content using keywords and style preferences.

3.2.5.2 Critical analysis of the research item

Easy-Peasy.ai is the simplest and easiest to use AI, which makes it easy for users who require quick social media content. This platform is very useful to generate content according to trends and keywords, so users can make posts in a short period of time.However, it does not have advanced features beyond content generation. Easy-Peasy.ai does not provide functionalities like automated scheduling, performance monitoring, analytics, as a result it is only meant for content creation. Moreover, the platform does not offer collaboration tools nor is it possible to manage multiple social media accounts from a single dashboard, which may be a drawback for businesses or influencers that would need an all-in-one social media management tool.

3.2.5.3 Relationship to the proposed research work

SocialMind takes a step further with an all in one social media management platform. Unlike Easy-Peasy.ai, SocialMind isn't just about generating optimized social media posts; it also offers AI-driven post descriptions, automated scheduling based on peak engagement times, sentiment analysis to see how

audiences respond to posts, and tools to monitor post performance. In addition, SocialMind gives users the opportunity to connect with and manage multiple social media accounts, so that users can handle all social media aspects from a single platform. This comprehensive approach enables businesses and influencers not just create optimized content but also manage and grow their social media presence in a well organized and efficient way, and thus SocialMind aims to fill a gap in the market by highlighting the ease of use, with targeted AI functionalities and audience feedback analysis, to generate a boundless and much easier social media presence and engagement platform than Easy-Peasy.ai's only content generation capabilities.

3.2.6 Related Research Work 6: RADAAR

3.2.6.1 Summary of the research item

RADAAR provides a social media post generator that helps you create social media content in no time. By inputting various parameters, users can create posts that are tailored to their specific needs and thus make content creation more efficient. It also seamlessly integrates with media libraries such as Lexica, Unsplash, Pexels, and Giphy, so that users can enrich their posts with visuals. RADAAR's tools are easy to use, so marketers and people who want to make great social media content without having to be a technical genius can use it.

3.2.6.2 Critical analysis of the research item

What RADAAR excels at is blending AI driven content generation with robust media integration, which can dramatically improve the visual appeal of social media posts. The platform is easy to use and you can create content very fast with relevant images and videos added to it. Like Easy-Peasy.ai, RADAAR's primary focus is on content generation, and it does not have some of the more advanced features, such as automated scheduling, analytics, or collaboration tools. Though it simplifies the creation of visually appealing posts, it does not provide complete management tools to monitor audience engagement or performance metrics as in the case of SocialMind.

3.2.6.3 Relationship to the proposed research work

RADAAR is a good tool to generate exciting social media posts with embedded media, but SocialMind is unique in that it provides a complete social media management solution. What SocialMind does is way beyond just creating optimized descriptions, it allows you to schedule posts automatically according to peak engagement times and monitor the performance through analytics. It also allows sentiment analysis features to know what people are saying about you, and collaboration tools to manage several social media accounts from a single platform. By taking this approach, SocialMind becomes a more

powerful tool for businesses and influencers to not only create content but also manage and analyze their social media presence in its entirety.

3.3 Literature Review Summary Table

The following table 3.1 provides a concise summary of the literature reviewed for the development project, highlighting the key features, relevance, and limitations of each application.

Table 3.1: Literature Review Summary Table

This Table summarizes the points discussed throughout this chapter.

Application	Features	Relevance	Limitations
Dlvr.it [1]	Automates publishing and Post Scheduling	Automation of social media posts, consistent posting across platforms	Lacks advanced AI functionality, basic analytics
Anyword [2]	AI content creation, includes social media scheduling	Comprehensive content creation and scheduling	Limited AI-driven insights, not specialized in social media optimization
Later [3]	Visual content calendar and schedule posts	Social media scheduling and visual planning	No advanced AI optimization for content, basic analytics
Sprinklr [4]	Social media sentiment analysis	Sentiment analysis and customer engagement	Complex setup and not providing Scheduling and Content Enhancement features
Easy-Peasy [5]	AI-based post description	Social Media post generation	Not providing Scheduling and Content Enhancement features
RADAAR [6]	AI content creation	Engaging Social media posts in few clicks	Lack of advanced features like Scheduling, Analytics and Content Enhancement features

3.4 Conclusion

Social Mind stands out because it is incorporating some of the most dynamic AI into social media management, giving us a complete package for content optimization, automated scheduling, as well as deep sentiment analysis of audience. Social Mind stands out from the likes of Later, Sprinklr, Dlvr.it, Easy-Peasy, RADAAR and Anyword as it's the only tool that has ease of use, powerful AI driven insights, and robust automaton to deliver an all-in-one experience. That's why it's ideal for businesses and individual influencers who are aiming to improve their social media game without spending a lot on marketing experts or having to subscribe to various separate tools.

Chapter 4 Software Requirement Specifications

This chapter provides highlights for important features including functional and non-functional requirements of the project,use cases and risk analysis.

4.1 List of Features

1. **Smart Post Scheduling:** It posts automatically at the best time based on user engagement data.
2. **AI-Powered Content Generation:** It helps provide users with AI-driven post descriptions and hashtag that enhance visibility.
3. **Audience Feedback Analytics:** Offers insights into the behavior of the audience on post interactions (likes, comments, shares).
4. **Multi-Account Management:** It helps users handle more than one social media account (Instagram, Facebook, and LinkedIn) from a single dashboard.
5. **User-Friendly Dashboard:** An interface that is simple and intuitive, allowing users with limited technical knowledge to manage their social media presence effectively.

4.2 Functional Requirements

This section will be discussing complete functional requirements of different entities which will be using SocialMind.

4.2.1 Funtional Requirements for Users:

Users within SocialMind will be able to:

1. **Connect Social Media Accounts:** Users can connect their social media accounts (Instagram, Facebook, LinkedIn) to the platform to manage all their profiles in one place.
2. **Schedule Posts:** Users can schedule posts either automatically or manually with AI-generated suggestions for the best posting time to achieve maximum engagement.
3. **AI-Powered Content Recommendations:** The platform provides AI-powered recommendations for post descriptions and hashtags, helping users enhance post visibility.
4. **Detailed Analytics:** Users can access detailed analytics on audience engagement, including metrics such as likes, comments, shares, and follower growth trends.

5. **Notifications and Insights:** Users are notified about upcoming scheduled posts, and receive performance insights to optimize their social media strategy.

4.2.2 Functional Requirements for Admin

1. **User Account Management:** Admins can create, modify, and delete user accounts, as well as manage user profiles and control access permissions.
2. **System Monitoring and Reporting:** Admins can monitor the system performance and generate reports regarding platform usage and user engagement.
3. **Management of Social Media Accounts:** Admins can view and manage all user-linked social media accounts and check API connections across platforms to ensure they are functioning properly.
4. **Data Export for Analysis:** Admins can export user engagement data, analytics, and system reports for further analysis or business insights.

4.2.3 Functional Requirements for System

1. **Account Integration:** The system has to enable the linking of social media accounts (Instagram, Facebook, LinkedIn) using APIs for easy management.
2. **Post Scheduling:** The system will allow users to schedule posts on different social media networks. The scheduling can either be the default or optimized by AI using engagement data.
3. **AI-Powered Content Optimization:** Readily available AI suggestions for post content, including descriptions and hashtags, which can increase visibility and engagement.
4. **Multi-Account Management:** The system will enable users to manage different accounts or pages, posts, analytics, and scheduling from one platform.
5. **Audience Feedback Analytics:** The system will provide analytics data on likes, comments, shares, and engagement rates, giving users insights into audience behavior and post performance.
6. **Notification System:** Users will be notified of upcoming scheduled posts, engagement frequency, and receive AI advice on how to optimize post interactions.
7. **User Access Management:** The system will allow administrators to control user access levels, and manage user accounts by creating, modifying, or deleting them as needed.
8. **API Interaction:** The system will read and write data to social media platforms, adhering to current API regulations and rules of Instagram, Facebook, and LinkedIn.

