A Mini Project Synopsis on

NeighbourNet: Enhancing Community Connections with Machine Learning

T.E. – Computer Science and Engineering-Data Science

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CERTIFICATE

This is to certify that the Mini Project report on NeighbourNet: Enhancing Community Connections with Machine Learning System has been submitted by Sumit Samanta (21107003), Shreyas Revankar (21107065), Janvi Sharma (21107032) and Devansh Kopra (2117013) who are Bonafede students of A. P. Shah Institute of Technology, Thane, Mumbai, as partial fulfilment of the requirement for the degree in **Computer Science and Engineering (Data Science)**, during the academic year **2023-2024** in a satisfactory manner as per the curriculum laid down by the University of Mumbai.

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Acknowledgement

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Abstract

This paper introduces NeighbourNet, an innovative E-community platform designed to enhance citizen engagement and optimize service delivery through advanced technology. NeighbourNet integrates key features such as WhatsApp text analysis, citizen feedback analysis, service request routing optimization, and Chatbot interface. NeighbourNet uses machine learning algorithms, such as the Random Forest Classifier, to efficiently analyze and classify citizen feedback, enabling data-driven,decision-making. In addition, NeighbourNet uses a genetic algorithm to optimize the routing of service requests, ensuring timely and efficient resource allocation. In addition, the platform includes geodetic and folio technologies for the visualization of geographic data that provide insight into citizen demographics and demand for services. The user-friendly interface developed with Streamlit offers a seamless interaction with the platform and allows citizens to express their concerns and queries effortlessly. Through the amalgamation of these cutting-edge technologies, NeighbourNet aims to revolutionize e-community, promoting transparency, efficiency and citizen satisfaction.

Chapter 1

Introduction

NeighbourNet represents a pioneering initiative aimed at enhancing community services through the innovative application of machine learning technologies. With a commitment to making community services more accessible and efficient, NeighnourNet integrates four key features to streamline citizen engagement and community.

Firstly, the Citizen Feedback Analysis Implementation harnesses the power of data analytics to interpret and respond to citizen feedback effectively, ensuring that public concerns are addressed promptly and comprehensively. Secondly, the WhatsApp Chat Analysis enables efficient communication analysis. Thirdly, the Service Routing Optimization Implementation optimizes resource allocation and service delivery, ensuring that community services reach their intended recipients swiftly and efficiently.

Lastly, the ChatBot using Machine Learning Implementation serves as an intelligent interface, providing citizens with instant access to information and assistance, thereby enhancing communication between government agencies and the public. By integrating these innovative features, NeighbourNet revolutionizes community engagement, fostering transparency, accountability, and accessibility in community.

1.1. Purpose

NeighbourNet is a comprehensive system designed to revolutionize community services through the seamless integration of machine learning technologies. At its core, NeighbourNet aims to enhance accessibility and efficiency within community realms by leveraging four key features: Citizen Feedback Analysis Implementation, WhatsApp Text Analysis, Service Routing Optimization Implementation, and ChatBot using Machine Learning Implementation. Firstly, the system facilitates Citizen Feedback Analysis, enabling communities and public service organizations to gauge public sentiment, identify concerns, and prioritize areas for

improvement based on real-time feedback. Secondly, NeighbourNet WhatsApp text analysis involves the application of preprocessing techniques to extract meaningful information from WhatsApp conversations. Thirdly, through Service Routing Optimization, the system streamlines the allocation of resources, reducing redundancy and ensuring optimal distribution for enhanced service delivery.

Lastly, the inclusion of a ChatBot powered by machine learning algorithms enhances accessibility and responsiveness by providing citizens with instant, personalized assistance and information. By amalgamating these features, NeighbourNet endeavors to foster transparency, accountability, and citizen-centricity within community services, ultimately empowering communities and promoting inclusive community.

1.2 Problem Statement

The primary goal is to enhance the accessibility of vital community services by simplifying and accelerating the process, while also increasing awareness of the services available. Additionally, there is a focus on assisting community agencies in improving their management of citizen feedback and complaints. This will enable agencies to respond swiftly and resolve issues effectively, thereby restoring and strengthening public trust in community services. The initiative recognizes that outdated systems and traditional methods are impediments to the growth and efficiency of community services, and seeks to address these challenges directly.

1.3. Objectives

- To Develop user-friendly interfaces and platforms that facilitate easy access to community services.

  Developing user-friendly interfaces and platforms that facilitate easy access to community services is a central goal aimed at enhancing the way individuals interact with the resources available within their communities. This objective focuses on the design and implementation of digital solutions that are straightforward and intuitive, ensuring that users of all ages and technological skill levels can navigate and utilize these services without difficulty.

- Ensure that community services are accessible to a wider range of citizens, including those with limited technological proficiency.

  Ensuring that community services are accessible to a wider range of citizens, including those with limited technological proficiency, is crucial for fostering an inclusive community where everyone can benefit from available resources. This goal involves several strategic efforts designed to accommodate diverse user needs and to reduce barriers that may prevent some individuals from accessing services.

- To continuously refine and enhance NeighbourNet's features based on user feedback and evolving technological advancements.

  To continuously refine and enhance NeighbourNet's features based on user feedback and evolving technological advancements is an objective that emphasizes ongoing improvement and responsiveness to both user needs and the latest technology trends. This approach is crucial for maintaining a relevant and effective platform.

1.4. Scope

NeighbourNet offers a broad and multifaceted scope, presenting itself as an indispensable tool across various domains in the contemporary landscape of data-driven community and citizen engagement. With its four distinct features, community Feedback Analysis Implementation, WhatsApp Text Analysis, Service Routing Optimization Implementation, and ChatBot using Machine Learning Implementation, this system holds immense potential for diverse applications:

- Enhanced Citizen Engagement: NeighbourNet enables communities to actively listen to citizen feedback through sophisticated analysis tools. By understanding the sentiments and preferences of citizens, communities can tailor policies and services to better meet the needs of their constituents.

- WhatsApp Text Analysis: Analyze user behavior within WhatsApp conversations to understand communication patterns, interaction frequency, and engagement levels.

- Optimized Resource Allocation: Through Service Routing Optimization Implementation, NeighbourNet streamlines the allocation of resources, such as personnel and funds, leading to more efficient and equitable service delivery. This ensures that community services reach those in need in a timely and effective manner.

- Accessible and Responsive Service Delivery: The ChatBot using Machine Learning Implementation provides citizens with a user-friendly interface to access community services and obtain assistance. This promotes accessibility and responsiveness, making it easier for citizens to engage with government agencies and access the support they require.

In practical terms, the scope of NeighbourNet spans across various sectors and stakeholders:

Businesses: NeighbourNet offers businesses insights into customer feedback and sentiment, enabling them to refine their products and services to better meet customer needs and preferences.

Topic Modeling: Extract topics and themes from WhatsApp conversations to identify popular discussion topics, emerging trends, and areas of interest among users.

Politicians and Policy Makers: NeighbourNet provides politicians and policy makers with valuable insights into public sentiment and reactions to policies, enabling them to make informed decisions and adjust strategies accordingly.

Citizens: By facilitating easier access to community services and fostering greater transparency and responsiveness from government agencies, NeighbourNet ultimately benefits citizens by improving their overall experience and satisfaction with government services.

