SCHEMESETU - CHATBOT FOR GOVERNMENT SCHEMES

A PROJECT REPORT

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Under the guidance of,
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in partial fulfillment for the award of the degree of
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IN

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At

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY
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JANUARY 2024

PRESIDENCY UNIVERSITY
SCHOOL OF COMPUTER SCIENCE ENGINEERING

CERTIFICATE

This is to certify that the Project report **"SCHEMESETU - A CHATBOT FOR GOVERNMENT SCHEMES"** being submitted by "VIKRAM, SHREYAS, THEJAS, TUSHAR" bearing roll number(s) "20201ISE0055, 20201ISE0085, 20201ISE0054, 20201ISE0091" in partial fulfillment of requirement for the award of degree of Bachelor of Technology in Information Science and Engineering is a bonafide work carried out under my supervision.

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DECLARATION

We hereby declare that the work, which is being presented in the project report entitled **SCHEMSETU - A CHATBOT FOR GOVERNMENT SCHEMES** in partial fulfillment for the award of Degree of **Bachelor of Technology** in Information Science and Engineering, is a record of our own investigations carried under the guidance of **Ms. Kimmi Kumari, Assistant Professor, School of Computer Science Engineering, Presidency University, Bengaluru.**

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

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ABSTRACT

SchemeSetu is a cutting-edge chatbot created to transform the way people may apply for government-backed insurance plans and loans. This ground-breaking platform combines state-of-the-art technologies such as machine learning and Natural Language Processing (NLP) to simplify and aggregate important data from reliable sources like RBI and NABARD. By providing a single, user-friendly interface that makes it simple to study and comprehend different financial aid programs, it seeks to empower individuals. SchemeSetu changes how people interact with financial affairs by democratizing access to government services and fostering inclusivity and financial literacy.

The primary goals of the project are to establish a Comprehensive Information Hub and to ensure credibility through the integration of dependable data and customized recommendations. Its eight-phase technique ensures the effectiveness and dependability of the chatbot system by starting with data source and ending with documentation.

Implementation includes an Android app and a web interface, ensuring cross-platform accessibility and seamless integration. OAuth integration with Google and GitHub facilitates secure and convenient user authentication. The system promises scalability and synchronization between platforms, with future plans for iOS compatibility and enhanced web experiences. SchemeSetu's outcomes include advanced conversational AI, seamless data fusion, intuitive user interfaces, and empowered decision-making, aiming to enhance government efficiency and bridge the gap between citizens and financial programs.

ACKNOWLEDGEMENT

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CHAPTER-1

INTRODUCTION

In an era defined by the relentless evolution of digital services and the rapid proliferation of government initiatives, our project, Scheme Setu, stands as a beacon of innovation. It is poised to empower citizens through a groundbreaking solution that aims to revolutionize the accessibility and understanding of crucial government-sponsored loans and insurance schemes.

Scheme Setu represents an ambitious endeavor, born from the convergence of cutting-edge technologies and an acute understanding of the citizen's needs. It serves as an intelligent and interactive gateway—a singular, comprehensive reservoir of knowledge sourced from diverse and reputable channels. This initiative is not just about information aggregation; it encapsulates a vision to democratize access to essential financial assistance programs, thereby transforming the landscape of citizen-state engagement.

At its core, Scheme Setu is powered by advanced Natural Language Processing (NLP) algorithms and state-of-the-art machine learning models. These technological marvels converge to create an intuitive, conversational interface—a digital ally that empowers individuals to navigate the labyrinthine realm of government services effortlessly.

The bedrock of our initiative lies in the assimilation of credible data from revered repositories such as the National Bank for Agriculture and Rural Development (NABARD) and the Reserve Bank of India (RBI). This partnership ensures not only the accuracy and credibility of the information but also instills a sense of trust and reliability among users seeking financial guidance.

Scheme Setu is not just a digital innovation; it's a catalyst for change—a catalyst that propels financial literacy, fosters inclusivity, and redefines the paradigm of citizen empowerment. By offering a unified platform for comprehending, accessing, and capitalizing on an array of governmental and financial offerings, our initiative aims to

dismantle barriers, democratize opportunities, and inspire a wave of financial empowerment across diverse strata of society.

In essence, Scheme Setu embodies a transformative vision—one that transcends the conventional boundaries of citizen-state interactions. Through this project, we embark on a journey to redefine accessibility, knowledge dissemination, and inclusivity in government-sponsored financial services. We aim to catalyze a future where every individual possesses the tools to navigate and leverage the vast landscape of governmental support.

As we delve deeper into the specifics of Scheme Setu, we find that it is designed to be user-friendly, with a focus on simplifying complex financial jargon. The chatbot is equipped to handle queries in multiple languages, making it accessible to a wider audience. It also provides personalized recommendations based on the user's profile and needs.

Moreover, Scheme Setu is continuously learning and evolving. It uses feedback and interactions to improve its understanding and performance, thereby providing more accurate and relevant responses over time. This continuous learning process is a testament to the project's commitment to serving the citizens better.

CHAPTER-2

LITERATURE SURVEY

Title: A survey on providing customer and public administration based services using AI: chatbot

Authors: Krishna Kumar Nirala, Nikhil Kumar Singh & Vinay Shivshanker Purani

Year: 2022

Challenges:

The paper discusses challenges in developing efficient chatbot applications, focusing on issues such as the lack of training data for machine learning-based systems, poor conversational understanding in ML chatbots, and the need for significant improvements in grammatical errors, language structure, sentiment analysis, and more. It emphasizes the potential of deep learning algorithms to address these challenges but acknowledges the requirements for substantial data and time for natural response generation.

Motivation:

The primary motivation of the review paper is to explore AI-Chatbots, specifically in the context of customer and public administration services. It highlights the limited work in developing public administration service-based chatbots and outlines the goals of the review, including categorizing AI-Chatbots, examining their architecture and evolution, assessing performance measurements, and discussing the limited research on public administration-focused chatbots.

Public Administration Service-Based Chatbots:

The paper mentions various research works on AI in public administration, citing examples such as AI for e-Government assessment of immigration forms, urban growth modeling using artificial neural networks, and AI-based evaluation of urban public security. It emphasizes the potential for unbiased and transparent solutions in citizen-centric services using AI. Additionally, it notes applications in forecasting unemployment rates, predicting groundwater levels, and improving citizen services through AI.

Government Initiatives and AI Integration:

The paper cites examples of government initiatives integrating AI, such as the use of chatbots in North Carolina to handle basic inquiries, Singapore's collaboration with Microsoft to create digital representatives for citizen services, and New York City's plan to leverage IBM's Watson for a customer management system to enhance the efficiency of answering questions and handling complaints about city services. The conclusion anticipates increased interaction with AI in daily government interactions.

Title: Natural Language Processing for Government Policy Intelligence
Authors: Michael Stankosky and Prasad S. Chaudhari
Year: 2019

Objectives:

Analysis of NLP in Government Policies: The paper aimed to explore the potential applications of Natural Language Processing (NLP) techniques in the domain of government policy analysis and understanding.

Challenges Faced:

The vast amount of unstructured data generated by government agencies. The difficulty of extracting meaningful insights from this data. The lack of effective tools for analyzing and understanding policy-related text

Data Availability: Availability and access to comprehensive and standardized government policy datasets posed a challenge for effective NLP-driven analysis.

Semantic Understanding: Ensuring accurate semantic understanding and contextual interpretation of policy documents could have been a significant challenge.

Furthermore, the authors discuss the significance of NLP in aiding policymakers, government agencies, and researchers in gleaning actionable insights from vast repositories of policy-related texts. Insights garnered from this paper encompass the transformative impact of NLP in enhancing the comprehension, analysis, and decision-making processes concerning government policies.

The paper also highlights case studies or examples showcasing successful implementations of NLP techniques in policy intelligence, emphasizing the potential benefits and implications of such applications within the governmental landscape.

Overall, "Natural Language Processing for Government Policy Intelligence" serves as a comprehensive exploration into the realm of NLP's role in decoding and deriving intelligence from governmental policies, offering valuable insights into the potential applications and challenges within this domain.