4.3 Quality Attributes

As the case may be, to achieve the desired end for the Social Mind platform, there are several key quality attributes that must be taken into consideration in order to guarantee the performance, reliability, usability, security and scalability of the platform. These attributes are crucial for making sure that it is possible to help small and medium business, influencers, and individual users manage their social media profiles effectively. The next sub-section describes the design and development quality attributes of Social Mind.

4.4 Non-Functional Requirements

This section will be discussing all non-functional requirements related to our SocialMind application.

4.4.1 Performance

Social Mind must provide fast and proactive responses to all the features, coping with numerous users and multiple accounts in social networks.

4.4.2 Reliability

The platform must be always up and running with hardly any downtime, while ensuring seamless integration with third-party APIs (Instagram, Facebook, LinkedIn).

4.4.3 Usability

Because the application is aimed at non-professional users, the interface must be as simple as possible and allow users to manage social networks efficiently in the shortest amount of time.

4.4.4 Security

For user information protection, the platform has to provide data encryption, API security, and basic authentication mechanisms.

4.4.5 Scalability

Social Mind should be able to handle increasing users and accommodate new features seamlessly as the application evolves.

4.5 Assumptions

The following assumptions have been made for our SocialMind Application:

- Users should have a browser which have JavaScript compatibility supported.
- As the end Application will be deployed for the end users, so internet connection is required.
- Users are supposed to have some background knowledge of how the web interface works including login, getting to the dashboard and how to click on buttons and submit forms.

4.6 Use Cases

This section lists the use cases of our application. The table 4.1 onwards provide use cases.

Table 4.1: Use Case 1: User SignUp

A new user creates an account on SocialMind.

Name	User Signup		
Actors	New User		
Summary	New users can create an account by providing details such as name, email, password, and agreeing to terms.		
Pre-Conditions	None		
Post-Conditions	Account is successfully created and user is redirected to the login page.		
Special Requirements	None		
Basic Flow			
Actor Action		**System Response**	
1	User navigates to signup page.	2	The system displays the Signup form.
2	User fills out form with required details.	3	System creates account and redirects to login.
Alternative Flow			
2	User enters a username that is not unique.	3-A	System displays error message telling username already exists.

Table 4.2: Use Case 2: User Login

A registered user login our Application SocialMind.

Name	User Login		
Actors	User, Admin		
Summary	A registered user login and is redirected to dashboard.		
Pre-Conditions	None		
Post-Conditions	The user is logged in and redirected to the dashboard.		
Special Requirements	None		
Basic Flow			
Actor Action		**System Response**	
1	User accesses the login page.	2	The system shows the login form page.
2	User enters valid email address and password and submit form.	3	System verifies credentials and logs user in.
Alternative Flow			
2	User enters invalid email or password.	3-A	System displays incorrect email or password error message

Table 4.3: Use Case 3: Upload Media

User uploads media including images or videos through dashboard.

Name	Upload Media		
Actors	User		
Summary	User uploads images, videos or other media to our media center through dashboard.		
Pre-Conditions	User must be logged in and have a valid social media account linked.		
Post-Conditions	Media is successfully uploaded to cloud for anytime usage.		
Special Requirements	Supported file formats and size limits must be followed.		
Basic Flow			
Actor Action		**System Response**	
1	User clicks on upload media.	2	System prompts user to select a file.
2	User selects media file.	3	System uploads file and displays a success message.

Table 4.4: Use Case 4: Schedule Post

User can schedule posts on desired social media handles to post automatically at peak time or selected time.

Name	Schedule Post		
Actors	User		
Summary	User schedules a post for automatic posting at peak time or selected time on one or more linked social media accounts.		
Pre-Conditions	User is logged in and has linked social media account.		
Post-Conditions	Post is successfully scheduled for the selected date and time.		
Special Requirements	None.		
Basic Flow			
Actor Action		**System Response**	
1	User selects a post to schedule.	2	System displays scheduling options custom time or suggested peak times.
2	User chooses custom or peak time for scheduling.	3	System schedules post and confirms the selected time.

Table 4.5: Use Case 5: Create Optimized Descriptions

User generates AI-optimized post descriptions based on keywords and trends to increase post visibility.

Name	Create Optimized Descriptions		
Actors	User		
Summary	System generates AI-optimized post descriptions based on initial idea and trends to increase post visibility.		
Pre-Conditions	User is logged in and has connected at least one social media account.		
Post-Conditions	None		
Special Requirements	None		
Basic Flow			
Actor Action		**System Response**	
1	User navigates to the description generation section.	2	System prompts user to input keywords and initial product idea.
2	User enters keywords and product idea.	3	System processes the input and generates an optimized description.
3	User reviews and selects the generated description.	4	System displays a success message and saves the description.
Alternative Flow			
3	User does not like the generated description.	4	System provides an option to regenerate the description.

Table 4.6: Use Case 6: Connect Multiple Social Media Accounts

User connects multiple social media accounts (e.g., Instagram, Facebook, LinkedIn) to the platform.

Name	Connect Multiple Social Media Accounts		
Actors	User		
Summary	User connects multiple social media accounts (e.g., Instagram, Facebook, LinkedIn) to the platform.		
Pre-Conditions	User must be logged in and have accounts on multiple social media platforms.		
Post-Conditions	None		
Special Requirements	User must have valid credentials for each social media account. API access must be granted by each platform.		
Basic Flow			
Actor Action		**System Response**	
1	User navigates to the account linking section.	2	System displays options to connect to various social media platforms.
2	User selects a social media platform to connect.	3	System redirects the user to the social media platform's authorization page.
3	User grants permissions and authorizes the connection.	4	System confirms the successful linking of the account and displays a success message.
Alternative Flow			
3	User encounters an error during account linking.	4	System displays an error message indicating the issue and prompts the user to retry.

4.7 Hardware and Software Requirements

This section will be discussing the hardware and software requirements that are necessary to develop the web application SocialMind.

4.7.1 Hardware Requirements

The following are the hardware requirements for our application:

- Desktop PC/Laptop
- Internet Connection is required

4.7.2 Software Requirements

The following software requirements are necessary for our application:

- VS Code

- Laravel
- Python
- Vue.js

4.8 Graphical User Interface

This section covers the Graphical User Interface of our Web-App Social Mind.