Chapter 2

Literature Review

The discourse surrounding data-driven technologies and their applications in addressing community-centric challenges spans a vast landscape of scholarly inquiry and practical innovation. Madyatmadja et al. [1] (2023) embarked on a rigorous exploration into the classification of crowdsourced citizen complaints, employing a multifaceted approach that leveraged advanced machine learning algorithms including k-Nearest Neighbors, Random Forest, Support Vector Machine, and AdaBoost. Through meticulous analysis and validation, their research not only underscored the efficacy of these algorithms in accurately categorizing complaints but also elucidated the intricate interplay between algorithmic models and real-world data dynamics. By delving deep into the underlying mechanisms of complaint classification, Madyatmadja et al. shed light on the potential of data-driven methodologies to inform policy-making, resource allocation, and community governance strategies, thereby catalyzing a paradigm shift towards more data-informed decision-making processes.

In the realm of network protocols, Manikandan et al. [2] (2011) embarked on a pioneering endeavor to develop a Secure On-Demand Routing Protocol tailored specifically for Mobile Ad-hoc Networks (MANETs), drawing inspiration from the evolutionary principles of genetic algorithms. Grounded in the recognition of the inherent challenges posed by dynamic network environments, their research sought to forge a path towards robust and adaptive communication protocols capable of withstanding the rigors of fluctuating network topologies and adversarial threats. Through a meticulously crafted framework of genetic algorithm-based optimization, Manikandan et al. not only demonstrated the resilience and efficiency of their routing protocol but also opened new frontiers in the domain of network security and resilience. Their work not only addressed immediate technological challenges but also laid the groundwork for future advancements in decentralized communication infrastructures, with implications spanning disaster response, military operations, and emerging IoT ecosystems.

Meanwhile, Lalwani et al. [3] (2018) embarked on a transformative journey into the realm of Artificial Intelligence (AI) and Natural Language Processing (NLP), seeking to harness the potential of chatbot systems in enhancing user engagement and streamlining interactions across diverse domains. Their research marked a pivotal moment in the evolution of conversational interfaces, where AI-driven chatbots emerged as virtual assistants capable of navigating complex tasks and facilitating seamless user experiences. Through a meticulous fusion of advanced NLP techniques and iterative model refinement, Lalwani et al [6]. not only demonstrated the prowess of their chatbot systems but also pioneered a new frontier in human-computer interaction. By democratizing access to information and services through intuitive conversational interfaces, their research paved the way for a more inclusive and user-centric approach to digital engagement, with implications spanning customer service, healthcare, education, and beyond.

Simultaneously, Renukadevi et al. [4] (2023) embarked on a quest to unravel the intricacies of group communication dynamics through WhatsApp group chat analysis

powered by machine learning techniques. Their research delved deep into the fabric of collective interactions, deciphering hidden patterns, sentiment trends, and conversational structures that shape group dynamics. Through a meticulous synthesis of machine learning algorithms and social network analysis methodologies, Renukadevi et al. [5] not only illuminated the emergent properties of group communication but also laid the groundwork for developing intelligent chatbot systems capable of orchestrating meaningful interactions in group settings. By unraveling the complexities of human interaction within digital spaces, their research transcended disciplinary boundaries, offering profound insights into the interplay between technology, social behavior, and community dynamics.

Jain, Agarwal, & Gupta [7] (2022) explore request routing strategies for optimizing community services, presenting a case study of the NeighbourNet platform. Their research delves into the complexities of resource allocation and task assignment, leveraging NeighbourNet's genetic algorithm-based routing system. By analyzing routing strategies and performance metrics, Jain et al. demonstrate the efficiency gains and resource optimization benefits afforded by data-driven routing approaches. This study underscores the importance of algorithmic optimization in enhancing service accessibility and efficiency within community service platforms.

The literature surrounding NeighbourNet reflects a diverse array of research endeavors, each contributing unique insights and methodologies to the broader discourse on community service accessibility and engagement. By harnessing the power of data analytics, artificial intelligence, and user-centric design principles, NeighbourNet emerges as a transformative force in the realm of community service platforms, poised to empower communities, foster stronger connections, and drive positive social impact.

Chapter 3

Proposed System

NeighbourNet represents a cutting-edge platform meticulously designed to fundamentally transform the manner in which community services are accessed and delivered. At its core, this transformation is driven by the advanced capabilities of machine learning technologies. The overarching goal of NeighbourNet is to enhance the way in which services interact with their users, ensuring not only a boost in efficiency but also making these services more accessible and user-friendly.

Traditionally, community service systems have been plagued by various inefficiencies that stem from outdated methods and processes that haven't kept pace with technological advancements. These traditional systems often result in slower response times, underutilization of resources, and a general disconnect between service providers and the community members they serve. NeighbourNet aims to address these issues head-on by reimagining and reshaping the foundational structures of community service delivery. By leveraging state-of-the-art machine learning technologies, NeighbourNet introduces a suite of innovative features designed to streamline and optimize the interaction between community services and their users. This technology-driven approach is geared towards dismantling the barriers that typically complicate the delivery of community services, thus fostering a more efficient and effective service environment.

One of the key benefits of integrating machine learning into NeighbourNet is its ability to analyze vast amounts of data quickly and accurately. This capability allows the platform to identify patterns and trends that may not be visible to human administrators. For instance, by analyzing user interaction data and feedback, NeighbourNet can pinpoint areas where services are falling short and identify opportunities for improvement. This kind of insight is invaluable for decision-makers tasked with allocating resources and planning service delivery.

Furthermore, machine learning enables NeighbourNet to adapt and evolve based on the data it collects. As the system gains more insights from daily interactions with users, it becomes increasingly adept at anticipating needs and managing resources accordingly. This dynamic adaptability ensures that the platform remains effective over time, continually adjusting to meet the changing demands of the community.

The introduction of NeighbourNet also means that community services can be delivered more quickly. Machine learning algorithms optimize routing and resource allocation, ensuring that services are not only delivered efficiently but are also targeted precisely where they are needed most. This results in reduced wait times and increased satisfaction among community members, who can see a tangible improvement in service delivery speed and accuracy.

Moreover, NeighbourNet's machine learning technology makes it possible to offer a more personalized interaction experience for users. By analyzing individual user behaviors and preferences, the platform can tailor its responses and services to better meet the specific needs of each user. This personalized approach helps to build a stronger relationship between community services and their users, enhancing trust and improving overall service engagement.

In addition to improving service efficiency and personalization, NeighbourNet also introduces greater transparency into the workings of community services. With more data available for analysis, service providers can offer clear and detailed explanations for their decisions and actions. This transparency is crucial for building and maintaining trust within the community, as it assures citizens that their needs and feedback are taken seriously and that services are being managed responsibly and effectively.

In sum, NeighbourNet is not just a technological upgrade to existing community service systems; it is a comprehensive rethinking of how these services can and should interact with their users. By adopting a technology-driven approach that leverages the capabilities of machine learning, NeighbourNet aims to make community services more efficient, accessible, and responsive, thereby transforming the landscape of community service delivery for the better.

3.1. Features and Functionality:

NeighbourNet offers a comprehensive suite of features designed to enhance citizen-government interactions and streamline service delivery:

Citizen Feedback Implementation: This feature enables communities to gather and analyze feedback from citizens through various channels. By extracting valuable insights from citizen feedback, NeighbourNet facilitates responsive community and tailored service improvements.

WhatsApp Chat Analysis: Topic modeling enables the extraction of topics and themes from conversations, revealing popular discussion topics and emerging trends. User profiling techniques can create user profiles based on demographic information and preferences to personalize marketing strategies.