Title: Chatbots: Are they Really Useful?
Author: Bayan Abu Shawar, Eric Atwell
Year: 2018

A Chatbot as Information Retrieval Tool:

The section discusses the application of chatbots as information retrieval tools, particularly in educational settings. It highlights the use of chatbots in language practice and mathematics education. The Sofia chatbot, developed by Knill et al., was employed at Harvard Mathematics Department to assist in teaching mathematics. Sofia could chat with users and other mathematical agents, such as Pari and Mathematica, to solve algebra problems. Results indicated that teachers could use chatbots to identify student problems and enhance the learning experience.

Information Retrieval Beyond Education:

The paper extends the discussion to information retrieval beyond education, citing examples like FAQchat, which retrieves answers from the Frequently Asked Questions database. Users preferred FAQchat over Google for its direct answers and fewer links, saving time in browsing. The evaluation showed that about two-thirds of users found answers using FAQchat, emphasizing its viability as an alternative to Google for accessing FAQ databases.

Chatbots in Social Theory Learning and Telecommunications:

Gibbs et al. used an ALICE chatbot to enhance social theory learning by building a

knowledge base that answers questions about social theory. Schumaker et al. retrained ALICE with telecommunications-related definitions, showing promising results for knowledge delivery and acquisition in an introductory Management of Information System course.

Chatbots in Yellow Pages Information Retrieval:

The Yellow Pages Assistant (YPA) is introduced as a natural language dialogue system allowing users to retrieve information from British Telecom's Yellow Pages. It uses a dialogue manager, natural language front-end, query construction component, and a backend database to return relevant addresses based on user queries. Evaluation results showed success in returning appropriate addresses for user queries.

Chatbots in Medical Education:

Webber developed Virtual Patient bot (VPbot), a chatbot simulating a patient for medical students to interview. VPbot was successful in Harvard Medical School's virtual patient program, with students using it scoring higher marks on exams.

The section illustrates the diverse applications of chatbots in education, information retrieval, and medical training, emphasizing their potential in enhancing learning experiences and providing valuable information.

CHAPTER-3

RESEARCH GAPS OF EXISTING METHODS

SchemeSetu, an AI-powered chatbot facilitating information retrieval about Indian government schemes, operates on the Zephyr-7b-beta model with retrieval augmented generation. Analyzing existing methodologies in this context reveals specific research gaps crucial for enhancing the effectiveness and accuracy of such platforms.

Identification of Current Methodologies

- **Zephyr-7b-beta Model Integration**: Acknowledge the state-of-the-art Zephyr-7b-beta model used in SchemeSetu for information retrieval and response generation.
- **Retrieval Augmented Generation**: Highlight the significance of retrieval augmented generation in ensuring relevant and contextually accurate responses within the chatbot.

Research Gaps in Existing Methods

- **Comprehensiveness of Information Retrieval**

  The primary research gap lies in the comprehensive cataloging of Indian government schemes. Despite the model's capabilities, limitations persist in capturing, categorizing, and updating all schemes. Gaps in data collection methodologies or indexing processes may lead to incomplete or outdated information being presented to users.

- **Precision and Accuracy**

  Improving the precision of understanding user queries and providing accurate responses is crucial. The challenges arise when dealing with ambiguous queries or complex language nuances.

Current methods might struggle to disambiguate certain

queries or understand regional language variations, impacting the accuracy of responses.

● **Real-time Updates and Maintenance**

The absence of real-time updates poses a significant gap in ensuring the database's accuracy and relevance. Strategies for prompt updates need to be implemented to keep pace with the ever-evolving landscape of government schemes. This could involve automated feeds, regular data audits, or partnerships with government databases for real-time updates.

● **Coverage of Niche Schemes**

The database might lack coverage of niche or lesser-known schemes, focusing primarily on mainstream government programs. Addressing this gap involves actively seeking and incorporating information about smaller or regional schemes that cater to specific demographics or localities, ensuring inclusivity and equity in information dissemination.

● **Data Privacy and Security**

Another research gap lies in the handling of sensitive user data. Ensuring data privacy and implementing robust security measures to safeguard user information are paramount. Strategies to anonymize and securely store user queries and interactions should be developed and integrated into the system.

Technical Shortcomings

● **Scalability**

As the database grows with the inclusion of more schemes and data, potential scalability issues may arise. Ensuring the continued efficiency and speed of information retrieval and generation as the volume of data increases requires robust system architecture and optimization to handle the expanding dataset without

compromising response times.

- **Adaptability and Learning**

  Enhancing the adaptability of the AI model is crucial for continuous improvement. This includes its ability to learn from user interactions, constantly refining its accuracy and response quality. Active learning mechanisms need to be incorporated to enable the model to adapt to evolving language patterns and user preferences.

- **Resource Optimization**Optimizing resource utilization is a critical aspect often overlooked. Efficiently managing computing resources, such as CPU utilization, memory allocation, and network bandwidth, is crucial for the chatbot's smooth operation. Implementing resource monitoring and optimization algorithms can ensure optimal performance even during peak usage.

- **Latency Reduction**

  Minimizing latency in response delivery is essential for an enhanced user experience. Analyzing and optimizing each component of the system's architecture, from the backend servers to the frontend interface, can contribute to reducing response times. Caching commonly accessed data and employing edge computing techniques closer to users can significantly cut down latency.

- **Contextual Understanding**

  Improving the system's ability to understand contextual cues is crucial for providing more accurate and personalized responses. This involves not only analyzing the query itself but also considering the broader context, including user history, preferences, and the current conversation context. Implementing context-aware models and reinforcement learning techniques can aid in this aspect.

- **Robustness and Error Handling**

  Enhancing the system's robustness to handle unexpected or erroneous inputs is essential. Implementing comprehensive error handling mechanisms and fallback strategies ensures graceful handling of unforeseen scenarios.

Robustness testing and incorporating error prediction models can strengthen the system's reliability.

User-Centric Perspectives

● **User Experience Enhancement**

Improving the user experience involves enhancing the conversational flow to make interactions more natural and intuitive. This also encompasses the need to handle complex queries more effectively by implementing advanced context-aware mechanisms. Integrating multi-language support will ensure wider accessibility, catering to diverse user demographics.

● **User Feedback Integration**

Actively incorporating user feedback is critical for iterative improvements. There's a gap in the process of collecting, analyzing, and integrating user feedback to enhance

the chatbot's performance. Implementing robust feedback mechanisms and agile development cycles can bridge this gap, ensuring the chatbot evolves according to user needs.

CHAPTER-4

PROPOSED METHODOLOGY

The comprehensive research methodology unfolds through eight crucial phases, meticulously designed to ensure the efficacy and unwavering reliability of the envisioned chatbot system tailored for government-sponsored loans and insurance schemes. Embarking on this journey, the initial phase is dedicated to Data Sourcing, where advanced web scraping tools like Beautiful Soup and Scrapy are adeptly employed. This allows the extraction of structured data from a diverse array of sources, including but not limited to Nabard, RBI, and Paper Tyari, alongside additional reputable sources meticulously curated for authenticity.

Moving seamlessly into the Model Integration phase, the methodology involves the implementation of a fine-tuned Generative Pre-trained Transformer (GPT) model. This strategic incorporation enhances the chatbot's conversational abilities, ensuring a dynamic and contextually aware interaction with users.

The third phase, Connectivity with Langchain, marks a pivotal point in the methodology. Here, the platform is leveraged for dynamic data retrieval from RBI and Nabard, providing the chatbot with real-time and up-to-date information. In the subsequent Data Source Integration phase, the retrieved data is seamlessly incorporated into the chatbot's training set using Langchain, ensuring a continuous flow of accurate and relevant information.

The Automation and CI/CD phase introduces an advanced level of efficiency into the methodology. In this stage, scripts are implemented for periodic web scraping, coupled with Continuous Integration and Continuous Deployment (CI/CD) pipelines. This automation not only streamlines the process but also ensures timely updates, keeping the chatbot abreast of the latest developments.

User-Friendly Interaction, the sixth phase, takes center stage in enhancing the chatbot's usability. This involves the development of an intuitive interface and the strategic

implementation of Natural Language Processing (NLP) techniques, ensuring a seamless and user-centric interaction.

The Testing and Validation phase follows suit, meticulously assessing the accuracy and reliability of the chatbot's information. A robust feedback mechanism is integrated to facilitate continuous improvement, ensuring that the chatbot evolves to meet user expectations and industry standards.

Lastly, Documentation and Reporting wrap up the methodology, providing stakeholders with a comprehensive overview. This includes insights into the tools utilized, methodologies employed, challenges encountered, and innovative solutions applied throughout the development process. This detailed report encompasses the technical intricacies, workflow, and notable outcomes achieved, laying the groundwork for ongoing enhancement and maintenance of the chatbot.