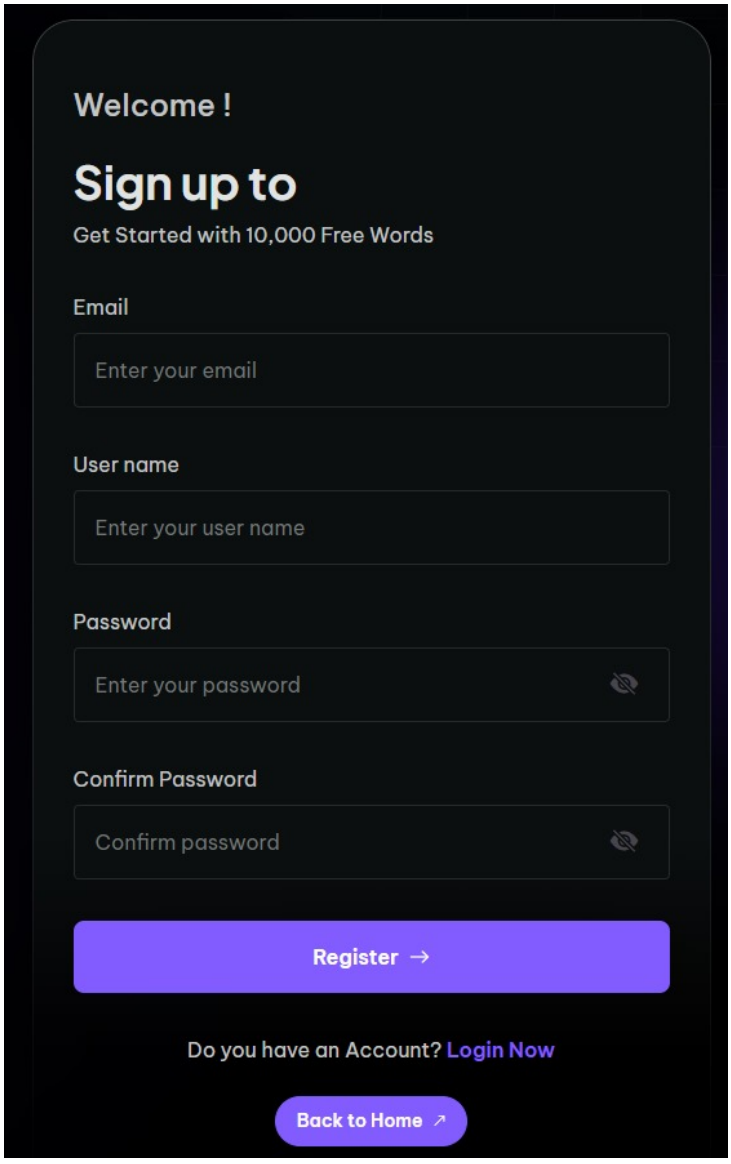

Figure 4.1: Graphical User Interface for Sign-Up
This screen is the user Sign-Up page of our Social Mind Application where new users can create an account

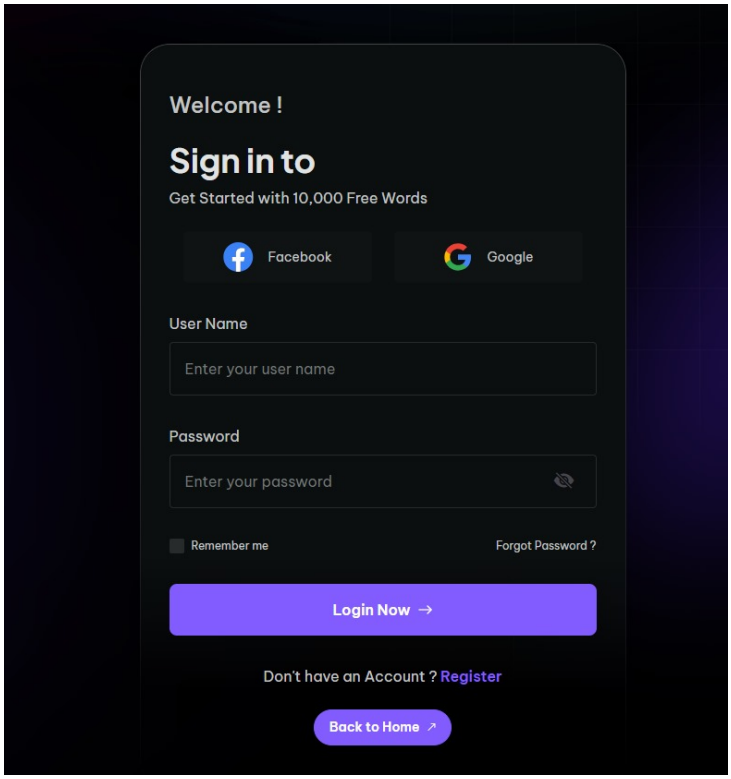

Figure 4.2: Graphical User Interface for Login
This screen is the user Sign-In page of our Social Mind Application where registered users can login and access dashboard

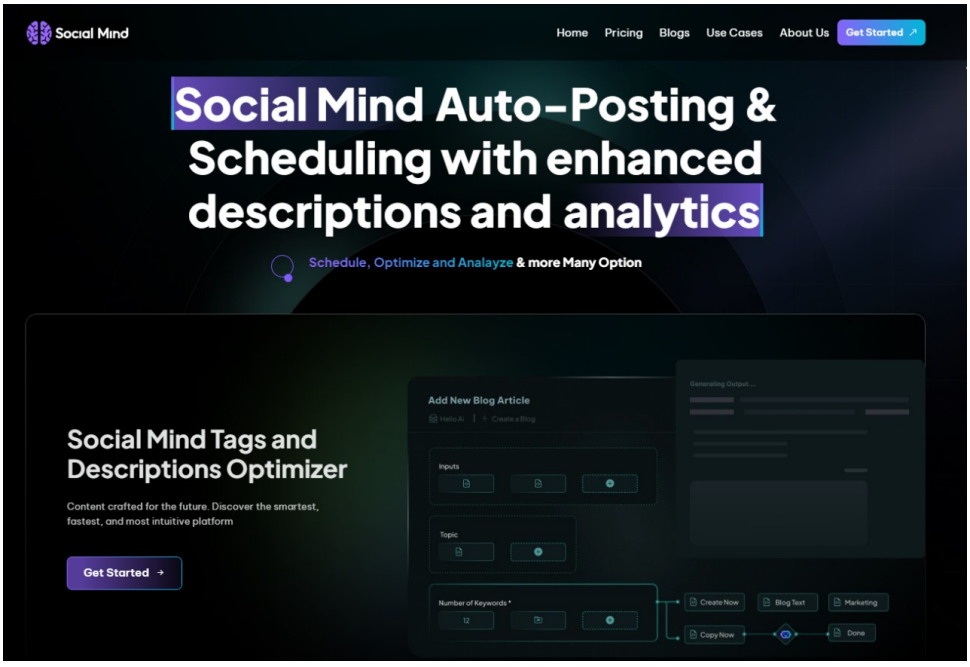

Figure 4.3: Graphical User Interface of Website Home Page
This screen represents home page of SocialMind

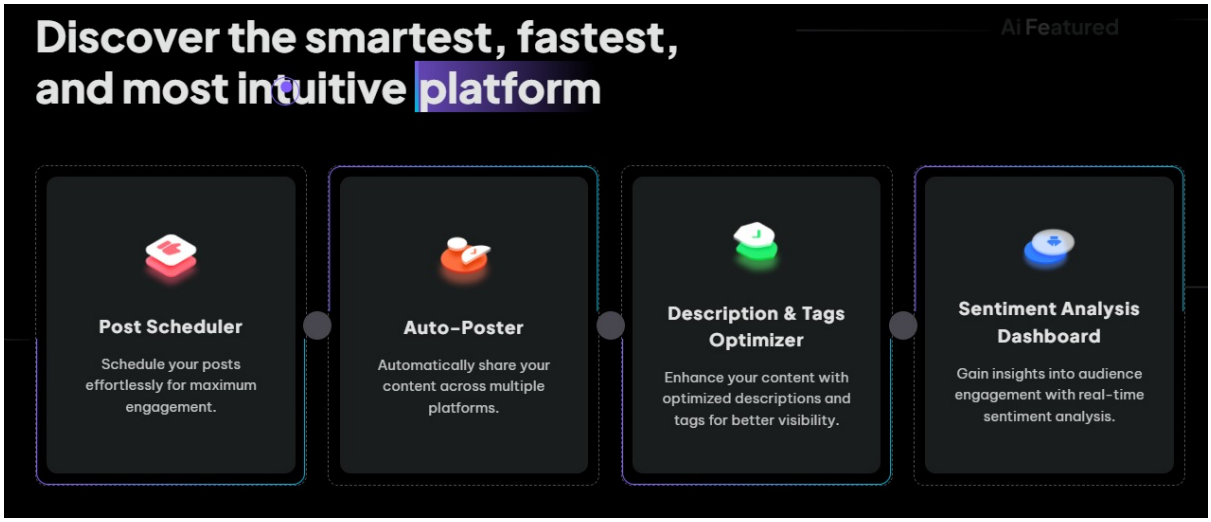

Figure 4.4: Graphical User Interface for Main Tools / Features
This screen shows the features / tools of our Application

