International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 04 | April - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

BookBanter - PDF INTERACTION USING AI

Principal ,Dr. Madhu H Gowda

Agreem Saini, Aman Saurabh, Deekshitha R, Srimatamvar Singh

Department of Computer Science and Engineering

Rajiv Gandhi Institute of Technology

Bangalore-560032, Karnataka

Abstract - The goal of this project is to create a SaaS (Software as a Service) web application that allows users to upload documents and interact with it. The application uses cutting-edge technologies to ensure a smooth user experience. The front end uses Next.js to create a responsive and dynamic user interface. An OpenAI model is integrated into the application to improve document interactions with advanced features like natural language processing (NLP). Kinde AUTH provides secure user authentication to ensure data privacy and data security. The database management system, Prisma, stores and manages the user's data and documents efficiently. Stripe is an integrated payment gateway that allows users to perform secure transactions. The overall goal of the project is to provide a robust and easy-to-use document management platform that can be used for a variety of use cases.

***Key Words*:** SaaS (Software as a Service), Natural Language Processing, ChatGPT model, Web application, Education innovation,

1. INTRODUCTION

In this age of information overload, the need for cutting-edge tools that seamlessly combine collaboration and artificial intelligence is at an all-time high. This is where BookBanter comes in, a revolutionary platform designed to change the way users interact with digital content. With the volume and complexity of digital documents increasing, BookBanter stands out as a solution that goes beyond traditional filesharing platforms and offers users a dynamic and smart environment for collaborative document work. BookBanter's dual goal is to enhance collaboration and incorporate advanced AI capabilities.

In this report, we'll look at how BookBanter works, its technical architecture, features and potential use cases, and how it changes how users engage with digital content. From its user-friendly interface to the sophisticated chatbot that powers it, BookBanter is a fusion of technology and design. We'll also look at its future implications. BookBanter isn't static, it's a living project, constantly evolving with new features and upcoming expansions. Join us as we explore where AI meets document interactions, opening up a whole new paradigm for users looking for an intelligent and collaborative digital experience.

BookBanter is the best solution for anyone looking for a new way to interact with documents. With an easy-to-use interface and a focus on smooth collaboration, it's redefining how teams interact with their digital content. BookBanter's integration of AI takes it to the next level, surpassing traditional document tools with advanced features like real-time collaborative work, intelligent document analytics, and a chatbot that responds instantly. Users benefit from an environment that encourages efficient teamwork and uses AI to extract valuable information from documents. Whether you're a pro managing complex projects or a student working on group assignments BookBanter will be your go-to solution, offering a sophisticated yet intuitive platform that seamlessly blends cutting-edge technology with practical usability. With BookBanter, you'll get the best of both worlds: innovation and intuitive document interactions.

2.BODY OF PAPER

For instance, standard methods of document management such as e-mail attachments and file-sharing platforms are quite ineffective and awkward especially when it comes to collaborative work. These techniques can lead to difficulties in monitoring changes taking place in the documents, troubles with version control and security bugs. Furthermore, this digitalisation is bringing about an increase in both the quantity and quality of e-documents necessitating smarter instruments for better document management.

BookBanter is a web application based on SaaS which seeks to address these issues by providing users with an active platform where they can work together on documents. Next.js is the framework upon which this platform has been developed, a React JavaScript library used for building server-side rendered (SSR) web apps. This technology choice serves to ensure that BookBanter gives end-users a simple and intuitive online environment that enables them upload documents as well as interact with them flawlessly.

Scalable and efficient technical architecture of BookBanter ensures that documents can be accessed and managed easily. Frontend interface built on Next.js is responsive and interactive thereby allowing users to upload documents, collaborate with others, and use advanced functionalities such as document analysis and summarization.

On the backend, Prisma a modern database toolkit for TypeScript and Node.js is used by BookBanter for securely storing and managing documents. This way, Prisma ensures fast access to documents while maintaining their security and performance.

A unique feature of BookBanter is its integration with OpenAI models. These models enable advanced document analysis to enable users distil key insights from books, summaries of text written in them or even generation of new content given a starting point. Thus, the platform becomes smarter thus improving efficiency in terms of working together on materials.

Kinde Auth powers the authentication system of BookBanter – one more important characteristic. Consequently, unauthorized individuals are prevented from using this portal hence ensuring safety for data belonging to users. Moreover, it has integration with Stripe for payment processing

BookBanter can be used across a variety of sectors and industries. This platform could be applied in educational environments for cooperative learning in which students would share ideas, work together on assignments and exchange information. Moreover, BookBanter may help researchers to analyze huge volumes of literature by summarizing important information that is within them thus saving time. Other than that, it can help streamline the document workflow cycle so that teams can collaborate on projects more effectively and meet deadlines faster.