CHAPTER-5

OBJECTIVES

The objectives for the development and implementation of the SchemeSetu chatbot, can be articulated as follows:

1. **Centralized Information Hub:** Establish SchemeSetu as a centralized information hub for government-sponsored loans and insurance schemes, consolidating comprehensive details from diverse and reliable sources.

2. **Empower Citizens:** Empower citizens by providing them with easy access to crucial information on financial assistance programs, thereby enhancing their ability to make informed decisions.

3. **Revolutionize User Experience:** Revolutionize the user experience in navigating government services by leveraging cutting-edge technologies and natural language processing in SchemeSetu, ensuring a seamless and user-friendly interaction.

4. **Unified Gateway:** Position SchemeSetu as a unified gateway to essential financial assistance programs, simplifying the process of exploring, understanding, and benefiting from various governmental financial offerings.

5. **Technological Innovation:** Harness cutting-edge technologies to enhance the capabilities of SchemeSetu, ensuring it stays at the forefront of innovation in the ever-changing digital landscape.

6. **Natural Language Processing (NLP) Implementation:** Utilize advanced NLP algorithms to make SchemeSetu an intelligent and conversational interface, allowing users to interact with the chatbot in a natural and intuitive manner.

7. **Data Integration from Reputable Sources:** Draw information from reputable institutions such as NABARD and RBI, ensuring the accuracy, credibility, and reliability of the data presented by SchemeSetu.

8. **Simplify Access:** Simplify access to government-sponsored financial assistance programs through SchemeSetu, making it easier for individuals to navigate the complex landscape of available schemes.

9. **Transform User-Government Interactions:** Transform how individuals interact with and access government services, fostering a positive change in the perception of government initiatives and enhancing citizen-state engagement.

10. **Financial Literacy Promotion:** Actively contribute to the promotion of financial literacy by providing users with valuable information and insights through SchemeSetu, empowering them to make sound financial decisions.

11. **Inclusivity in Financial Matters:** Promote inclusivity in financial matters by ensuring that SchemeSetu caters to a diverse audience, making information accessible to individuals from various backgrounds and demographics.

12. **Continuous Improvement:** Establish a framework for continuous improvement, incorporating user feedback and staying agile to adapt to evolving user needs, technological advancements, and changes in government policies.

13. **Real-time Updates:** Ensure SchemeSetu provides real-time updates on changes to government-sponsored schemes, policy adjustments, and new offerings, keeping users informed of the latest developments.

14. **Multi-language Support:** Implement multi-language support in SchemeSetu to cater to a diverse population, enhancing accessibility for users who prefer to interact in languages other than the default.

15. **Personalized Recommendations:** Develop an algorithm within SchemeSetu that offers personalized recommendations to users based on their profiles, preferences, and financial needs, providing a tailored user experience.

16. **Integration with Social Platforms:** Explore integration options with popular social platforms to expand SchemeSetu's reach and accessibility, meeting users where they are most active.

17. **Educational Resources:** Integrate educational resources within SchemeSetu to provide users with additional information, tutorials, and resources that enhance their understanding of financial matters and government schemes.

18. **Secure Data Handling:** Implement robust security measures to ensure the confidentiality and privacy of user data, establishing trust and compliance with data protection regulations.

19. **Collaboration with Government Agencies:** Foster collaboration with government agencies responsible for financial programs to ensure SchemeSetu stays aligned with policy changes and emerging initiatives.

20. **Offline Accessibility:** Develop a mechanism within SchemeSetu that allows users to access essential information even in offline mode, catering to users with limited or intermittent internet connectivity.

21. **Community Engagement:** Establish a community engagement strategy to encourage users to share their experiences, feedback, and insights, fostering a sense of community around SchemeSetu.

22. **Cross-platform Compatibility:** Ensure SchemeSetu's compatibility across various platforms, including web browsers, mobile devices, and other digital interfaces, enhancing its accessibility to a broader audience.

23. **User Training and Awareness:** Conduct user training sessions and awareness campaigns to educate individuals on the capabilities of SchemeSetu, promoting its adoption and usage among the target audience.

24. **Monitoring and Analytics**: Implement robust monitoring and analytics tools to track user interactions, gather insights on user behavior, and continuously refine SchemeSetu for optimal performance and user satisfaction.

25. **Scalability:** Design SchemeSetu with scalability in mind, allowing the chatbot to handle an increasing user base, evolving user needs, and potential expansion into additional government services beyond loans and insurance.

CHAPTER-6
SYSTEM DESIGN & IMPLEMENTATION

SchemeSetu's system design prioritizes the seamless delivery of information on Indian government schemes through a meticulous amalgamation of cutting-edge technologies and an intricately crafted architecture. The objective is to offer users a highly efficient, accurate, and scalable platform for accessing crucial information.

Architecture Overview

Designed for modularity and efficiency, SchemeSetu's architecture encompasses distinct yet interrelated components that collectively ensure the system's seamless operation. The architecture is composed of a robust database system, AI model integration, a sophisticated user interface, and meticulously devised deployment strategies.

Database Design

MongoDB serves as the cornerstone for user authentication, providing both security and scalability. Pinecone, a sophisticated database, houses an extensive repository of government scheme data. Its advanced indexing capabilities empower SchemeSetu's retrieval augmented generation, significantly enhancing the precision and relevance of responses.

AI Model Integration

At the heart of SchemeSetu lies the Zephyr-7b-beta AI model from Hugging Face. This AI orchestrates the response generation process by first parsing and categorizing user queries. It discerns between inquiries related to government schemes and general prompts, intelligently initiating either retrieval augmented generation or standard response generation based on query context.

User Interface Design

The user interface is built using Next.js, a React framework renowned for its powerful server-side rendering and routing capabilities. This framework ensures scalability and superior performance. Tailwind CSS complements Next.js, enhancing the user interface's aesthetics, responsiveness, and overall user experience.

Deployment Strategy

SchemeSetu's deployment strategy is orchestrated on Vercel, harnessing the capabilities of Server-Side Events (SSE) for streamlined data streaming. SSE significantly enhances the system's responsiveness by enabling swift data processing, ensuring an uninterrupted and seamless user experience. This deployment approach underscores reliability, scalability, and real-time data processing efficiency.

Key System Modules and Components

Authentication Module (MongoDB):
The Authentication Module, powered by MongoDB, forms the foundation of secure user authentication and authorization processes within SchemeSetu. MongoDB, known for its flexibility and scalability, ensures that user data remains secure and accessible only to authorized users. It handles user credentials, session management, and access controls, thereby guaranteeing the integrity and confidentiality of user information.

Pinecone Database:
Pinecone Database serves as the central repository housing a comprehensive collection of government scheme data. Optimized for retrieval augmented generation, Pinecone's advanced indexing capabilities allow for swift and accurate retrieval of scheme-related information. Its efficient indexing structure enables SchemeSetu to deliver contextually relevant and precise responses to user queries about various government schemes, ensuring an enriched user experience.

Zephyr-7b-beta AI Model:

The Zephyr-7b-beta AI Model, sourced from Hugging Face, is the backbone of SchemeSetu's intelligent response generation mechanism. This advanced AI model plays a pivotal role in analyzing, categorizing, and understanding user queries. It efficiently differentiates between queries related to government schemes and general prompts, thereby steering the conversation toward either retrieval augmented generation or standard response generation. Its adaptability and accuracy empower SchemeSetu to deliver tailored, context-aware responses, optimizing user engagement.

Next.js Framework:

Next.js, a powerful React framework, underpins SchemeSetu's user interface, providing a robust and responsive platform for user interaction. Renowned for its server-side rendering capabilities and efficient routing, Next.js ensures scalability, performance, and SEO-friendliness. Its modular approach streamlines development, facilitating the creation of intuitive and dynamic user interfaces that seamlessly adapt to user needs. Next.js forms the backbone of SchemeSetu's user-centric design, enabling an engaging and user-friendly experience.

Tailwind CSS:

Tailwind CSS complements the Next.js framework by enhancing the aesthetics and responsiveness of SchemeSetu's user interface. Known for its utility-first approach, Tailwind CSS streamlines UI development by offering a wide array of predefined classes. These classes empower developers to craft visually appealing and responsive UI components with ease. Tailwind CSS significantly accelerates the UI development process within SchemeSetu, ensuring a visually captivating and user-friendly interface.