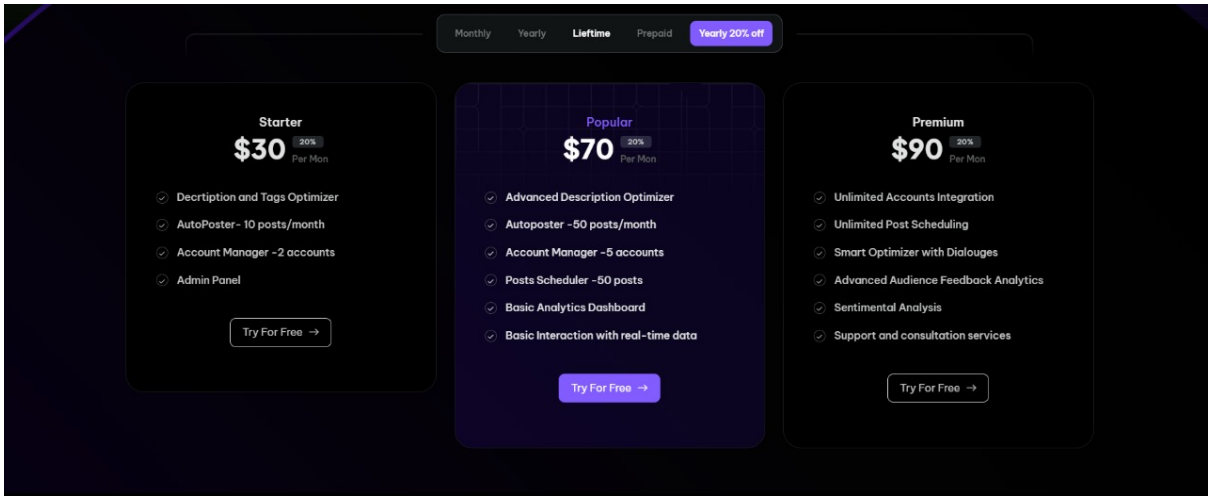

Figure 4.5: Graphical User Interface for Yearly Subscription Offers
This screen shows the yearly pricing plans for the users

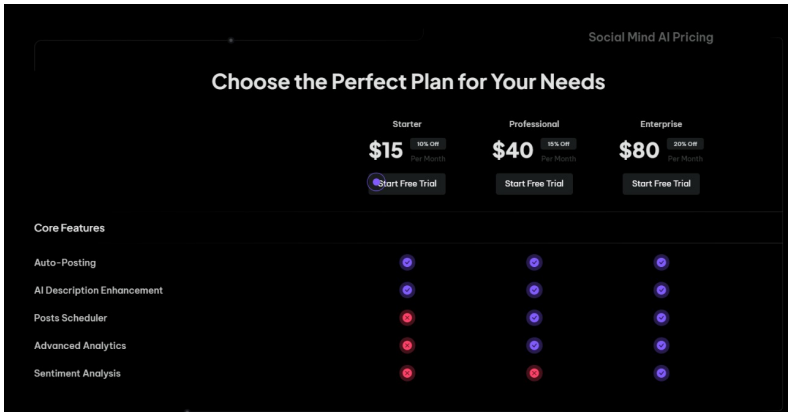

Figure 4.6: Graphical User Interface for Monthly Subscription Offers
This screen shows the monthly pricing plans for the users

4.9 Database Design

This section will be showcasing the Entity Relationship diagram and the data dictionary associated with it.

4.9.1 ER Diagram

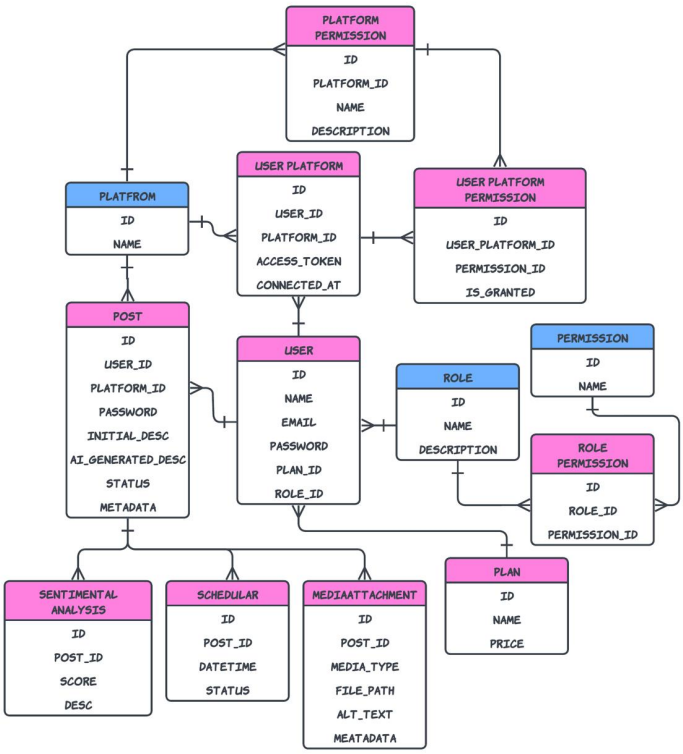

Figure 4.7: Entity Relationship Diagram for SocialMind
Entity-Relationship (ER) Diagram illustrating the relationships among tables including User, Post, Plans, Roles, Platform Permissions, detailing entities, attributes, and their connections.

4.9.2 Data Dictionary

The Data Dictionary for each of the entity mentioned in the Entity Relationship diagram is given in this chapter to better visualize the entities and their relations with other entities.