In conclusion, In a nutshell, BookBanter has now entered into the era of document management where collaboration and AI come together to redefine our interaction with digital content. Technological tools such as Next.js, OpenAI, Kinde Auth, Prisma and Stripe have been utilized by BookBanter to create a complicated but still user-friendly platform meant for uploading documents, analyzing them and collaborating on them. This means it is adaptable across various disciplines like education, research or even business among others. In this respect, BookBanter is driving forward the possibilities for an intelligent approach that can be used in managing documents online which is faster and more cooperative than what was expected before.

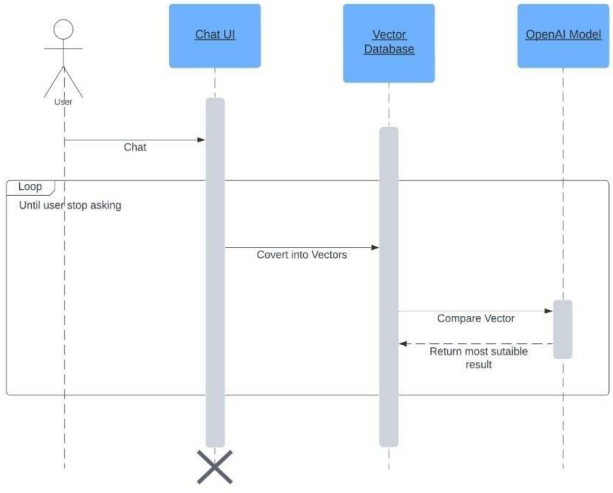

Figure 1: Sequence Diagram

3.RELATED WORK

Google Docs remains one of the most widely used platform for collaborative document editing since it offers real-time collaboration. This is why it is popular among those people working on projects together as it has basic features such as text editing, formatting and commenting. Nonetheless, Google Docs does not have advanced AI capabilities for document analysis and interaction which are essential components of BookBanter.

Microsoft Word Online is another popular platform for document editing that has similar collaborative functionality to that available in Google Docs. In this case, users can collaborate by tracking each other's changes in real time. Just as with Google Docs, Microsoft Word Online lacks the advanced AI capabilities that are essential parts of BookBanter's operation.

Dropbox is a cloud storage platform where files can be stored and shared online. Even though Dropbox supports some forms of collaboration like shared folders and file commenting, it cannot carry out document interaction or analysis at the same extent as BookBanter does. Additionally, Dropbox lacks advanced AI capabilities that highly define what BookBanter stands for.

Dropbox is an online storage service that allows users to save and distribute computer files to each other in the cloud. Despite having some collaborative tools like shared folders and file commenting, Dropbox does not have the same capacity for document collaboration and analysis as BookBanter. Moreover, Dropbox lacks the advanced Artificial Intelligence functions which are necessary for its functionality.

Microsoft OneDrive is another cloud-based file hosting service that has collaboration features similar to those of Dropbox. With Microsoft Office Online apps, users can share documents and also work on them together in real-time. However, as with Dropbox, Microsoft OneDrive does not possess the sophisticated AI capabilities that make BookBanter unique in its own way.

DocuSign and Panda Doc are among AI-powered document management platforms specializing more on workflow automation and e-signatures rather than collaborative document editing and analysis. Although these platforms offer useful functionalities for managing documents, they don't allow much collaboration or sharing of content like Book Banter does.

4.TECHNOLOGIES USED

NEXTJS: Next.js is a web framework of React that uses server-side rendering to create effective and SEO-compatible web apps.

This helps to provide a strong foundation for building interactive and dynamic user interfaces which are in line with BookBanter's objective of creating a platform that is user friendly and highly responsive.

Server-side rendering (SSR) is the process of generating whole HTML page on server and sending it as browser over HTTP. Some of its benefits include improved performance, enhanced user experience by reduced loading times, better SEO due to pre-rendered content.

Next.js makes implementation of SSR seamless in React applications through its built-in support for rendering on the server Side. Additionally, Next.js offers other features such as automatic code splitting, hot module replacement, and optimized image loading that make it an excellent choice for developing modern websites.

TYPESCRIPT: TypeScript is a superscript which has been typed into JavaScript codes making them more scalable readable and maintainable especially in large applications. Its static typing checks help capture errors early in the development cycle leading to stronger more reliable application codes as exemplified by BookBanter. Next.js is a web framework of React that uses server-side rendering to create effective and SEO-compatible web apps. JavaScript can have its static types added to it through TypeScript which lets developers explain their code better by defining the types of function parameters, return values and variables among other things. TypeScript also has interfaces, generics as well as enums that improve readability and reusability of codes. TypeScript's type system is useful in preventing common programming mistakes when working on large-scale applications; moreover, it makes refactoring code easier. Moreover, developer productivity increases due to better tooling support with features like code navigation, auto-completion, and refactoring tools.