Vercel Deployment with SSE:

SchemeSetu's deployment on Vercel harnesses the power of Server-Side Events (SSE) to streamline data streaming and response generation. SSE facilitates real-time communication between the server and client, enabling efficient data transmission. This deployment strategy

optimizes SchemeSetu's performance by ensuring rapid data streaming, which directly translates to prompt and seamless response generation. The use of Vercel with SSE enhances SchemeSetu's reliability, scalability, and real-time data processing capabilities, fostering an uninterrupted and dynamic user experience.

Scalability, Performance, and Security

SchemeSetu's architecture is inherently scalable, adept at accommodating increased user demands and expanding data volumes. Performance optimization techniques such as caching and load balancing ensure consistently responsive operations. Furthermore, robust security measures, including encryption protocols and access controls, fortify user data protection and compliance with stringent security standards.

Future Development Roadmap

Looking ahead, SchemeSetu's future development roadmap focuses on refining the AI model, optimizing database performance, and continuous UI/UX enhancements driven by user feedback. The roadmap also includes plans for the integration of advanced natural language processing (NLP) techniques, further augmenting SchemeSetu's accuracy and responsiveness to user queries.
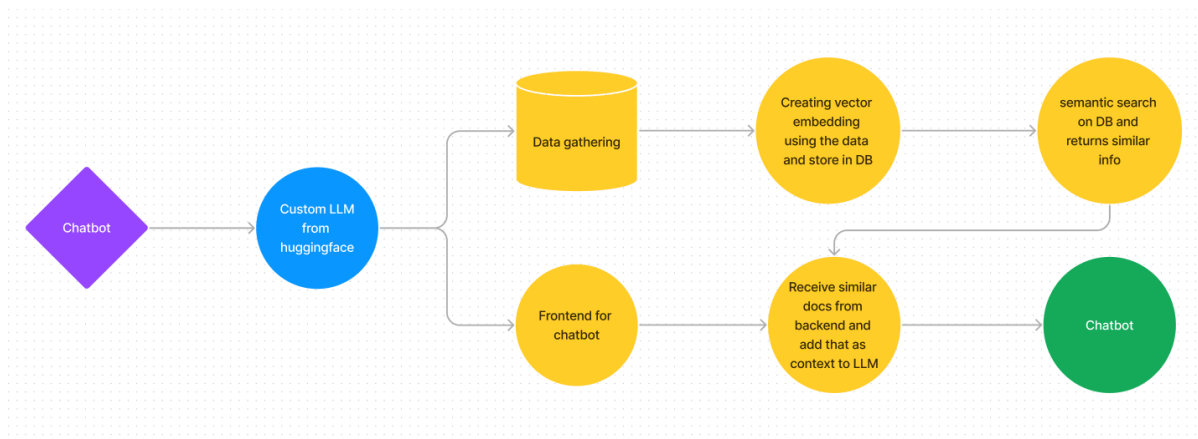
fig 1: Methodology

CHAPTER-7

TIMELINE FOR EXECUTION OF PROJECT

Sl. No	Review	Date	Scheduled Task
1	Review - 0	09-10-23 to 13-10-23	Initial Project Planning and Proposal Submission.
2	Review - 1	06-11-23 to 10-11-23	Completion of Research and Data Gathering Phase.
3	Review - 2	27-11-23 to 30-11-23	Completion of Chatbot Development and User Interface Design
4	Review - 3	26-12-23 to 30-12-23	Testing, User Training, and Documentation.
5	Final Viva Voce	08-01-24 to 11-01-24	Project Submission and Presentation for Evaluation.

CHAPTER-8
OUTCOMES

The proposed SchemeSetu system is the culmination of cutting-edge advances aimed at revolutionizing the way citizens interact with government-backed financial programs.

At its core are several key features that serve as pillars to reshape this interaction environment.

- Advanced Conversational AI: SchemeSetu is based on advanced conversational AI consisting of a sophisticated chatbot with cutting-edge natural language processing (NLP) capabilities.

- This AI guides users into seamless, meaningful conversations, understanding subtle questions and providing accurate and relevant answers.

- Integration of NLP algorithms allows chatbots to decipher complex user queries and take user interactions to a more human level.

- Seamless data fusion: An important aspect of SchemeSetu is the ability to seamlessly combine data from different government sources.

- This provides real-time access to a comprehensive and accurate pool of information on government plans and financial programs.

- This integration not only guarantees accuracy; This gives advice-seekers immediate access to the most up-to-date, trusted information, which is critical.

- Intuitive User Interface: It is important to develop an interface that is intuitive and user-friendly.

- SchemeSetu values clarity and simplicity, making it easy for users to navigate the complexities of government financial programs.

- This intuitive design creates an environment where users can easily explore and understand the myriad products available.

- Empowerment through Decision-Making: SchemeSetu acts as an expert guide, helping users make informed decisions about government-backed financial programs

- By providing insights, details, and personalized recommendations, we can improve users' ability to navigate the complexities of these programs and make informed decisions that meet their needs.

- Improving Government Efficiency: This initiative aims to provide valuable policy insights to streamline information dissemination and foster improvements in government efficiency.

- By enabling better communication between government agencies and the public, SchemeSetu contributes to informed decision-making and promotes more responsive and efficient governance structures.

- Technical implementation: Real-time data updates: This feature ensures that the chatbot always provides up-to-date information about government plans and financial programs and allows users to access the latest details.

- Comprehensive Data Pool: The integration of 's various data sets ensures a comprehensive understanding of available programs and their intricate details, providing users with a holistic view.

- Langchain Connection: Building a connection with Langchain or a similar platform enables dynamic data retrieval by incorporating APIs or connectors that retrieve data directly from trusted repositories such as RBI or NABARD.

- Integrating trusted data: information from trusted repositories makes chatbots

- trustworthy and trustworthy, creating trust among users who want accurate information.

- Secure Data Transfer: Ensuring secure data transfer from external sources to chatbots maintains data integrity and privacy, which are important aspects when working with sensitive financial information.

- Deeper technical results: Integration of advanced NLP algorithms allows chatbots to accurately understand complex user queries and provide accurate and relevant answers.

- SchemeSetu uses a sophisticated conversation model based on the GPT architecture that enables chatbots to generate human-like responses, facilitating engaging and informative conversations.

- Reliable real-time data access is a fundamental aspect of SchemeSetu and is achieved through the use of data scraping tools and long-chain connections.
  This allows chatbots to provide timely and reliable information from trusted sources, providing users with a trusted source for their financial inquiries.
  The adaptive, personalized interactions enabled by these advanced technologies respond to the preferences and needs of individual users.
  SchemeSetu provides an intuitive, accurate and personalized experience for users seeking information about government-backed financial schemes through personalized recommendations and customized guidance.

Fundamentally, SchemeSetu's technological advancements redefine the user experience and provide a robust, reliable, and user-centric platform for navigating the complex realm of government financial services.

This cutting-edge technology integration not only improves accessibility, but also empowers users and transforms the way individuals interact with government support systems.

CHAPTER-9
RESULTS AND DISCUSSIONS

Purpose and Functionality:

SchemeSetu stands as a pioneering chatbot designed with the primary objective of democratizing access to crucial government-sponsored loans and insurance schemes. Through a user-friendly interface and intelligent algorithms, it consolidates a wealth of information sourced from esteemed institutions like NABARD and RBI. The chatbot's core functionality revolves around simplifying the otherwise intricate landscape of financial assistance programs. It acts as a reliable and comprehensive repository, ensuring that individuals seeking guidance on governmental financial offerings can access accurate, trustworthy, and up-to-date information effortlessly. The technology underpinning SchemeSetu embodies a convergence of advanced NLP algorithms and machine learning models, enabling users to interact naturally, ask queries, and receive prompt, reliable responses. By serving as a centralized hub for financial guidance, SchemeSetu embodies a transformative vision, aimed at fostering financial literacy and inclusivity among citizens.

Technological Integration:

. SchemeSetu's technological integration is a testament to innovation in streamlining user experiences and data handling. The utilization of advanced NLP algorithms and machine learning models empowers the chatbot to engage users effectively, processing their queries and providing accurate information. The incorporation of chunked data streaming and LLMs optimizes the chatbot's efficiency by enhancing data transfer, reducing latency, and ensuring optimal utilization of available network resources. This integration not only improves the user experience, particularly in regions with limited network connectivity but also significantly enhances the app's ability to handle diverse data types and formats. By employing these cutting-edge technologies, SchemeSetu stands as a testament to the power of innovation in simplifying access to complex information, fostering an environment of trust and reliability among users.