Service Routing Optimization Implementation: This feature optimizes the allocation of resources and enhances service delivery efficiency. By analyzing data related to service demand and resource availability, NeighbourNet ensures that community services are delivered in a timely and cost-effective manner, minimizing delays and maximizing resource utilization.

ChatBot using Machine Learning Implementation: The ChatBot feature serves as a user-friendly interface for citizens to interact with community services. Powered by machine learning algorithms, the ChatBot provides personalized assistance and guidance to users, offering real-time support and information on various community processes and initiatives.

3.2. Proposed System Architecture:

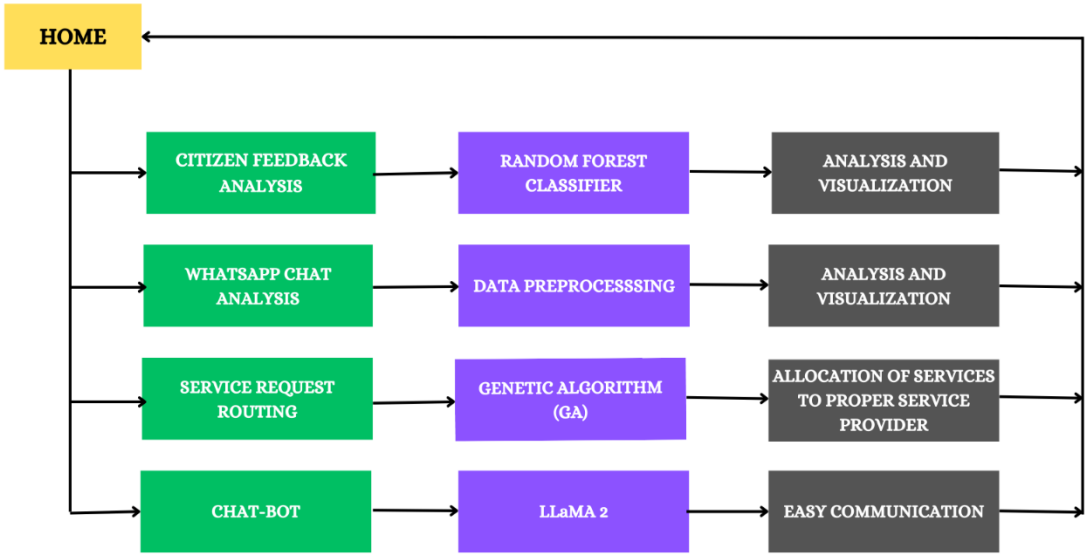

Figure 3.2 : System Architecture of NeighbourNet

NeighbourNet's system architecture is a meticulously crafted framework designed to ensure the efficient delivery of community services while prioritizing scalability, reliability, and performance. The architecture comprises three key layers: the presentation layer, the application logic layer, and the data storage layer, each playing a vital role in the platform's functionality and user experience. The presentation layer serves as the interface through which users interact with NeighbourNet. It encompasses the user interface elements, including visual design, layout, and navigation features, aimed at providing an intuitive and engaging experience for users. Through responsive design principles and user-friendly features, this layer ensures seamless access to NeighbourNet's functionalities across various devices, including desktop computers, smartphones, and tablets. Additionally, accessibility considerations are incorporated to ensure inclusivity for users with diverse needs and abilities.

At the core of NeighbourNet lies the application logic layer, where the platform's business rules, processing logic, and algorithms are implemented. This layer orchestrates the flow of data and commands between different components of the system, ensuring the efficient execution of NeighbourNet's functionalities. It

encompasses a range of processes, including service request routing, chatbot interactions, data analysis, and decision-making algorithms. By optimizing performance and resource utilization, the application logic layer enhances the overall responsiveness and effectiveness of NeighbourNet, enabling seamless service delivery and user engagement.The data storage layer is responsible for managing the storage and retrieval of data within NeighbourNet. It includes databases, data repositories, and file storage systems where user information, service requests, chat transcripts, and analytical insights are stored. This layer ensures data integrity, availability, and scalability, facilitating seamless access to information and efficient data processing. Additionally, data security measures are implemented to safeguard sensitive information and protect user privacy, aligning with regulatory requirements and best practices in data management.

NeighbourNet's system architecture is designed with a holistic approach to address the complexities of community service delivery. By integrating robust layers for presentation, application logic, and data storage, NeighbourNet ensures an intuitive user experience, efficient data processing, and seamless access to essential services. Through continuous optimization and refinement, NeighbourNet is poised to meet the evolving needs of communities and empower users with accessible and efficient access to vital resources and support.

Chapter 4

Requirements Analysis

The NeighbourNet project requires a thorough requirements analysis to ensure the platform successfully enhances the accessibility and efficiency of community services through advanced machine learning technologies. This analysis addresses critical technological and operational needs essential for the project's success.

Firstly, the platform must integrate a robust data ingestion framework capable of efficiently managing high volumes of diverse data from community interactions. It is crucial to implement sophisticated machine learning algorithms designed to process and analyze this data effectively. These algorithms will identify patterns, discern trends, and provide actionable insights, which are fundamental for improving service delivery. Additionally, NeighbourNet requires advanced real-time data processing capabilities, particularly for features such as WhatsApp Chat Analysis and Citizen Feedback Implementation. These features necessitate the use of high-performance natural language processing tools that can quickly and accurately analyze textual and spoken data, delivering timely insights into community sentiments and feedback.

The system also needs to include a comprehensive suite of algorithms for service routing optimization. These algorithms must handle logistical data and real-time service demand to optimize resource allocation and scheduling efficiently. They should be capable of adapting to changes in demand and resource availability, ensuring services are delivered promptly and without delays. Furthermore, developing an intuitive user interface for the ChatBot is essential. This interface should be user-friendly and capable of providing personalized interactions based on the users' history and preferences. Integration with backend systems is critical to ensure that the ChatBot can access real-time data and deliver accurate and relevant information.

Lastly, given the sensitivity of the data involved, the platform must incorporate stringent security measures, including data encryption, secure data storage practices, and strict access controls. These measures will protect user data and ensure compliance with privacy standards. In summary, the requirements analysis for the NeighbourNet project emphasizes the need for advanced data processing capabilities, sophisticated machine learning algorithms, user-centric interface design, and robust security protocols. These components are indispensable for developing a scalable and adaptable platform that meets the evolving needs of community service providers and users.

1. Functional

NeighbourNet's functional requirements span across three core modules: Service Request Routing, WhatsApp Chat Analysis, and Chatbot Using LLAMA 2. The Service Request Routing module enables users to input location details and select service types, leveraging genetic algorithms to efficiently allocate tasks to nearby workers. Integrated

geolocation services ensure accurate mapping of user and worker locations, while a feedback mechanism solicits user feedback for service quality assessment. In parallel, the WhatsApp Chat Analysis module preprocesses chat data, generates insightful visualizations, and extracts key insights using machine learning algorithms, facilitating a deep understanding of communication dynamics. Complementing this, the Chatbot Using LLAMA 2 module accepts PDF uploads for analysis, employs natural language processing for user interaction, and continuously learns to improve response accuracy, ensuring seamless communication and information retrieval for users across various modalities.

These modules collectively address NeighbourNet's overarching system requirements, including scalability to accommodate growth, robust security measures to protect user data, and cross-platform compatibility for widespread accessibility. By fulfilling these requirements, NeighbourNet aims to revolutionize community service accessibility, empower users with actionable insights, and foster seamless interactions through advanced technologies and user-centric design principles.