Table 4.7: Users Table
Sample table for users along with there detailing entities,attributes and relations

USER

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
User	id	int	No		
	name	varchar	No		
	email	varchar	No		
	password	varchar	No		
	plan_id	int	No	Plan	Many-to-One
	role_id	int	No	Role	Many-to-One

Table 4.8: Users Platform Table
Sample table for users platform along with there detailing entities,attributes and relations

USER PLATFORM

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
User Platform	id	int	No		
	user_id	int	No	User	Many-to-One
	platform_id	int	No	Platform	Many-to-One
	access_token	varchar	No		
	connected_at	datetime	No		

Table 4.9: Users Platform Permissions Table
Sample table for users platform permissions along with there detailing entities,attributes and relations

USER PLATFORM PERMISSION

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
User Platform Permission	id	int	No		
	user_platform_id	int	No	User Platform	Many-to-One
	platform_permission_id	int	No	Platform Permission	Many-to-One
	is_granted	boolean	No		

Table 4.10: Sentimental Table
Sample table for sentimental analysis along with there detailing entities,attributes and relations

SENTIMENTAL ANALYSIS

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
Sentimental Analysis	id	int	No		
	post_id	int	No	Post	Many-to-One
	score	float	No		
	desc	text	No		

Table 4.11: Scheduler Table
Sample table for scheduler along with there detailing entities,attributes and relations

SCHEDULER

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
Scheduler	id	int	No		
	post_id	int	No	Post	Many-to-One
	datetime	datetime	No		
	status	varchar	No		

Table 4.12: Roles Table
Sample table for roles along with there detailing entities,attributes and relations

ROLE

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
Role	id	int	No		
	name	varchar	No		
	descrtiption	varchar	Yes		

Table 4.13: Posts Table
Sample table for posts along with there detailing entities,attributes and relations

POST

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
Post	id	int	No		
	user	int	No	User	Many-to-One
	platform_id	int	No	Platform	Many-to-One
	initial_desc	varchar	No		
	ai_generated _desc	text	Yes		
	status	text	No		
	metadata	json	Yes		

Table 4.14: Platform Table
Sample table for platform along with there detailing entities,attributes and relations

PLATFORM

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
Platform	id	int	No		
	name	varchar	No		

Table 4.15: Platform Permissions Table
Sample table for platform permissions along with there detailing entities,attributes and relations

PLATFORM PERMISSION

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
Platform Permission	id	int	No		
	name	varchar	No		
	platform_id	int	No	Platform	Many-to-One
	description	text	Yes		

Table 4.16: Plan Table
Sample table for plans along with there detailing entities,attributes and relations

PLAN

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
Plan	id	int	No		
	name	varchar	No		
	price	float	No		

Table 4.17: Permission Table
Sample table for permission along with there detailing entities,attributes and relations

PERMISSION

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
Permission	id	int	No		
	name	varchar	No		

Table 4.18: Media Attachment Table
Sample table for Media Attachment along with there detailing entities,attributes and relations

MEDIA ATTACHMENT

Entity	Attribute	Datatype	Nullable	Relation to	Relation type
Media attachment	id	int	No		
	post_id	int	No	Post	Many-to-One
	media_type	varchar	No		
	file_path	varchar	No		
	alt_text	varchar	Yes		
	metadata	json	Yes		

4.10 Risk Analysis

Risk analysis is a crucial part of the **Social Mind** project planning, addressing potential challenges during development and deployment:

4.10.1 Technical Risks

Social Mind is composed of lots of 3rd party APIs (Instagram, Facebook, LinkedIn) which heavily rely. Some API policies can change, some usage limitations can change and some timeout could impact core feature like scheduling posts and getting analytics.The implementation of API integration should be flexible enough to adapt to changing API requirements quickly.

4.10.2 Business Risks

Social Mind is at the risk of market saturation, being at the social media management space due to high level of competition. To differentiate itself, the platform must be unique in features which include AI powered content suggestions. Furthermore, the pricing should be affordable and did not compromise sustainability at the same time, sustainable meaning profitable without killing small businesses or influencers.

4.10.3 API Usage and Policy Risks

SocialMind relies upon social media platform, causing dependencies of owner on Instagram,Facebook and Linkedin putting parameters around what can be shared on there platforms.For better controlling the risk, there should be regular monitoring of API changes and maintain strict compliance with platform policies.

4.10.4 User Adoption and Engagement Risks

SocialMind will focus on providing a seamless, intutive interface with strong user support, and regular updates to keep the users engaged and active as attracting and retaining users is a challenge in saturated market, if the platform's features are not engaging, users may abandon it early.

4.10.5 Data Security and Privacy Risks

SocialMind implementation must follow robust encryption, secure authentication mechanisms and comply with data protection regulations as the system would be handling highly sensitive user data, such as social media credentials, which could potentially introduce security and privacy risks.

4.10.6 Competition Risks

SocialMind will continue providing different unique features because as the social media industry grows, established competitors would replicate features or offer more advanced functionalities.

SocialMind will minimize the impact of these risks and ensure proper and successful implementation of the project by conducting regular risk assessments as discussed within the section.

4.11 Conclusion

Chapter 4 of the Software Requirement Specifications (SRS) for SocialMind given a brief description about the roadmap for the platform's development. It starts off by conveying a list of features and functional requirements related to specific needs for Users, Admin and the overall system. Quality attributes along with the non-functional requirements such as performance,usability,reliability,security and scalability are outlined. The chapter then showcases graphical user interface, Entity-Relationship diagram and a data dictionary. A thorough risk analysis which could be potential challenges are also identified.

Chapter 5 High-Level and Low-Level Design

This chapter includes the details and diagrams of High-Level and Low-Level designs of our system.

5.1 System Overview

Our end-product would be a web-based application providing different dashboards to Admin and Users. Admin can make changes to the web-app where as Users can login and link there social media accounts to utilize our smart tools. Users can add multiple social media accounts (of platforms including Instagram, Facebook, Linkedin) and even invite other users to collaborate.

5.2 Design Considerations

This section is about the problems faced in devising the design of our system.

5.2.1 Assumptions and Dependencies

Following are the assumptions/dependencies in our system.

- Our system is totally dependant on the APIs provided by the Social Media Platforms, any changes to these APIs may disrupt system functionality, which should be fixed from our side.
- Our system is dependant on LLM inference end-point provider, GROQ.
- Our tools like Tags Generator and Description Generator are dependent on the initial user prompt.

5.2.2 General Constraints

Following are the general constraints in our project:

- **Hardware or Software Environment**
  Social Mind is a Web-based product and it must run smoothly on all devices that have a browser (for example: Laptop, PC, Tablet, Smartphone), the design of website must be very responsive so that it can adapt to any device.
- **End-User Environment**
  Since we are covering a technical field of Social Media Marketing and the users are general public, the end-product must be very user friendly, allowing them to utilize all the crucial feature while hiding all the technicalities.

- **Availability or Volatility of Resources**

  Our system relies on external social media APIs, which may undergo changes, or limitations.

- **Interface/Protocol Requirements** The platform must be able to communicate with social media platforms through their own protocols. Which means we have to comply with their mechanisms, rate limits, data format requirements, etc.

- **Security Requirements** The system must take care of data privacy, since it has confidential data like user accounts and passwords.

- **Performance Requirements** The tools which use AI and LLM usually take some time to process the response. This processing delay should be minimal.

5.2.3 Goals and Guidelines

1. **KISS Principle (Keep It Simple, Stupid!)**

   The main goal of our project is to minimize all the complexities of social media marketing and optimizing the process for better efficiency. Social Mind provides a very simple user interface to the end user and takes care of the technicalities involved in boosting the performance of any social media post.

2. **Scalability**

   As the user base grows, the system must be able to incorporate all users. The APIs used have a threshold quota and would charge capital once the usage exceeds a certain limit. We have therefore designed a subscription model, for heavy uses, in our web-app which will take care of these costs as well as potentially generate some capital.

3. **Security and Compliance**

   As we have to store sensitive user data such as social media credentials, we must have a strong focus on security and must ensure compliance with data protection regulations.

5.2.4 Development Methods

we are using the Agile Development approach because of its flexibility, iterative development, and continuous feedback which is important for such an extensive project. Iterative development allows us to work on individual features and integrate them step by step. Besides, the flexibility allows us to incorporate any changes to the requirements as per the demand of stakeholders.

5.3 System Architecture

This section covers the high-level design of our system.