User Accessibility:

Accessibility is at the forefront of SchemeSetu's design, ensuring that users across different platforms and devices can seamlessly access government-sponsored financial programs. The availability of an Android application and a web-based interface caters to diverse user preferences, offering a user-friendly experience optimized for each platform. The integration of OAuth authentication with Google and GitHub ensures secure and convenient access, enhancing user trust and simplifying the login process. This multi-platform approach enhances SchemeSetu's reach, ensuring that individuals from various backgrounds and technological preferences can benefit from its centralized repository of financial information.

Data Handling and Integration:

SchemeSetu's robust data handling mechanisms guarantee the reliability and security of information transmitted from reputable sources like NABARD and RBI. The integration with Langchain facilitates dynamic data retrieval, ensuring that the chatbot is consistently updated with the latest information on government schemes and financial programs. Secure data transmission protocols maintain the integrity and confidentiality of data, instilling user confidence in the accuracy and credibility of the information provided by SchemeSetu. This meticulous approach to data handling and integration establishes SchemeSetu as a trusted source for individuals seeking reliable guidance on government-sponsored financial initiatives.

Outcomes and Impact:

The tangible outcomes of SchemeSetu's implementation transcend mere technological innovation; they represent a significant leap in empowering individuals with financial knowledge. By offering real-time updates on government schemes and personalized recommendations based on user preferences, SchemeSetu facilitates informed decision-making. Its role in bridging the gap between citizens and government-sponsored financial assistance is instrumental in fostering financial literacy and inclusivity across diverse societal strata. SchemeSetu's impact extends beyond mere information

dissemination; it nurtures economic growth, societal well-being, and a culture of trust in government programs.

Centralized Information Access:

SchemeSetu acts as a one-stop destination for individuals seeking information about various government-sponsored loans and insurance schemes. By consolidating data from reputable sources like NABARD and RBI, it simplifies access to accurate and credible information. This centralized hub eliminates the need for users to navigate multiple sources, saving time and effort while ensuring they have comprehensive insights into available financial assistance programs.

Enhanced Financial Literacy:

The chatbot's intuitive interface and conversational abilities foster financial literacy among users. It translates complex financial jargon into understandable language, making it easier for individuals, including those with limited financial knowledge, to comprehend the intricacies of different schemes. As a result, users can make more informed decisions about which government programs align with their needs and financial goals.

Personalized Recommendations:

SchemeSetu's ability to offer personalized recommendations based on individual preferences and queries is highly beneficial. By understanding user needs, it suggests relevant schemes, eligibility criteria, and application procedures. This tailored guidance ensures that users receive information that aligns with their specific financial situations, increasing the likelihood of successfully accessing and benefiting from government initiatives.

Real-Time Updates and Trustworthy Information:

The chatbot provides real-time updates on government schemes, ensuring that users have access to the latest information. This dynamic nature of SchemeSetu's data ensures users are aware of any changes, new schemes, or updates in eligibility criteria. Moreover, sourcing information from reputable institutions like NABARD and RBI instills trust and reliability among users, fostering confidence in the accuracy and authenticity of the provided data.

Inclusivity and Accessibility:

SchemeSetu's availability through both an Android application and a web-based interface ensures accessibility across various devices and platforms. This inclusivity enables individuals from diverse backgrounds and technological capabilities to benefit from the platform. Additionally, the integration with OAuth authentication systems simplifies login processes, enhancing accessibility for users with existing Google or GitHub accounts.

Empowerment and Streamlined Decision-Making:

Ultimately, SchemeSetu empowers individuals by providing them with the necessary knowledge and tools to navigate and leverage government-sponsored financial programs effectively. Through informed decision-making, users can capitalize on available opportunities, access financial support, and improve their financial well-being.

CHAPTER-10
CONCLUSION

In the genesis of SchemeSetu, our ambition was to engineer not just a chatbot, but a transformative gateway amplifying accessibility to a diverse spectrum of government-sponsored schemes and financial programs. Throughout our odyssey, the central ethos revolved around harmonizing multifaceted datasets into a seamless tapestry while championing user-centric design as the cornerstone of our innovation. SchemeSetu's fruition heralds a profound paradigm shift, transcending the mere realm of technological advancement, and symbolizes a gateway unlocking empowerment across variegated societal strata.

This culmination is a testament to our commitment to democratize access, infusing transparency and ease in navigating the labyrinthine network of governmental support. SchemeSetu emerges as a catalyst for societal well-being, offering a bridge to narrow the chasm between citizens and the invaluable resources latent within government-sponsored financial assistance. Our endeavor is deeply rooted in fostering economic growth, catalyzing a socio-economic landscape where every individual, irrespective of their background or circumstance, seamlessly accesses the transformative potential enshrined in governmental aid.

Yet, our trajectory is not confined to this milestone; it's a continuum characterized by an unwavering dedication to perpetual evolution. We persist in our pursuit, refining SchemeSetu's capabilities, fortifying its security measures, and ensuring adaptability to the ever-evolving societal needs. This commitment propels us toward a future where the Mega Bot stands as an enduring force, a beacon of empowerment. Our ultimate pursuit persists—to embolden individuals, propel economic prosperity, and sculpt a landscape where the mantle of governmental support becomes effortlessly inclusive, catalyzing profound societal transformation.

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APPENDIX-A

PSEUDOCODE

```python
# Define function to handle user queries
function handleUserQuery(query):
  if isGovernmentSchemeQuery(query):
    response = generateGovernmentSchemeResponse(query)
  else:
    response = generateGeneralResponse(query)
  return response

# Function to determine if the query is related to a government scheme
function isGovernmentSchemeQuery(query):
  analysis = analyzeQuery(query)
  return analysis.isSchemeRelated()

# Function to analyze the query
function analyzeQuery(query):
  # Utilize Zephyr-7b-beta to analyze and categorize the query
  analysisResult = Zephyr7b.analyze(query)
  return analysisResult

# Function to generate response for government scheme queries
function generateGovernmentSchemeResponse(query):
  analysis = analyzeQuery(query)
  if analysis.isRAGEnabled():
    # Perform retrieval augmented generation for scheme-related query
    response = Pinecone.retrieveAugmentedData(query)
  else:
    # Perform standard response generation
    response = Zephyr7b.generateResponse(query)
  return response

# Function to generate response for general queries
function generateGeneralResponse(query):
  # Perform standard response generation for non-scheme queries
  response = Zephyr7b.generateResponse(query)
  return response

# Main function to handle user interactions
function main():
  while true:
    userQuery = getUserInput()
    if userQuery == "exit":
      break
    else:
      botResponse = handleUserQuery(userQuery)
      displayBotResponse(botResponse)

# Start the chatbot
main()
```