2. Non-Functional

NeighbourNet's non-functional requirements encompass key aspects of performance, reliability, security, and usability to ensure an optimal user experience. Performance considerations dictate fast response times, scalability to handle increasing user loads, and high throughput to accommodate concurrent requests without degradation. Reliability is paramount, with the system maintaining high availability and fault tolerance to swiftly recover from disruptions, safeguarding data integrity through robust error-handling mechanisms.

Security measures are stringent, encompassing data privacy through encryption, secure authentication and authorization protocols, and comprehensive auditability for traceability and accountability. Usability is prioritized with an intuitive user interface, inclusive design for accessibility, and multilingual support to cater to diverse user needs. By adhering to these non-functional requirements, NeighbourNet aims to deliver a resilient, secure, and user-centric platform, ensuring seamless performance, data integrity, and accessibility for its users.

Chapter 5

Project Design

It delves into the foundational blueprints that underpin the innovative NeighbourNet platform. Through the meticulous crafting of use case diagrams, dataflow diagrams, and system architecture, this chapter elucidates the structural framework guiding the development and implementation of NeighbourNet. These essential design elements serve as the cornerstone of NeighbourNet's functionality, ensuring clarity, efficiency, and scalability in its deployment. As we embark on a journey through the intricacies of project design, we unravel the intricate web of interconnected components that form the backbone of NeighbourNet's transformative capabilities.

5.1 Use Case Diagram

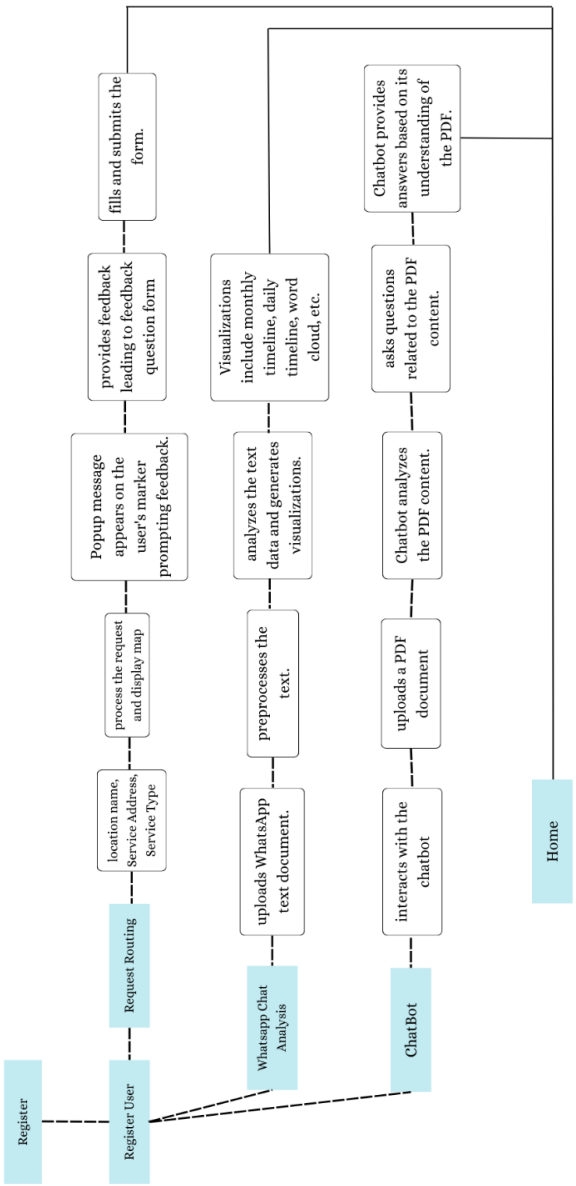

Figure 5.1: Use Case Diagram of NeighbourNet

Users initiate service requests, prompting genetic algorithm-based worker assignments and map display of worker locations. Simultaneously, WhatsApp text undergoes preprocessing for visualization creation, including timelines and word clouds. Additionally, users interact with a chatbot, submitting PDFs for analysis and receiving responses based on document content. Finally, a feedback mechanism enables users to provide input, fostering continuous system refinement.

5.2 Data Flow Diagram (DFD)

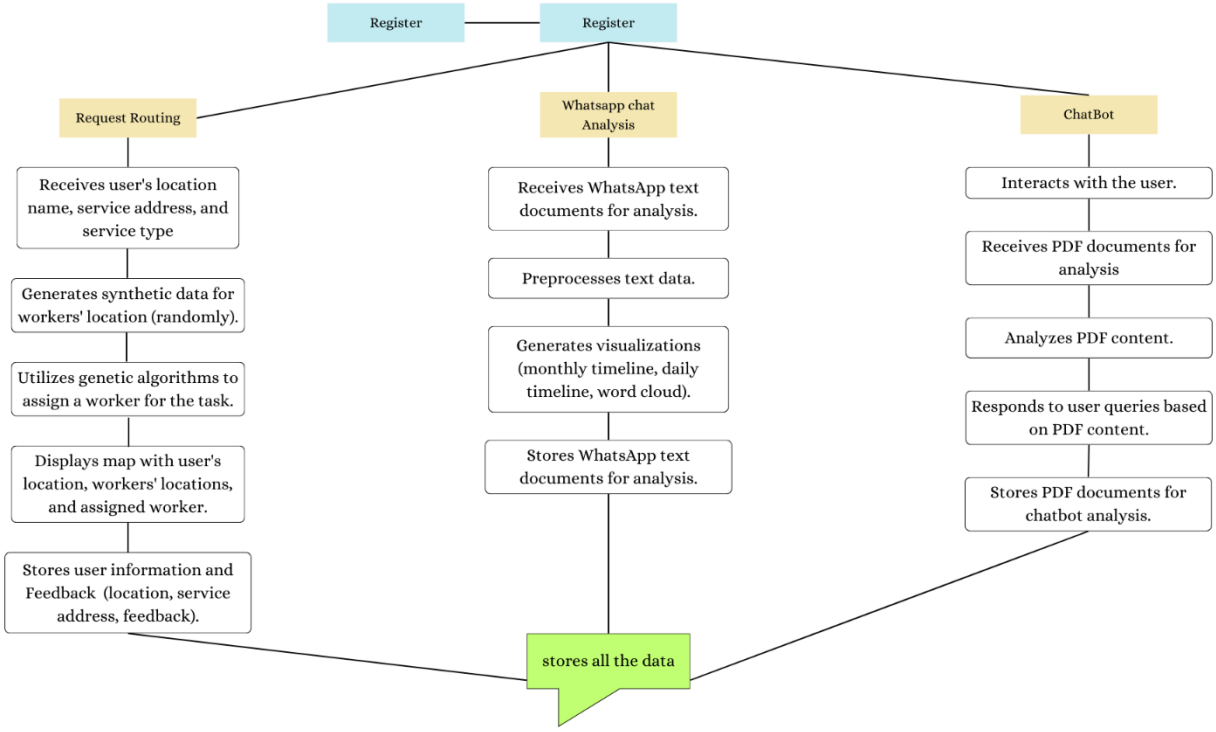

Figure 5.2: Data Flow Diagram for NeighbourNet

User inputs initiate processing in three key processes: Service Request Routing, WhatsApp Chat Analysis, and Chatbot Interaction. These processes are fueled by diverse data sources including user inputs, WhatsApp text documents, and PDF files for chatbot analysis. Genetic algorithms drive worker assignments and synthetic data generation for service routing, while preprocessing readies WhatsApp text for visualization. Concurrently, feedback submissions from users enhance system refinement, ensuring continual optimization and user satisfaction.