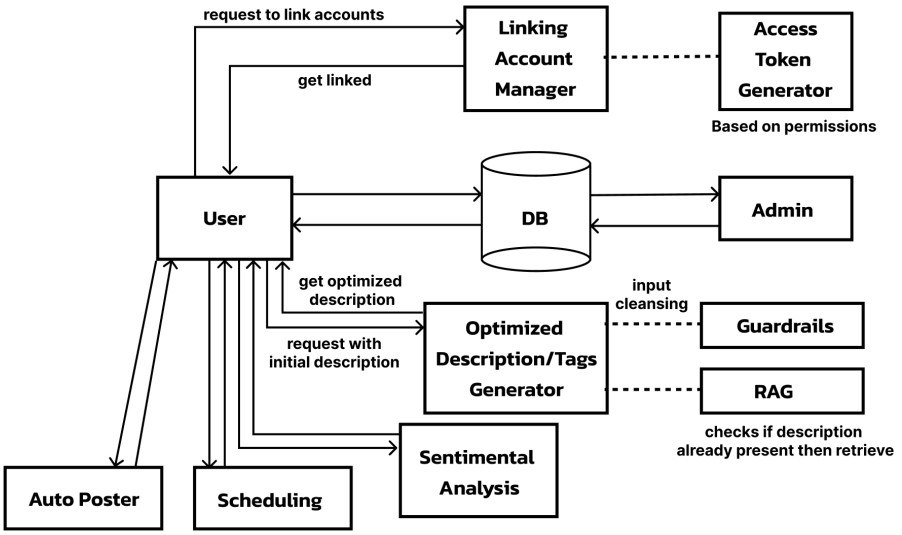

Figure 5.1: This diagram represents the high level System Architecture of Social Mind.

Users can link their social media accounts through the Linking Account Manager, which, in turn, generates access tokens based on user permissions. Once accounts are linked, users can submit descriptions to the Optimized Description/Tags Generator, which enhances the content using input cleansing and optimization algorithms facilitated by Guardrails and Retrieval-Augmented Generation (RAG). Now the optimized content is stored in a database and can be automatically posted using the Auto Poster module, scheduled for future posting, or analyzed for sentiment analysis to read engagements and turning cusotmers into leads This system ensures streamlined, high-quality content generation and management, providing users with an efficient workflow for maintaining their social media presence.

5.3.1 Subsystem Architecture

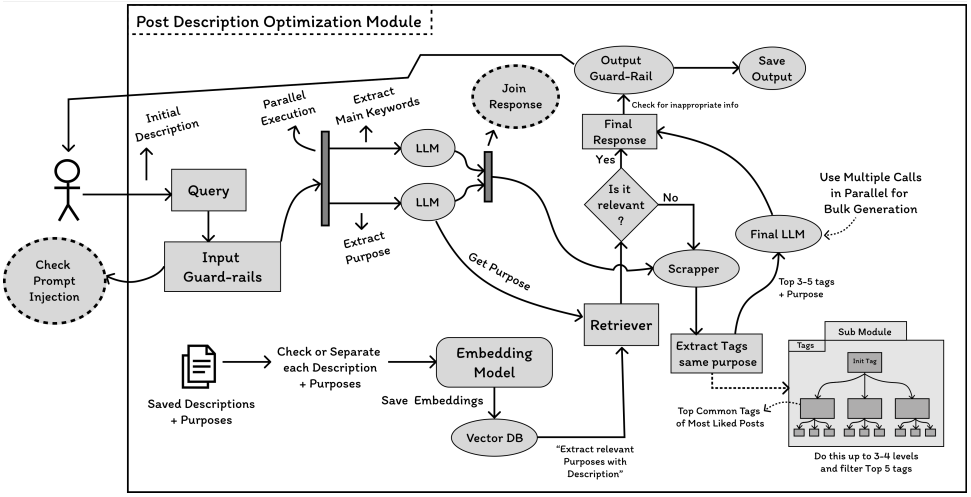

Figure 5.2: This diagram represents the low level Sub-System Architecture of our main module, Post Optimizer.

The user will write an initial prompt explaining what he wants to post. The Query will be processed and sent to an LLM to extract important keywords and purpose from it. The keywords and purpose would be used to find similar top performing posts which would be analysed by AI in order to produce an optimised description and find the best performing tags in that particular niche.

5.4 Architectural Strategies

This section includes the details about the Architectural Strategies that are being used in our project.

5.4.1 Programming Language and Frameworks

We are using laravel and vue.js for implementing the front-end of our web-app. On the other hand, most of the AI related tasks like finding top performing tags and generating optimized descriptions would be implemented in python. These particular languages are chosen as the best fit our needs and have minimal restraints according to our use case.

5.4.2 Hardware Involved

The user would only require a device capable of running a web browser (such as Laptop, Tablet, Smartphone, Desktop Computer). Where as the system would be deployed on cloud. AI models would be running on third party servers which will receive a prompt from us and return a response via internet.

5.4.3 Error Handling Techniques

If the user Inputs Invalid data or the provided information is incomplete then our system will prompt the user accordingly. It will give proper warnings and may ask the user to enter any missing information.

5.4.4 Version Control

We will be using Git for Version Control, specifically GitHub. As GitHub allows collaboration, version history, backup and issue tracking and has a more familiar interface.