APPENDIX-B

SCREENSHOTS
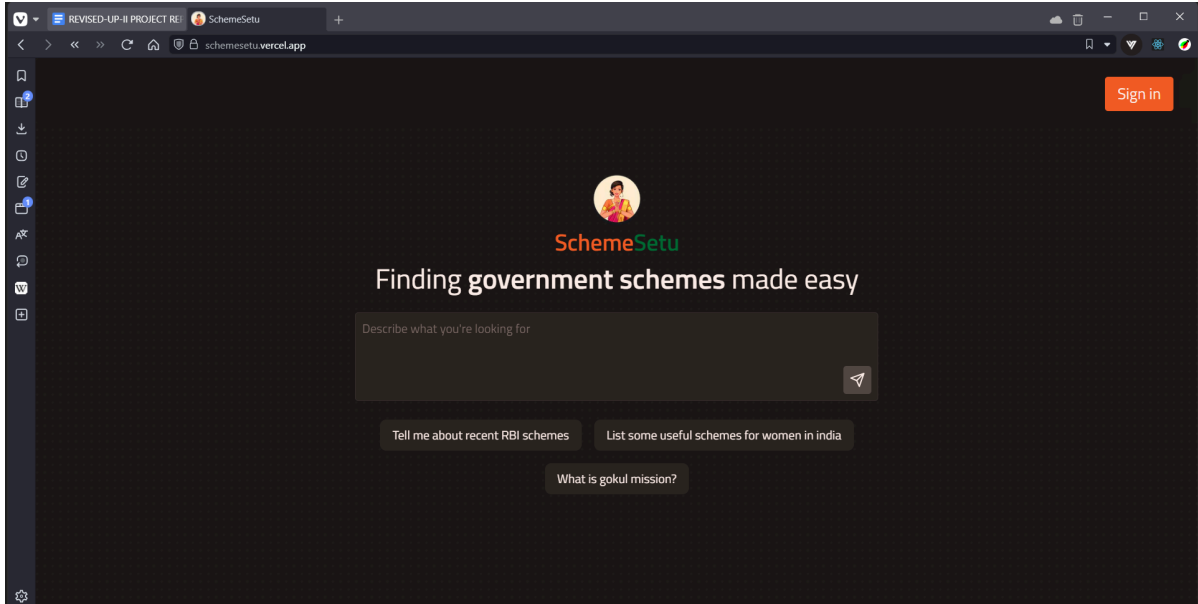
fig 2: Home Page
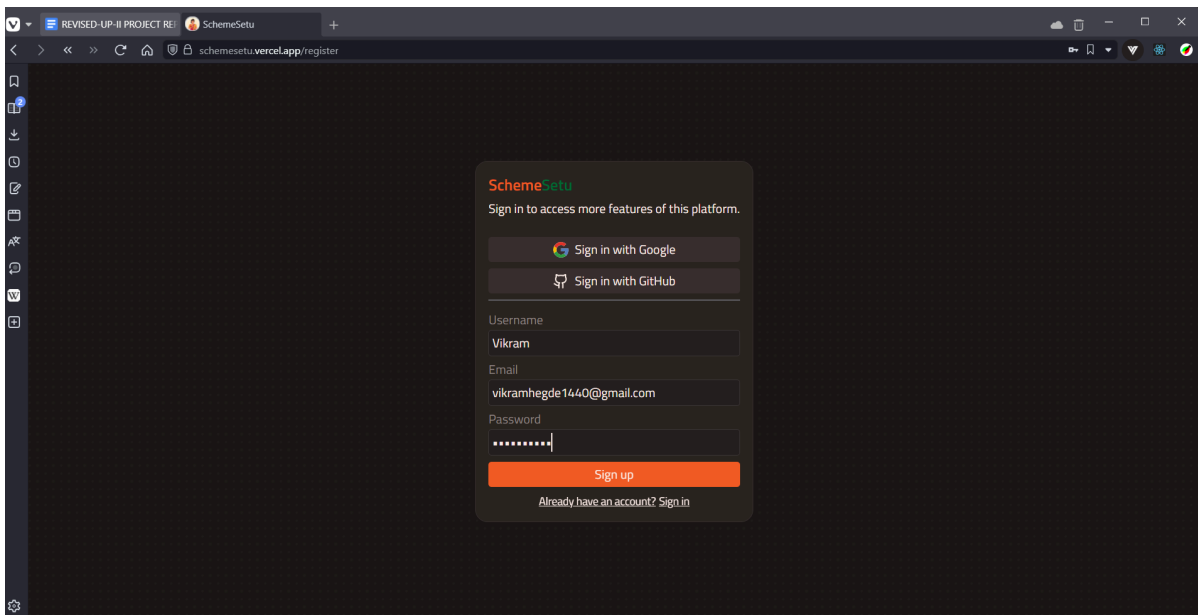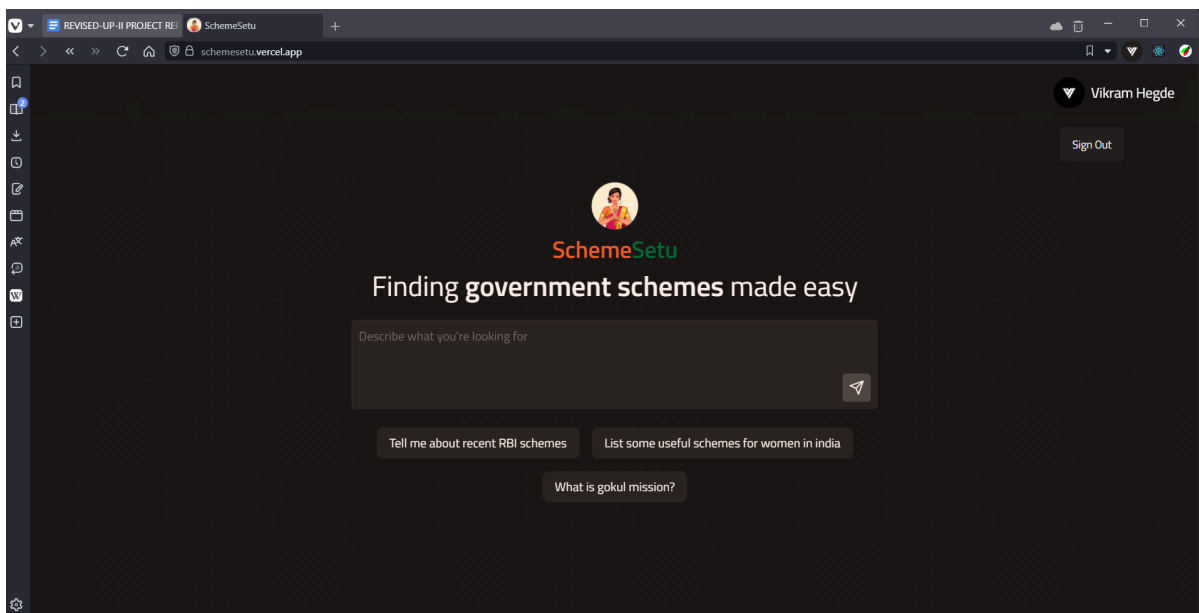