PINECONE (VECTOR DATABASE): Optimized for vector similarity search Pinecone is a database which could be very relevant to BookBanter- a platform where document-related vectors are stored and retrieved easily. These capabilities are closely aligned with the objectives of BookBanter that pays attention to document management and analysis. Vectors are structures containing data or elements that represent different aspects of documents such as their content, structure or metadata within a given context such as document management.

By storing documents in the form of vectors, Pinecone employs specialized index algorithms that enable quick response to user queries through locating similar documents. **:** Pinecone's architecture is horizontally scalable, making it great for big data and query loads. Additionally, the platform provides capabilities like real-time indexing and searching, which are very important to applications that require fast response times as in BookBanter.

GPT-3.5 TURBO: GPT-3.5 Turbo is an advanced version of OpenAI's GPT model known for its flexible language abilities. Plugging BookBanter with this one could improve the AI capacities of the platform allowing more sophisticated document analysis and interaction features. GPT-3.5 Turbo builds on previous GPT models by achieving improved performance and a larger model size. It can generate text that resembles human-like conversation more closely than any other NLG system I have seen before and has a good grasp on context, making it useful for diverse natural language processing tasks such as summarizing documents, generating content or sentiment analysis. Integrating GPT-3.5 Turbo in BookBanter could add some cutting-edge functionalities such as document auto-summarization, contextual search and personalized content recommendation systems to the platform. This would make it much cooler when working with documents together since people would benefit from them every time they need to collaborate on a document through Book Banter tool.

UPLOADTHINGS: Amazon Simple Storage Service (S3) is a very well-known site which offers a secure and scalable data storage for uploaded documents and other app assets. Including UploadThings in BookBanter could help to store user-uploaded files efficiently thus increasing Document Management.

Amazon S3 is devised to be highly available, durable and scalable such that it can hold all sorts of data types including documents, images as well as videos. Furthermore, it provides versioning, encryption and access controls ensuring that client information remains safe all through its transaction period.

BookBanter can leverage on Amazon S3 as a storage backend thus simplifying the management of storage infrastructure while focusing on features that add value to users. Moreover, integration with other AWS services like Lambda and CloudFront would enhance BookBanter's performance and scalability further.

STRIPE: Stripe is a common payment gateway that offers secure online processing of payments as well as management of subscriptions. By integrating Stripe into BookBanter, this platform could provide users with additional service- and product-based features thus boosting the overall revenue model and user experience. For instance, Stripe has various options for settling online transactions such as credit cards, digital wallets and money transfer services around the world. Furthermore, developers using it can take advantage of subscription management tools, payment dispute resolution systems, and analysis of different types of transaction data. Therefore, Stripe is one-stop solution for e-commerce.

PRISMA ORM: Prisma is a contemporary database toolkit that simplifies database access control in applications. It has a type-safe and auto-generated query builder which allows seamless integration with TypeScript and Node.js thereby facilitating scalability, readability and maintainability of the code especially when dealing with large-scale applications like BookBanter. Prisma's ORM capabilities enable developers to define object models in databases using declarative schema languages whereas this gets converted into efficient SQL queries. This reduces the complexity associated with database operations while preventing usual programming mistakes linked to handling databases.

5. IMPLEMENTATION

The basis of chat PDFs is large language models (LLMs) such as the GPT that use to handle and understand textual data. These LLMs are provided with training on extensive amounts of text so they can identify intricate patterns, and come up with coherent responses. Therefore, for effective interaction with PDFs, the document must be parsed and divided into smaller units known as text chunks. This ensures that context remains relevant and focused. In order to figure out which text chunks are most relevant for a given query we utilize embeddings – high dimensional vectors of meaning representation of the text. Embeddings make it possible to pick out fine details or likenesses between chunks, leading to more accurate identification of the information sought.

In addition to this Lang chain also presents an abstraction layer which simplifies the communication process between LLMs and vector databases like Pinecone DB. With this flexibility, changing from one language model or vector database to another doesn't require extensive code changes; we just need to change some configurations in our settings file.

To start off, we need to take the PDF document into our chat PDFs and save out the necessary text as well as metadata from it. Such libraries like pdfparse and reactPDF enable us to easily get the text content page by page and extract metadata such as title, author, creation date etc. By parsing the PDF, we obtain raw Text and other relevant information that can be used for further processing.

In order to make this model more readable and optimize its performance efficiency, we clean up the extracted PDF's raw text using various techniques. This includes removing undesirable characters, fixing hyphenation and new lines as well normalizing the text in order to make it more coherent.