5.3 Implementation

In the implementation phase of our project, NeighbourNet, we meticulously brought our vision to life, crafting a seamless user experience that embodies accessibility and efficiency. Our journey begins with the creation of a captivating landing page, where

users are greeted by the essence of NeighbourNet through vibrant imagery and intuitive design. Through meticulously curated images showcasing the array of services we provide, alongside visual representations of WhatsApp chat analysis, including both monthly and daily timelines, we invite users to explore the depth and breadth of NeighbourNet's capabilities.

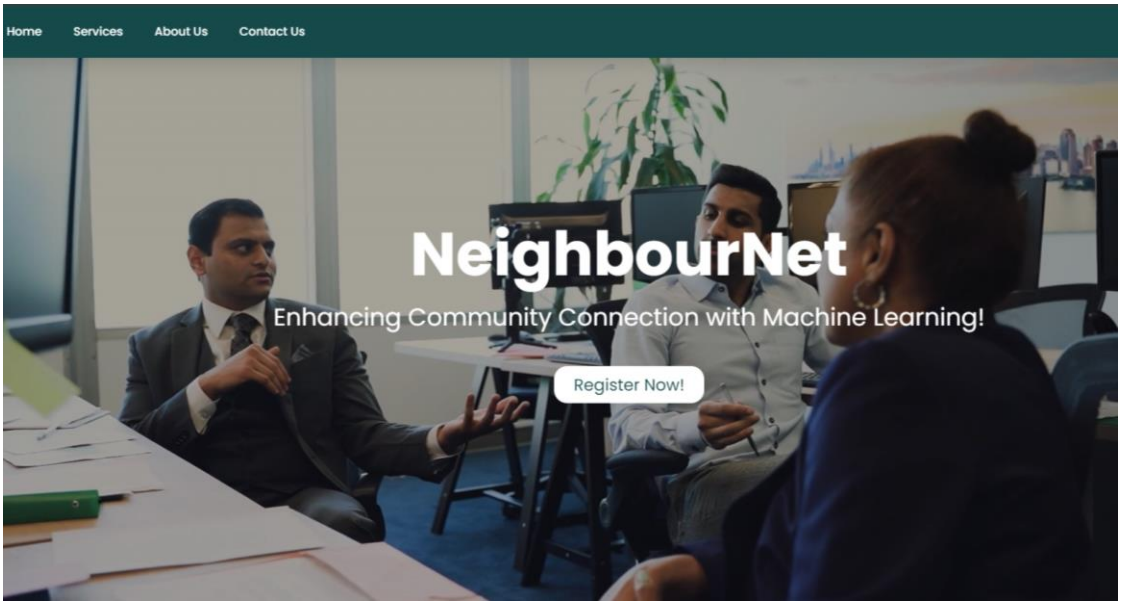

Figure 5.4: Landing Page of NeighbourNet

The NeighbourNet GUI is a user-friendly web-based application that provides intuitive access to its various features. Built using HTML, CSS, and JavaScript, the interface ensures seamless navigation and interaction for users of all backgrounds.

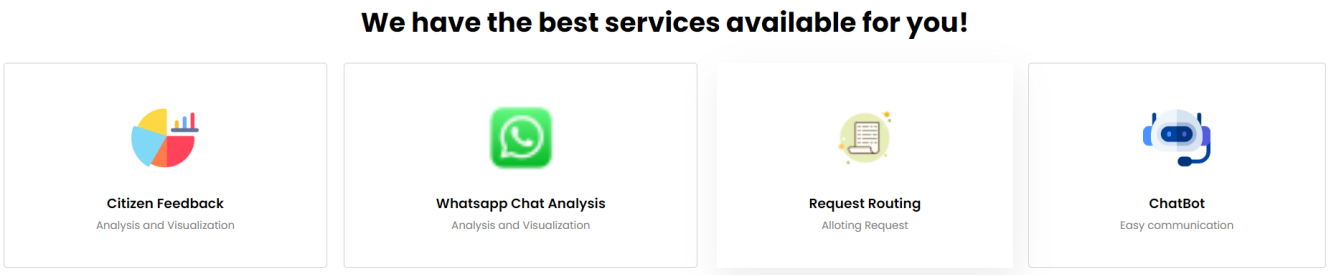

Figure 5.5: Services of NeighbourNet

NeighbourNet is a comprehensive mini project focused on enhancing community engagement and service optimization. Its four key services include Citizen Feedback Analysis, which harnesses community input for better decision-making. WhatsApp Chat Analysis enables efficient communication analysis. Service request routing optimization

streamlines resource allocation for timely responses. Finally, the Chatbot service offers a user-friendly interface for community inquiries and support.

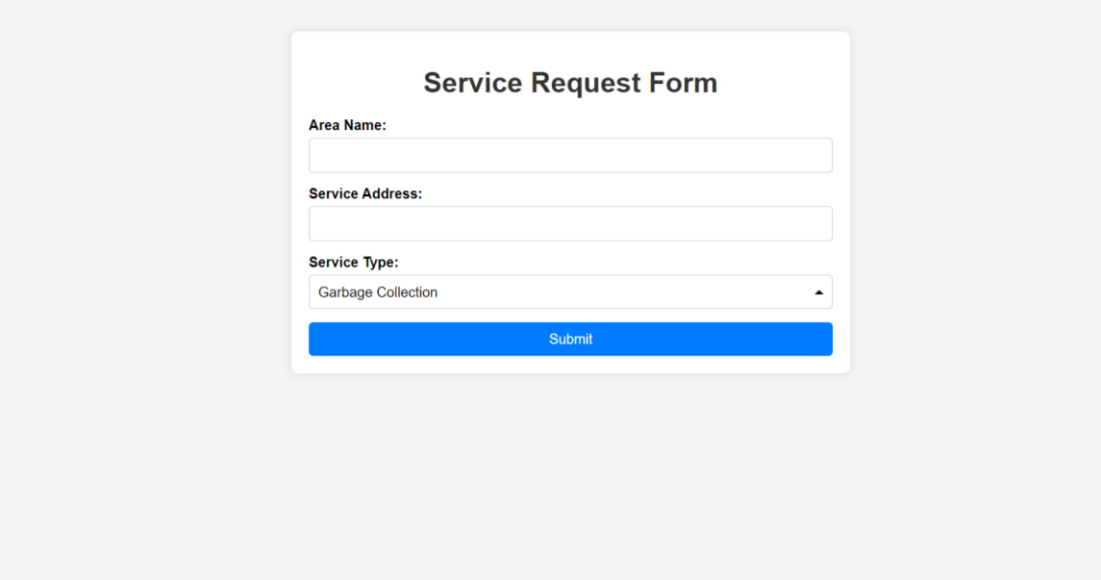

Figure 5.8: Service Request Form

The service request form includes user area details, aiding resource allocation by specifying the geographical location. The service address ensures prompt service delivery by pinpointing the exact location needed. Users select from a dropdown menu with ten service types, streamlining request specification for clarity and efficiency in provision.