fig 3: Sign Up / Register Page
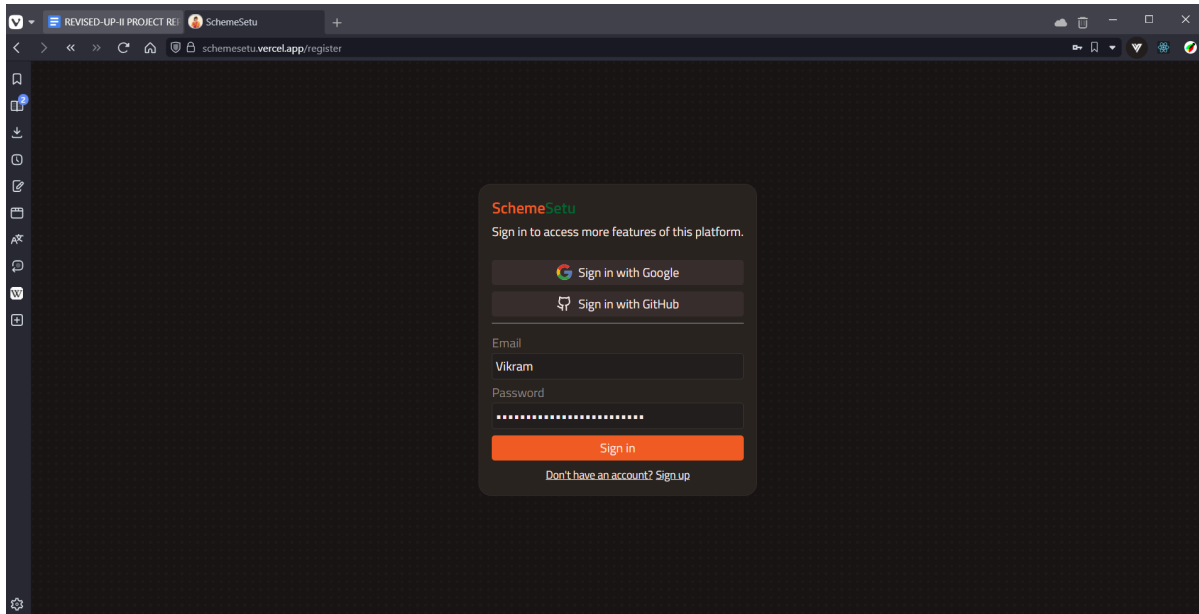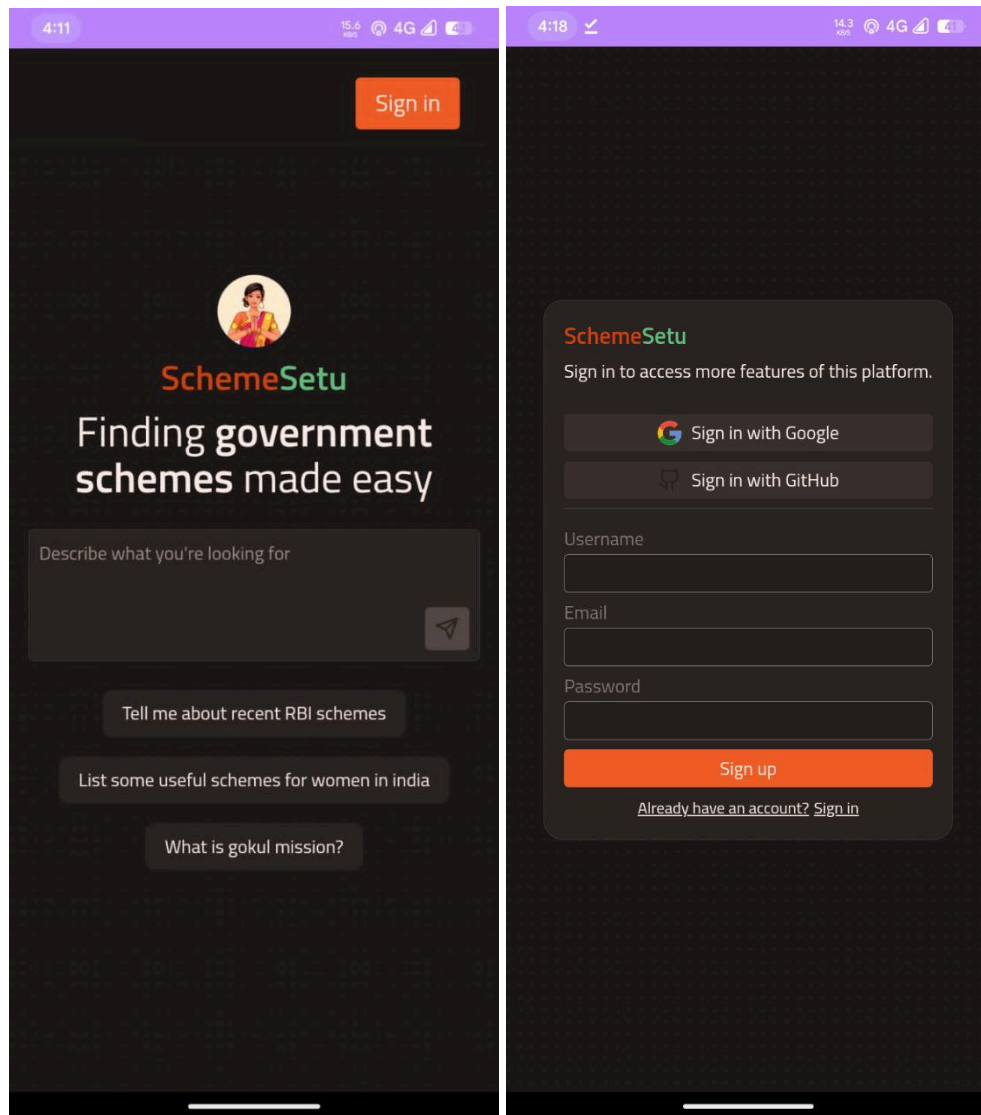
fig 4: Sign in / Login Page
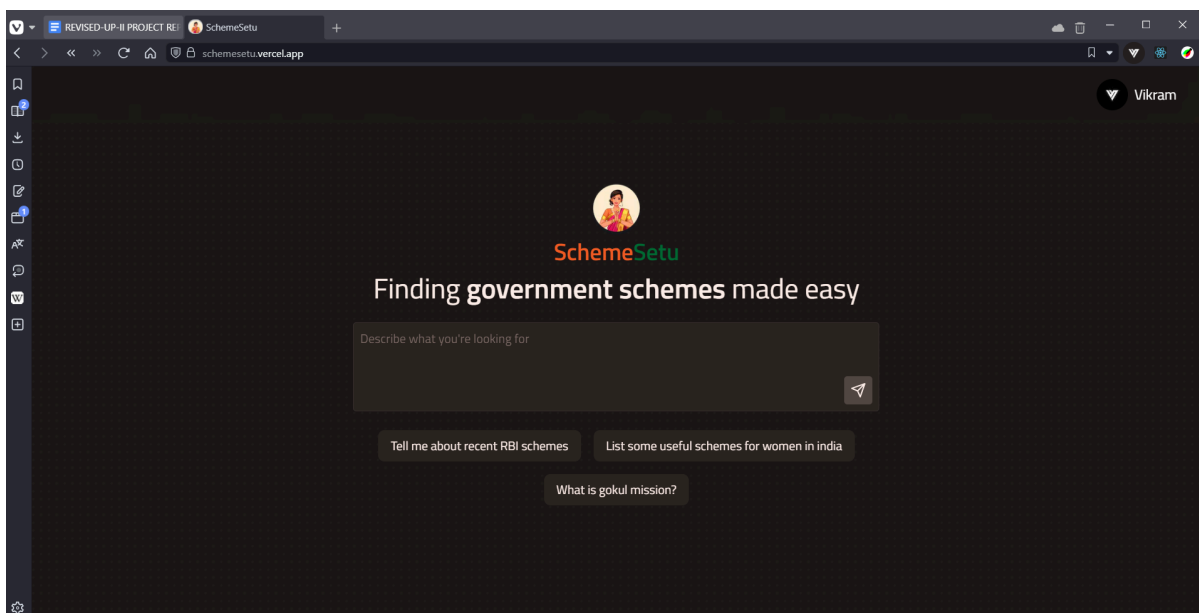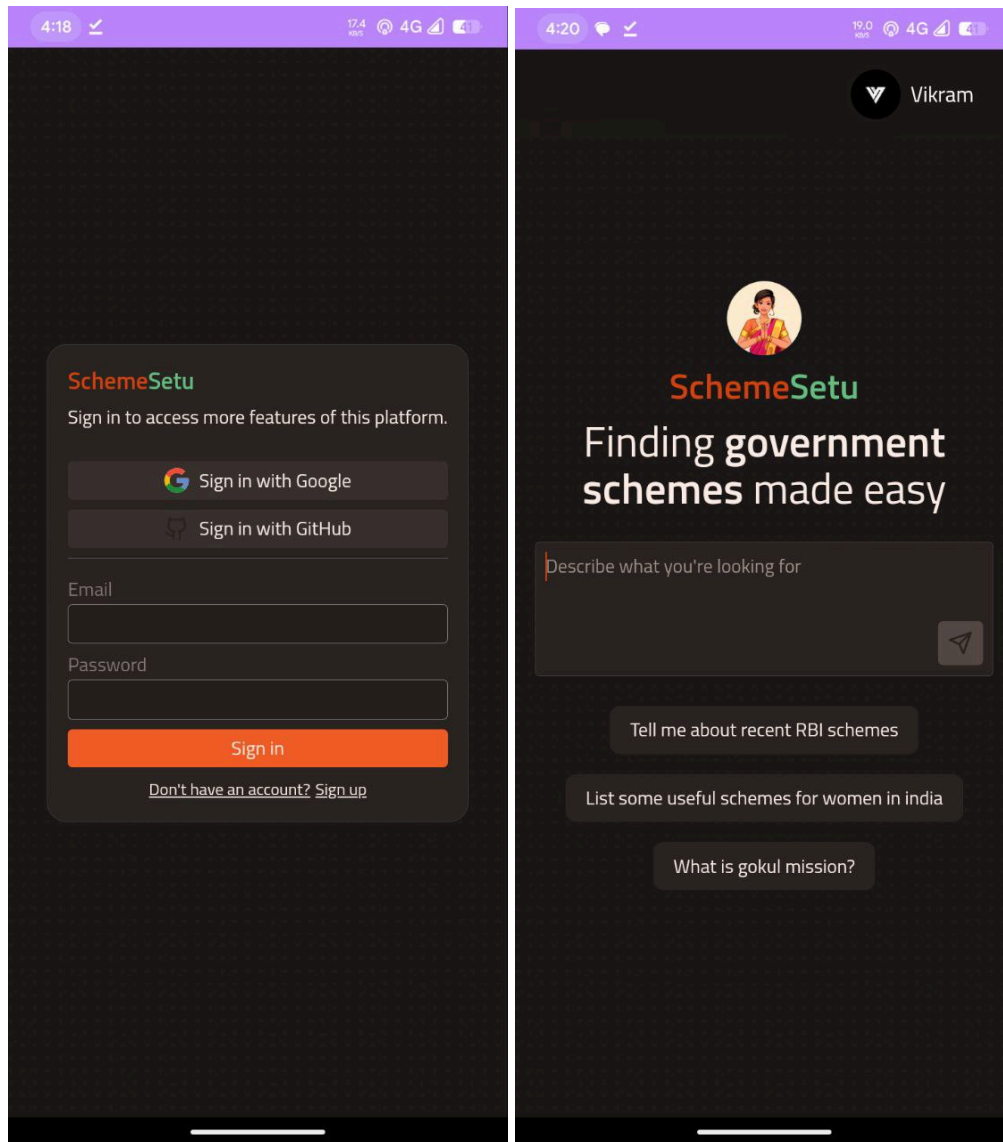