After cleaning the text, we split pages into smaller pieces of texts. This is done through Lang chain recursive character splitter, which splits a text into manageable parts that may overlap each other so as to maintain context. Each text chunk will also carry along with it some associated metadata such as: page number; chunk number thus ensuring a coherent conversation with the PDF.

To start off, we need to take the PDF document into our chat PDFs and save out the necessary text as well as metadata from it. Such libraries like pdfparse and reactPDF enable us to easily get the text content page by page and extract metadata such as title, author, creation date etc. By parsing the PDF, we obtain raw Text and other relevant information that can be used for further processing. In order to make this model more readable and optimize its performance efficiency, we clean up the extracted PDF's raw text using various techniques. This includes removing undesirable characters, fixing hyphenation and new lines as well normalizing the text in order to make it more coherent. After cleaning the text, we split pages into smaller pieces of texts. This is done through Lang chain recursive character splitter, which splits a text into manageable parts that may overlap each other so as to maintain context. Each text chunk will also carry along with it some associated metadata such as: page number; chunk number thus ensuring a coherent conversation with the PDF.

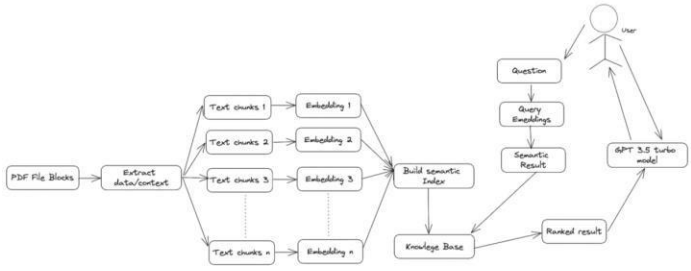

Figure 2: Architecture Diagram

6. RESULTS

Our SaaS-based web application BookBanter avails customers with a kind of platform for document cooperation which is highly dynamic and smart. The interface contains two main areas: one supports uploading of PDFs enabling users to find and handle them conveniently, the other involves a chat prompt. Once in the chat prompt, there is an AI-generated answer to any query asked as well as an option to check previous queries against relevant issues. This approach ensures that collaboration becomes seamless when it comes to document handling and interaction thus making BookBanter a suitable solution for people who are looking for an effective and user-friendly online collaborative document editing platform like this one.

7. CONCLUSION

In summary, the project seeks to develop a vast Software as a Service (SaaS) web application for document management, by employing state-of-the-art technologies and methods. The application looks forward to presenting a resilient and user-friendly substitute for its clients in order to enable them upload, store and deal with their documents using modern tools such as Next.js on the front end, Prisma for effective database control, Kinde Auth for safe identity authentication and OpenAI model with advanced document interaction as well as Stripe for secure payment processing. The project overcomes current deficiencies in document management systems by improving feature set, security among other things. In general terms this research has the possibility of tremendously improving document management processes of different types of users including individuals and firms through offering an all-inclusive and efficient platform aimed at managing documents.

8.REFERENCES

1. B. Casselden and R. Pears, “Higher education studentpathways to ebook usage and engagement, and understanding:Highways and cul de sacs,” J. Librariansh. Inf. Sci., vol. 52, no. 2, pp. 601–619, Jun. 2020, doi: 10.1177/0961000619841429.

2. B. C. Y. Lim, L. W. L. Liu, and C. Chian Hou, “Investigating the Effects of Interactive E-Book towards Academic Achievement,” Asian J. Univ. Educ., vol. 16, no. 3, p. 78, Oct. 2020, doi: 10.24191/ajue.v16i3.10272.

3. D. P. Srirahayu and G. C. Premananto, “The Printed Book and Electronic Book (Ebook) Experiences of Digital Natives in Indonesia,” J. Southwest Jiaotong Univ., vol. 55, no. 6, p.17,2020, doi: 10.35741/issn.0258-2724.55.6.17.

4. A. Green, “Post Covid-19: Expectations for Academic Library Collections, Remote Work, and Resource Description and Discovery Staffing,” J. Acad. Librariansh., vol. 48, no. 4, p. 102564, Jul. 2022, doi: 10.1016/j.acalib.2022.102564.

5. What is a PDF? Portable Document Format | Adobe Acrobat; 2023. Available from: https://www.adobe.com/in/acrobat/about-adobe-pdf.html.

6. ChatPDF. Chat with any PDF!; 2023. Available from: https://www.chatpdf.com/.

7. Chat with any PDF using the new ChatGPT API. Updated on; 2023. Available from: https://ai.plainenglish.io/chatpdf-com-chat-with-any-pdf-using-the-new-chatgpt-api-1864407a4d5f.

8. Future Tools: 2023. Available from: https://www.futuretools.io/tools/chatpdf