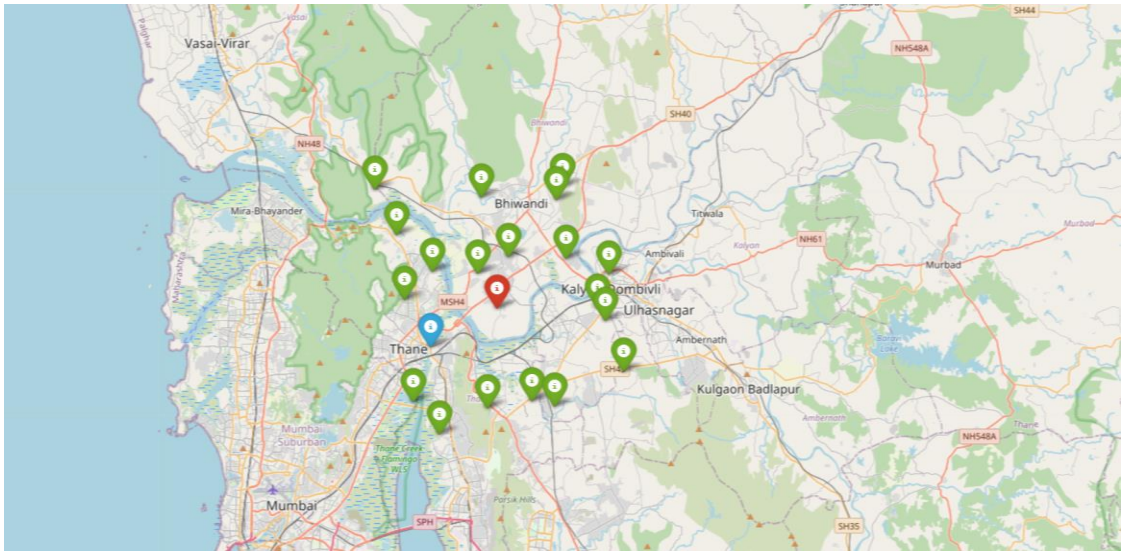

Figure 5.9: User Map

In the displayed map image, the user's location is represented by a blue marker, offering a clear visual reference point. Concurrently, the location of the assigned worker is indicated by a striking red marker, facilitating efficient coordination and task allocation. Complementing this, green markers pinpoint the locations of other workers within the department, fostering collaboration and enabling swift decision-making based on proximity and resource availability

Chapter 6

Technical Specification

NeighbourNet stands at the forefront of community service innovation, blending advanced technology with an unwavering dedication to accessibility. Through the strategic utilization of machine learning (ML) algorithms and a meticulously crafted technology stack, NeighbourNet sets out to redefine how individuals access crucial services and engage with their communities. This detailed exploration provides a comprehensive look into NeighbourNet's technology components, sub-components, and their latest specifications, illuminating the project's innovative spirit and its potential to catalyze positive change on a global scale. Operating within the dynamic Windows ecosystem, NeighbourNet leverages the cutting-edge features of Windows 11 to ensure seamless performance and interoperability. Complementing this robust foundation are a suite of programming languages including HTML, CSS, JavaScript, and Python. These languages serve as the backbone of NeighbourNet's development stack, empowering developers to craft intuitive user interfaces, implement intricate algorithms, and unlock the full potential of the platform.

At the heart of NeighbourNet's operations lies its resilient backend infrastructure powered by the versatile XAMPP solution stack. Built upon the solid foundation of XAMPP 8.0.12, NeighbourNet streamlines PHP development, facilitates efficient MySQL database management, and ensures seamless server-side processing through Apache server configuration. Paired with this robust backend framework is the industry-leading Visual Studio Code (VS Code) IDE. Equipped with a comprehensive suite of features for code editing, debugging, and collaboration, VS Code empowers developers to unleash their creativity and drive innovation.

NeighbourNet embraces a diverse array of cutting-edge technologies and machine learning models to enhance its functionalities and deliver impactful solutions to users. Leveraging technologies such as Streamlit, Geopy, Folium, and scikit-learn, NeighbourNet enables the creation of immersive web experiences, sophisticated geospatial data analysis, and intelligent machine learning algorithms. Furthermore, NeighbourNet integrates state-of-the-art machine learning models like LLAMA 2.1, alongside powerful algorithms such as RandomForestClassifier and Genetic Algorithm. These models and algorithms drive intelligent decision-making, uncover valuable insights, and pave the way for personalized service delivery. In summary, NeighbourNet represents a paradigm shift in the landscape of community service platforms, characterized by innovation, inclusivity, and social impact. By harnessing advanced technologies, robust infrastructure, and cutting-edge machine learning models, NeighbourNet aspires to empower individuals, foster stronger community connections, and create a more equitable and interconnected world. As NeighbourNet continues to evolve and extend its reach, it holds the promise of transforming lives, strengthening communities, and illuminating the path towards a brighter future for all.

Components	Sub-components	Specification
Operating System	Windows	Windows 11
Languages	HTML,CSS,JavaScript, Python	HTML5,CSS3,ECMAScript2022, Python 3.10
Backend	XAMPP	XAMPP 8.0.12
Database	PHP	PHP 8.1
IDE	Visual Studio Code	Visual Studio Code 1.65.2
Technologies	Streamlit,Geopy,Folium, Scikitlearn	Streamlit 1.2.0,Geopy 2.2.0, Folium0.12.1,Scikit-learn 0.24.2
Models	LLAMA	LLAMA 2.1
Algorithm	RandomForestClassifier, Genetic Algorithm	

Table 6.1: System Specifications

Chapter 7

Project Scheduling

Scheduling in this project management is the listing of activities, deliverables, and milestones within a project. A schedule also usually includes a planned start and finish date, duration, and resources assigned to each activity. Effective project scheduling is a critical component of successful time management, especially for professional service businesses.

Sr. No	Group Member	Time Duration	Work to be done
1	Sumit Samanta, Shreyas Revankar, Janvi Sharma, Devansh Kopra.	2nd week of January	Group formation and Topic finalization. Identifying the scope and objectives of the Mini Project. Discussing the project topic with the help of a paper prototype.
		1st week of February	Identifying the functionalities of the Mini Project. Designing the Graphical User Interface (GUI).
2	Sumit Samanta, Devansh Kopra, Shreyas Revankar, Janvi Sharma.	3rd week of February	Model trained
3	Shreyas Revankar, Janvi Sharma.	1stweek of March	GUIs Connectivity.
4	Sumit Samanta, Devansh Kopra.	3rd week of March	Integration of all modules and Report Writing.