fig 5: Logged In State
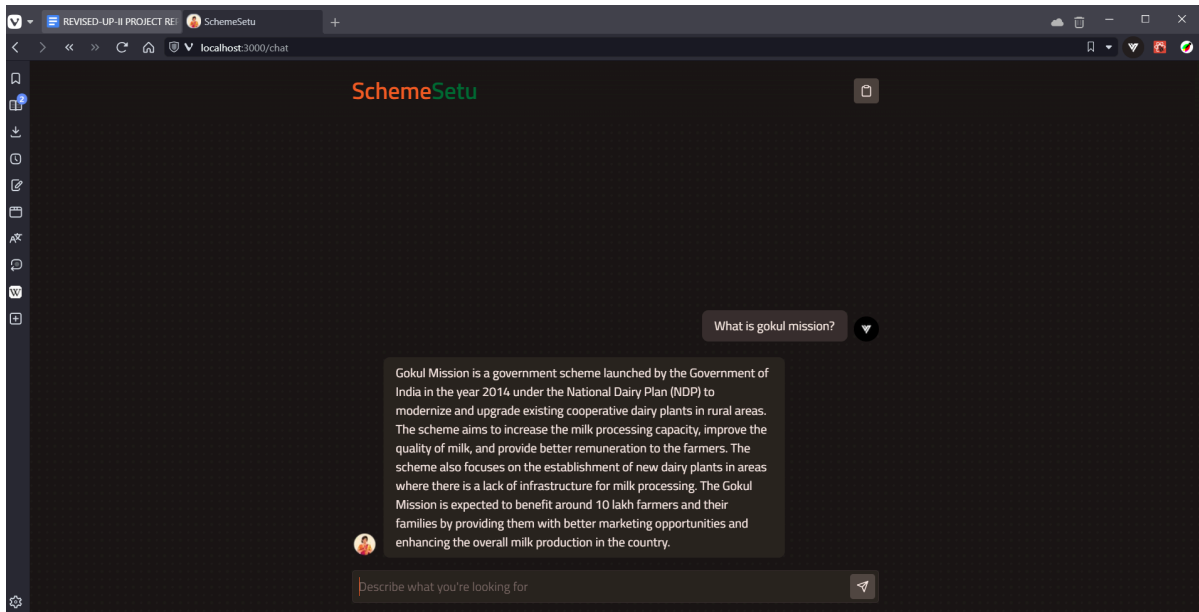
fig 6: Chat Interface

fig 7: Log Out Option

fig 8, 9: Home Page & Sign Up Page
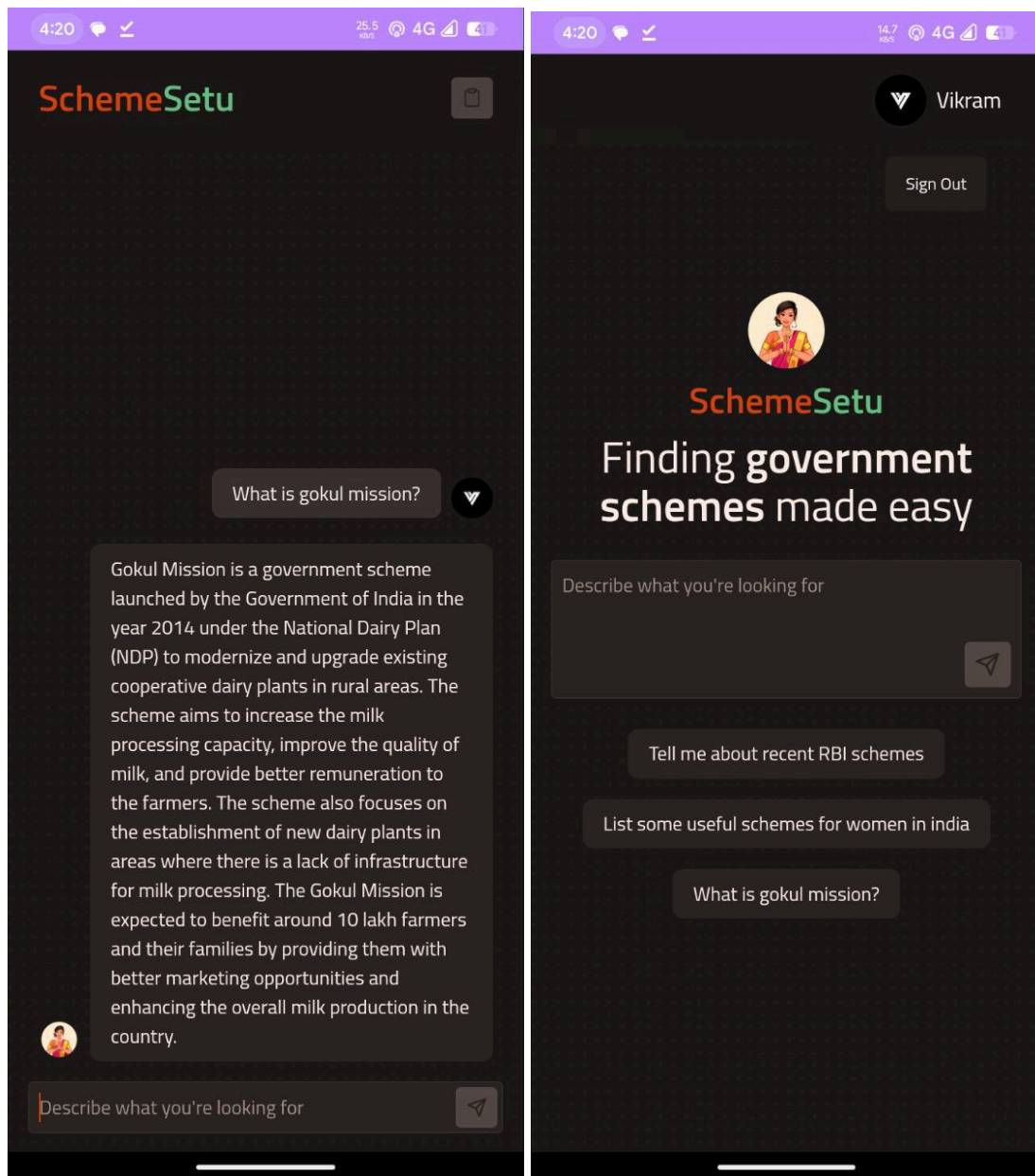
fig 10, 11: Sign In Page & Logged In State

fig 12, 13: Chat Interface and Log Out State

APPENDIX-C

ENCLOSURES

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6	Krishna Kumar Nirala, Nikhil Kumar Singh, Vinay Shivshanker Purani. "A survey on providing customer and public administration based services using AI: chatbot", Multimedia Tools and Applications, 2022 Publication	<1%

SchemeSetu significantly contributes to SDG-3, "Good Health and Well-being," and SDG-4, "Quality Education," by providing accessible and accurate information on Indian government schemes. The platform empowers individuals with crucial data on health-related initiatives, fostering informed decision-making and citizen awareness. This aligns with SDG-3's goal of ensuring healthy lives and well-being. SchemeSetu indirectly supports universal health coverage by raising awareness of available healthcare resources, ultimately improving community health outcomes. This platform acts as a vital tool in bridging information gaps, empowering individuals to make informed choices about their health, contributing to SDG-3's overarching objective of ensuring healthy lives for all.