5.5 Domain Model/Class Diagram

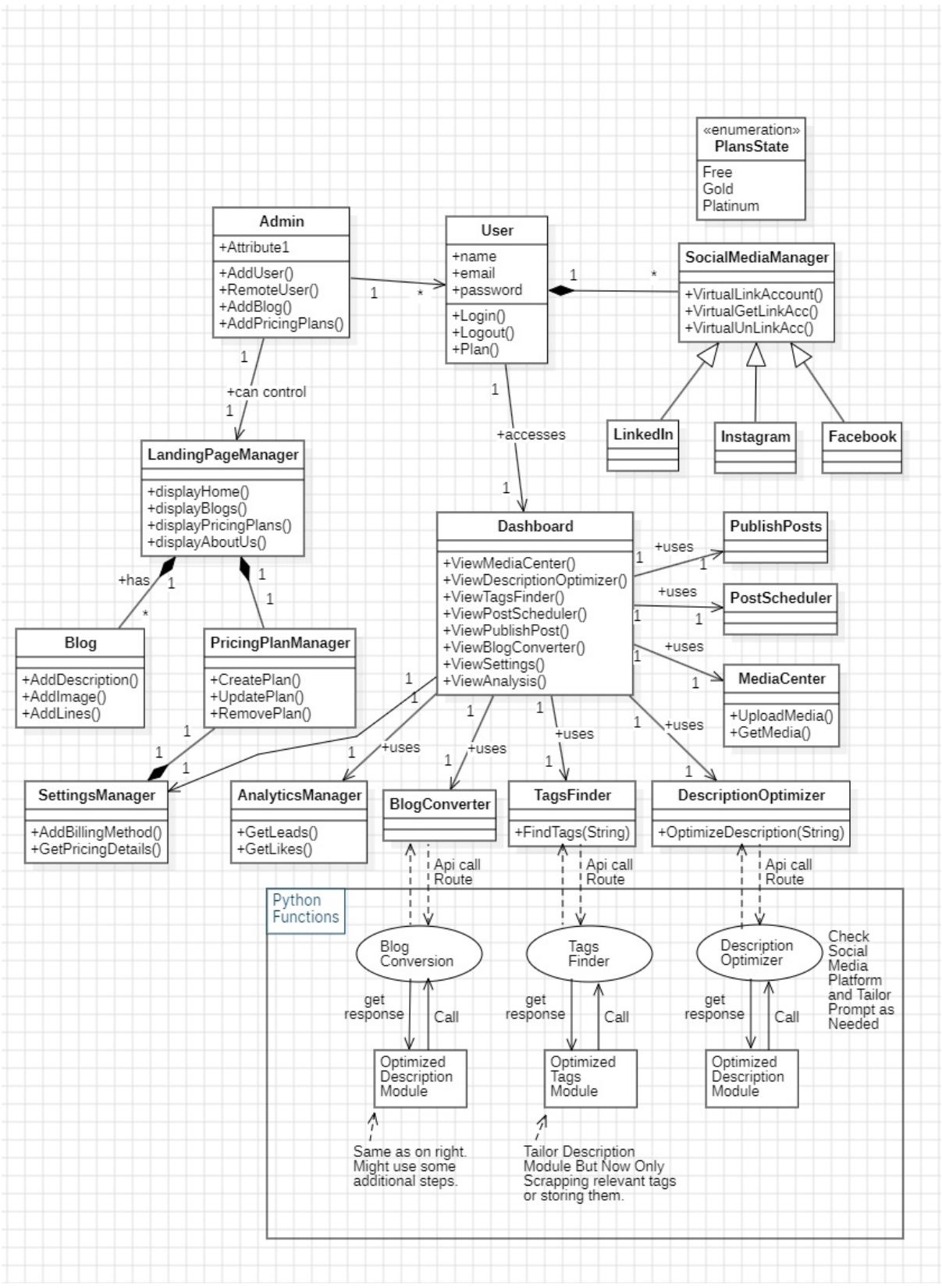

Figure 5.3: This diagram represents the low level Sub-System Architecture of our main module, Post Optimizer.

5.6 Policies and Tactics

This section includes the Policies and Tactics used in Social Mind project.

5.6.1 Choice of Tools and Libraries

Currently we are using Laravel for the back-end and Vue.js for the front-end because they are well compatible and offer a solid framework environment. Python is selected for AI processes such as tag optimization because of its versatility in accommodating various AI tasks.

5.6.2 Engineering Trade-offs

Python may not be the fastest language for real time processing of data, it would be a better option for the handling of AI related tasks given its wide range of libraries.

5.6.3 User Interfaces

The front-end is designed to be responsive, ensuring compatibility across devices of varying screen sizes and aspect ratios. This makes the Social Mind accessible on desktops, laptops, tablets, and smartphones.

5.6.4 Source Code Organization

The source code is well structured and organised into folders with separate directories for front-end, back-end, and AI-components. Following a modular approach make it easy to develop and maintain the system and easily find bugs and errors in the code.

5.7 Conclusion

In conclusion, the design of our project is done while taking care of the end-user. The platform is comprehensive and user-friendly and is designed with scalability, security, and simplicity in mind. We used technologies like Laravel (for back-end), Vue.js (for front-end), and Python (for AI integration). These choices were made to balance functionality and responsiveness. Moreover, Agile Development method was adopted according to nature of the project as we have limited time frame and have potentially changing requirements.

Chapter 6 Implementation and Test Cases

This chapter includes all the details of our implementation of various modules in Social Mind. Each feature is implemented as a separate python module, described in detail in section 6.1

6.1 Implementation

The website has been implemented in Vue.js and Laravel for front-end and back-end, respectively. All feature modules have been implemented as Flask API endpoints in Python.

6.1.1 Hashtag Searcher

This module is implemented in Python, it utilizes Instagram API to search for the top trending hashtags related to the user's post and purpose. The purpose and type of post is identified using the initial prompt of the user.

6.1.2 Auto-Poster

This Python module pushes the content of the post to Instagram, Facebook and Linkedin, at the same time. This module hides all the complex steps that are required by the user to do auto posting. Access tokens are automatically generated upon login and the access tokens are used to push content to the Social Media Accounts. All the permission related to user's access are also handled at the back-end.

6.1.3 Post's content and stats Scrapper

This Python module is used to scrap the best-performing posts that are related to the user's post. This module extracts the description, comments, and performance stats, such as engagement of those posts. These detailed insights allow us to imitate the content of the best performing posts, increasing our chances of producing an engaging post with optimized description.

6.1.4 AI Description Optimizer

The steps in the pipeline of this python module are as follows:

1. Preprocess the initial user query.
2. Check if the query is safe using guardrails.
3. If it is safe, pass it to the LLM, and extract the purpose. We are using the open-source llm: `mixtral-7b`.

4. Pass the extracted purpose to the LLM to find top keywords related to the post.
5. Use these keywords to fetch the top two descriptions for each extracted keyword.
6. Create a prompt template incorporating the purpose, the fetched descriptions, and important instructions.
7. Pass the prepared prompt to the LLM in a one-shot manner, enabling the LLM to generate optimized descriptions along with hashtags.

6.1.5 Business Plan Generator

This module is implemented in Python. It deals with generating an optimized and complete business plan for a company that knows his business goals, type, target demographics, platform, budget, timeframe, and challenges but does not know how to get started. Our LLM based optimized business plan module makes a compact plan to provide clear direction for the businesses to deal with marketing on social media platforms.

6.1.6 Sentiment Analysis

This Module provides the overall sentiment and reviews of the users on the posts published through our platform on social media handles. It keeps track of whether the majority of people reactions on the post were positive, neutral or negative and highlights critical points mentioned by the audience in comments and suggestions to improve, if any.

6.1.7 AI Agent

This Module developed in Python streamlines all the processing pipeline for the user using a human friendly chatbot. It takes queries in natural language process those queries and can generate business plans, post descriptions, and finding trending hashtags of any initial purpose of user. It can not only generate, but can post and schedule the posts for the user on the user connected platforms.

6.2 Test case Design and description

The Following tables show all the test cases and their results performed during testing of the system.

Table 6.1: Test Case No.1: User SignUp
This table provides a test case for the registration flow in the website's login module. It outlines the steps for user registration and verifies that the details are stored in the database.

Authentication Module			
System Component: SocialMind Auth Service			
Test Case ID:	*TC-01*	**QA Test Engineer:**	*Faizan Majid*
Test case Version:	*1*	**Reviewed By:**	*Muhammad Abdullah*
Test Date:	*12-04-2025*	**Use Case Reference(s):**	*UC-4.6.1*
Revision History:	*None*		
Objective:	*Verify that a new user can successfully create an account.*		
Product/Ver/Module:	*Website Authentication Service Module*		
Environment:	*Deployed web app on Chrome with active internet connection.*		
Assumptions:	*User has valid internet connection.*		
Pre-Requisite:	*None*		
Step No.	**Execution description**	**Procedure result**	
1	*User goes to SignUp Page*	*SignUp form is Displayed*	
2	*User Enter Details*	*Account created, redirected to dashboard*	
Comments:			
Passed			

Table 6.2: Test Case No.2: User Login
This table provides a test case for the user login in our website.Upon Successful login, it redirects to dashboard.

Authentication Module			
System Component: SocialMind Auth Service			
Test Case ID:	*TC-02*	**QA Test Engineer:**	*Faizan Majid*
Test case Version:	*1*	**Reviewed By:**	*Muhammad Abdullah*
Test Date:	*12-04-2025*	**Use Case Reference(s):**	*UC-4.6.2*
Revision History:	*None*		
Objective:	*Verify that a registered user can successfully log in.*		
Product/Ver/Module:	*Website Authentication Service Module*		
Environment:	*Browser is running with active internet connection.*		
Assumptions:	*User is already registered.*		
Pre-Requisite:	*User has valid credentials.*		
Step No.	**Execution description**	**Procedure result**	
1	*User opens login page*	*Login form is displayed*	
2	*User enters valid credentials*	*User is redirected to dashboard*	
Comments:			
Passed			

Table 6.3: Test Case No.3: Upload Media
This table provides a test case for upload media while creating post. Upon Successful upload it displays and preview the media file.