Table 7.1: Timeline Chart

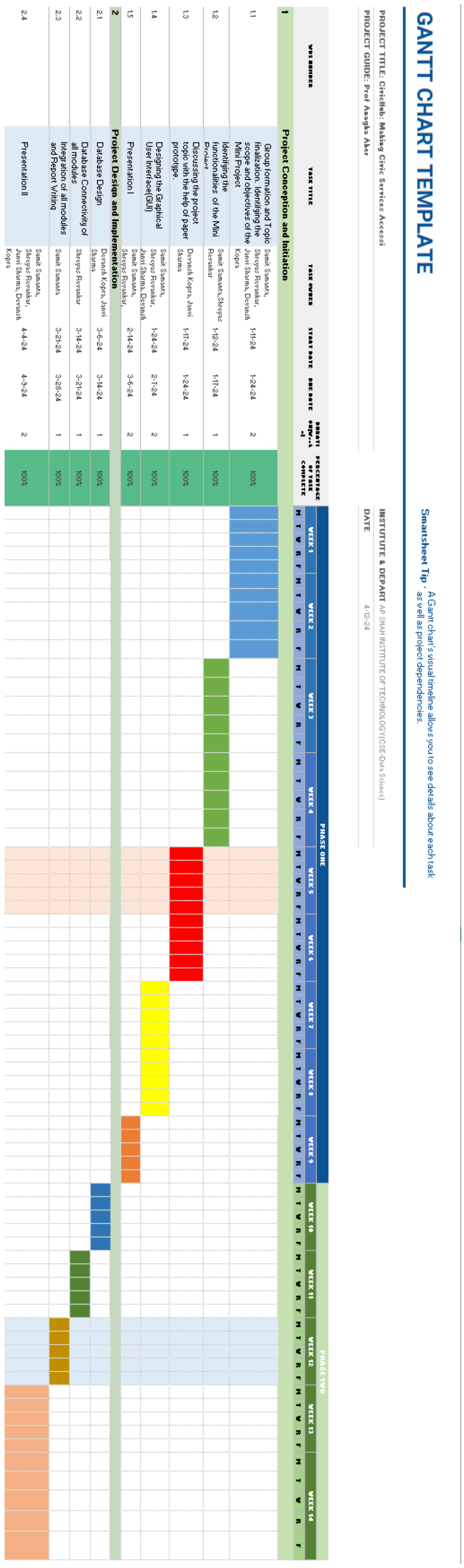

Figure 7.2: Gantt Chart

To visualize this schedule, a Gantt chart is employed, providing a graphical representation of task durations, start and finish dates, and interactivity. Additionally, Gantt charts help illustrate the project's work breakdown structure and the relationships between activities, ensuring effective project management and progress tracking.

Here in the above figure 7.1, the rows of the chart contain the task titles such as the project conception and initialization as well as the project design and implementation which in subdivision contains the group formation, topic finalizing, prototype, GUI designing, backend implementation etc. The columns contain the duration of the task completed, percentage of work completed, number of weeks required to complete a particular task, the specific dates, the team members who contributed towards the completion of tasks.

During this week, the group is expected to be formed, and a project topic should be decided upon. The group will need to agree on the scope and objectives of the mini project. This involves understanding what the project aims to achieve and defining its boundaries. The mention of a "paper prototype" suggests that the group might be discussing the project's concept visually on paper before moving on to technical details. This is a common practice in design and software development to clarify ideas.

Identifying the functionalities of the Mini Project. Designing the Graphical User Interface (GUI). In this phase, the group should identify what the project will do, essentially listing the features and functionalities it will offer. This is a critical step in the project's development as it sets the roadmap for the work ahead. Additionally, the group will work on designing the graphical user interface (GUI). The GUI is what the users will interact with, so its design is important for a good user experience.

Model trained by Shreyas Revankar and Janvi Sharma. It appears that the project involve some machine learning or data modeling work. Sumit Samanta and Devansh Kopra are responsible for training the model during third week of August. Training a model typically involves feeding it data and fine-tuning it to perform a specific task.

GUIs Connectivity by Shreyas Revankar and Sumit Samanta. The GUIs created in the earlier phase need to be connected to the underlying functionality of the project. This is when the user interface is made functional, and user actions trigger appropriate responses from the system.

Integration of all modules and Report Writing by Janvi Sharma and Devansh Kopra. This is the final phase of the project. It involves bringing together all the different components developed by the team members, ensuring that they work together seamlessly. Additionally, the team will be working on report writing. This suggests that they might be creating a documentation report that summarizes what they've done in the project, its results, and any relevant details for presentation or evaluation.

Chapter 8

Results

The trajectory of NeighbourNet unfolds as a testament to innovation and societal impact. This chapter delves into the comprehensive outcomes of NeighbourNet's core functionalities, namely service request routing, WhatsApp chat analysis, and AI-driven chatbots, exploring the intricate interplay between technological sophistication and societal relevance. As NeighbourNet reveals its findings, it unveils a rich tapestry of insights, performance metrics, and emergent patterns, underscoring its potential to empower communities and drive transformative change.

1. Service Request Routing: Optimization of Resource Allocation

NeighbourNet's exploration of service request routing witnessed the convergence of advanced algorithms and synthetic data to orchestrate efficiency. Employing a genetic algorithm paradigm, NeighbourNet demonstrated its adeptness in effectively allocating resources, leveraging synthetic data to simulate real-world scenarios. The results uncovered optimal routing plans meticulously crafted through iterative processes of evolutionary selection, crossover, and mutation, surpassing predefined fitness criteria. These findings represent a significant stride towards equitable resource allocation, fostering community resilience and progress.

2. WhatsApp Chat Analysis: Insights into Communication Dynamics

NeighbourNet emerged as a custodian of insights in WhatsApp chat analysis, unraveling the intricate tapestry of human interaction dynamics. Through meticulous text data preprocessing and machine learning techniques, NeighbourNet translated raw chat transcripts into vibrant visualizations. Monthly timelines, daily cadences, and word clouds provided illuminating insights into user engagement trends, offering stakeholders actionable intelligence for communication strategy refinement. Beyond the digital realm, these revelations provide a deeper understanding of community dynamics, fostering meaningful engagement and collaboration.

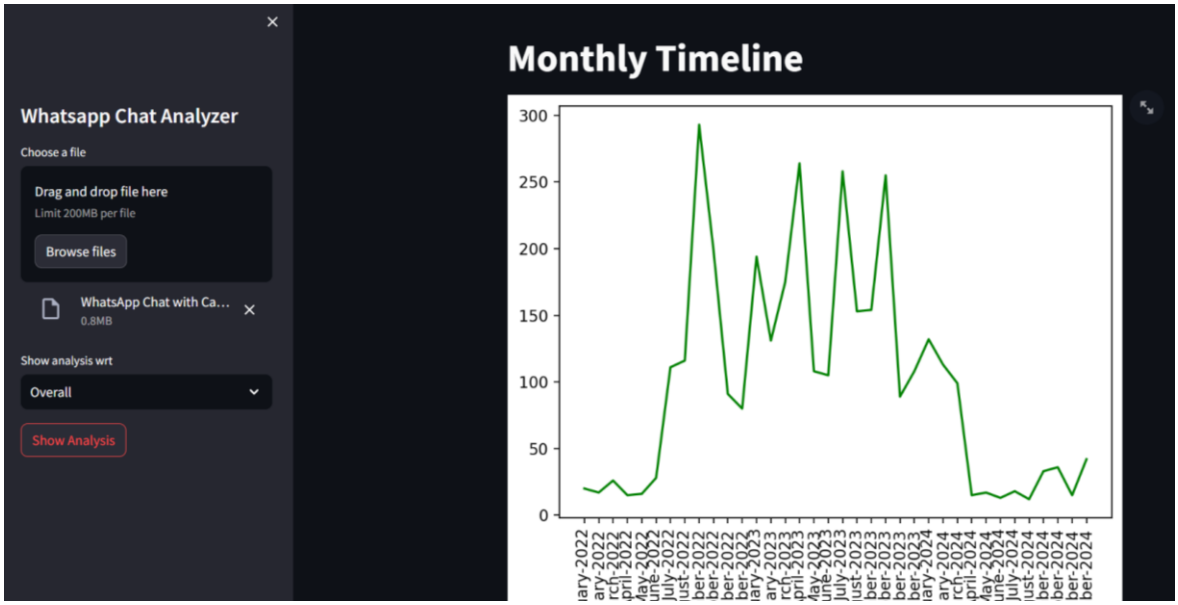

Figure 8.2.1: WhatsApp Chat Analysis (Monthly Timeline Graph)

The image presents a monthly timeline graph of the user's WhatsApp chat, revealing communication patterns with clarity. This visualization enables a deeper understanding of user engagement, facilitating informed decision-making and interventions as needed.