Media Upload Module			
System Component: SocialMind Media Service			
Test Case ID:	*TC-03*	**QA Test Engineer:**	*Faizan Majid*
Test case Version:	*1*	**Reviewed By:**	*Muhammad Abdullah*
Test Date:	*12-04-2025*	**Use Case Reference(s):**	*UC-4.6.3*
Revision History:	*None*		
Objective:	*Verify that a user can upload images or videos successfully.*		
Product/Ver/Module:	*Website Media Upload Module*		
Environment:	*Web app running in browser.*		
Assumptions:	*User is logged in.*		
Pre-Requisite:	*User is logged in and on dashboard creating a post.*		
Step No.	**Execution description**	**Procedure result**	
1	*User clicks "Upload Media"*	*File selector appears*	
2	*User selects file and confirms*	*File uploaded successfully, preview shown*	
Comments:			
Passed			

Table 6.4: Test Case No.4: Schedule Post
This table provides a test case for the Schedule Post.User picks up date and time and the post gets scheduled at the desired time.

Post Management Module			
System Component: SocialMind Scheduler Service			
Test Case ID:	*TC-03*	**QA Test Engineer:**	*Faizan Majid*
Test case Version:	*1*	**Reviewed By:**	*Muhammad Abdullah*
Test Date:	*12-04-2025*	**Use Case Reference(s):**	*UC-4.6.4*
Revision History:	*None*		
Objective:	*Verify that a user can schedule a post at a specified date and time.*		
Product/Ver/Module:	*Post Scheduler Component*		
Environment:	*Web app running in browser with active internet connection.*		
Assumptions:	*User has already uploaded media and filled post content.*		
Pre-Requisite:	*User is logged in and on "Schedule Post" page.*		
Step No.	**Execution description**	**Procedure result**	
1	*User selects date and time*	*Time picker appears and take input*	
2	*User then clicks "Schedule"*	*Post schedules*	
Comments:			
Passed			

Table 6.5: Test Case No.5: Create Optimized Description
This table provides a test case for the optimized description.User gives intial description and it generates optimized descrition template based on it.

Content Optimization Module			
System Component: SocialMind AI Writer Service			
Test Case ID:	*TC-05*	**QA Test Engineer:**	*Faizan Majid*
Test case Version:	*1*	**Reviewed By:**	*Muhammad Abdullah*
Test Date:	*12-04-2025*	**Use Case Reference(s):**	*UC-4.6.5*
Revision History:	*None*		
Objective:	*Verify that the AI generates a contextually relevant and optimized caption.*		
Product/Ver/Module:	*AI Description Generator Module*		
Environment:	*Web app connected active internet connection.*		
Assumptions:	*User has giving initial description or goal.*		
Pre-Requisite:	*User is on Dashboard and given initial description*		
Step No.	**Execution description**	**Procedure result**	
1	*User clicks "Generate"*	*Request sent to AI model*	
2	*Description displayed*	*Description is editable and relevant*	
Comments:			
Passed			

Table 6.6: Test Case No.6: Link Social Media Account
This table provides a test case for the linking social media handles.User can link their accounts and their access tokens get stored in database securely.

Account Linking Module			
System Component: SocialMind Auth Service			
Test Case ID:	*TC-06*	**QA Test Engineer:**	*Faizan Majid*
Test case Version:	*1*	**Reviewed By:**	*Muhammad Abdullah*
Test Date:	*12-04-2025*	**Use Case Reference(s):**	*UC-4.6.6*
Revision History:	*None*		
Objective:	*To verify that user can successfully link a valid social media account.*		
Product/Ver/ Module:	*Website Account Linking Module*		
Environment:	*Website should be running on the browser with active internet connection.*		
Assumptions:	*User is logged in and authorized to link new account.*		
Pre-Requisite:	*User Logged In and has active social media account.*		
Step No.	**Execution description**	**Procedure result**	
1	*User clicks "Link Account"*	*Redirects to OAuth screen*	
2	*User authorizes access*	*Success message, account saved in DB*	
Comments:			
Passed			

6.3 Test Metrics

Following are the Test Case Metrics of our test cases.

Table 6.7: Test case Metrics

Metric	Value
Number of Test Cases	6
Number of Test Cases Passed	6
Number of Test Cases Failed	0
Test Case Defect Density	0
Test Case Effectiveness	0

Chapter 7 User Manual

This chapter provides the user's workflow and website usage instructions for the SocialMind platform.

7.1 Getting Started

7.1.1 Sign Up

- Visit the SocialMind website.
- Enter Email.
- Enter Username.
- Enter Password.
- Confirm Password.
- Click the Sign Up button.

7.1.2 Login

- Enter Username.
- Enter Password.
- Click the Login button.

7.1.3 Logout

- Click the "Logout" button in the top right corner of the website to log out.

7.2 Core Features

7.2.1 Social Media Account Linking

- Navigate to Dashboard.
- Click the icon of the social media account you want to link.
- You will be redirected to their official website.
- Enter your credentials and log in.

7.2.2 Creating and Publishing Post

- Add initial description describing what you want to post about.
- Add media (image/video).
- Click on ”Generate Post”.
- Wait for a few moments.
- Select your preferred post description from a set of 3 choices.
- Select hashtags you like.
- Edit description or tags as preferred.
- Click on ”Publish”.
- Select the platform on which you want to post.
- Click ”Publish Now”, or ”Schedule for later”.

7.2.3 Scheduling Post for Later

- Once the post has been created, click on ”Schedule for later”.
- Enter the preferred time to publish.
- Click ”Schedule Post”.

7.2.4 Description Generator

- Enter what you want to post about.
- Click ”Generate Description”.

7.2.5 Sentiment Analysis

- Select the post for sentiment analysis from any platform.
- Click ”Analyze Sentiment”.
- Click ”Close” after viewing the sentiment.

7.2.6 Create Business Plan

- Navigate to the Business Plan Generator.
- Fill in the form according to your business.

- Click ”Generate Business Plan”.
- Click ”Print” to download the PDF.

7.2.7 Agentic AI Assistant

- Navigate to the AI Assistant.
- Enter a prompt in the chat box to chat with the AI Assistant.
- Give commands in simple English and let the Agent perform the task.

Chapter 8 Conclusion and Future Work

This chapter is the conclusion and summary of the work done so far and the future goals to be completed.

8.1 Conclusion

A good amount of work has been done up till now. Modules including, Hashtag Searcher, Auto-Poster, Post's content and stats Scrapper, and AI Description Optimizer have been completed. As of now, these modules are working properly and can be further fine-tuned in future. Besides this, almost 60-70 percent of the front end has been completed. The mentioned modules have been individually tested and the results are positive.

8.2 Future Work

In future, We plan to integrate all the modules build till now into our web app. Moreover, the following feature will also be developed and then integrated in our project.

1. **Post Scheduling:**
   It would allow the user to schedule the post to be posted at any desired time. It would also suggest the best time to the user based on the target audience traffic on the platform.
2. **Bulk Posting:**
   It would allow the user to create and save multiple posts as drafts, which can be scheduled for posting at the user's desired time.
3. **Sentiment Analysis of Posts:**
   This feature would scan and analyze the overall sentiment of the audience's comments on the user's posts, allowing the user to gain insights into their audience's sentiment regarding their posts.

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