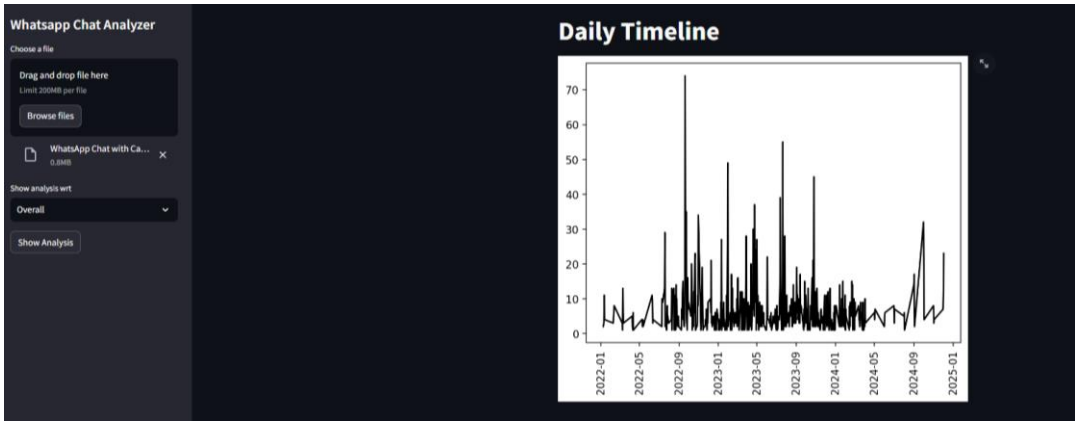

Figure 8.2.2: WhatsApp Chat Analysis (Daily Timeline Graph)

The image features a daily timeline graph showing WhatsApp chat activity, revealing peak communication times and interaction frequency. This detailed visualization aids in understanding user behavior and optimizing communication strategies. It helps identify opportunities for increased engagement or intervention as necessary.

3. Chatbot Using LLAMA 2: Empowering User Interaction

NeighbourNet's chatbot, fortified by LLAMA 2's sophisticated capabilities, epitomized conversational finesse and intuitive understanding. Trained on extensive dialogue datasets, the chatbot transcended mere response generation to embody empathetic communication. Equipped with AI and NLP technologies, it engaged users seamlessly, offering personalized solutions and evolving iteratively. Each interaction enhanced its ability to decipher human nuances, fostering a symbiotic relationship between users and technology, and promoting community cohesion.

4. Overall Performance and Impact

The comprehensive evaluation of NeighbourNet's performance metrics underscores its transformative potential. Beyond mere technological advancement, NeighbourNet serves as a catalyst for community empowerment and interconnectedness. The mosaic of results paints a compelling picture of profound impact, transcending traditional service delivery models. By harnessing the power of genetic algorithms, machine learning, and AI-driven chatbots, NeighbourNet not only streamlines processes but also fosters community resilience and progress.

This chapter serves as a testament to NeighbourNet's capacity to shape a future where community empowerment is paramount. As NeighbourNet continues to evolve, its impact will be measured not merely in metrics but in lives transformed and communities uplifted, heralding a more inclusive and interconnected world.

Chapter 9

Conclusion

In conclusion, NeighbourNet emerges as a beacon of innovation and progress in the realm of community community. Through its multifaceted features, including Citizen Feedback Analysis Implementation, WhatsApp Chat Analysis, Service Routing Optimization Implementation, and ChatBot using Machine Learning Implementation, NeighbourNet redefines the landscape of citizen-government interactions.

By harnessing the power of machine learning and data analytics, NeighbourNet facilitates transparency, efficiency, and inclusivity in the delivery of community services. It empowers communities to listen to the voices of their citizens, detect and prevent fraudulent activities, optimize resource allocation, and engage with citizens in a more personalized and responsive manner.

Moreover, NeighbourNet democratizes access to community services, ensuring that all citizens, regardless of their background or technical proficiency, can engage with governmental agencies effortlessly. Its continuous learning and adaptation mechanisms ensure that it remains relevant and effective in addressing the evolving needs and challenges of modern societies.

In essence, NeighbourNet represents a transformative tool that not only enhances the efficiency of community but also fosters stronger connections between communities and the communities they serve. As we navigate the complexities of the digital age, NeighbourNet stands as a testament to the potential of technology to drive positive change and empower citizens to actively participate in shaping their communities.

Chapter 10

Future Scope

NeighbourNet, a trailblazer in community service accessibility, stands at the precipice of a future characterized by innovation and transformative impact. As it continues to evolve, NeighbourNet is poised to explore various avenues for growth and development, each presenting unique opportunities to further its mission of making essential services accessible to all. Enhanced Service Accessibility: NeighbourNet's commitment to inclusivity drives efforts to refine its user interface and functionality, ensuring seamless access to essential services for users of all abilities. By implementing tailored features and adhering to accessibility standards, NeighbourNet strives to create an environment where every individual can navigate the platform with ease and confidence. Expansion of Service Offerings: In its pursuit of comprehensive community support, NeighbourNet envisions diversifying into new service verticals such as healthcare, education, and social welfare. This expansion, coupled with geographical outreach initiatives, will enable NeighbourNet to extend its reach and impact, addressing a broader spectrum of community needs and fostering greater engagement among users. Integration of Emerging Technologies: NeighbourNet remains at the forefront of technological innovation, leveraging emerging technologies such as artificial intelligence (AI), blockchain, and the Internet of Things (IoT) to enhance service delivery and user experience. By incorporating AI-powered chatbots for real-time assistance and implementing blockchain technology for transparent transactions, NeighbourNet remains committed to staying ahead of the curve and delivering cutting-edge solutions to its users.

Data-Driven Insights and Analytics: Harnessing the power of advanced analytics and machine learning algorithms, NeighbourNet seeks to derive valuable insights into user behavior, community needs, and service utilization patterns. Armed with this knowledge, NeighbourNet can tailor its service offerings more effectively, identify areas for improvement, and proactively address emerging challenges and opportunities, thereby maximizing its impact and relevance within communities. Community Engagement and Collaboration: At the heart of NeighbourNet's vision lies the belief in the power of community engagement and collaboration. Through the development of interactive features and collaborative tools, NeighbourNet aims to facilitate meaningful connections

among users, enabling them to share resources, collaborate on community projects, and drive positive change at the grassroots level.

Additionally, partnerships with governments, non-profit organizations, and other stakeholders will amplify NeighbourNet's reach and effectiveness, paving the way for more holistic and sustainable solutions to community challenges. In conclusion, NeighbourNet's future is brimming with promise, fueled by a steadfast commitment to innovation, inclusivity, and social impact. By embracing emerging technologies, expanding its service offerings, and fostering collaboration within communities, NeighbourNet is poised to redefine the landscape of community service accessibility, ushering in a future where access to essential services is equitable, empowering, and truly transformative for all.

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