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Voice Based Billing System

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Abstract: *Many small and local shopkeepers still rely on manual billing methods, which often lead to mistakes, delays, and a lot of extra effort during busy hours. This project introduces a voice-based billing system aimed at solving this everyday problem by making the billing process faster, easier, and more accurate. Using speech recognition technology and built with Flutter, the system allows shopkeepers to create bills by simply speaking item names, quantities, and prices. The spoken inputs are quickly processed into a digital invoice, reducing the need for typing or using complex billing software. This not only saves time but also helps those with limited technical experience or literacy. The system is designed to be simple, affordable, and practical for real-world use, especially in small shops and local markets. Through this approach, we aim to support small business owners in adopting digital tools that can improve their workflow without adding complexity.*

Keywords: Voice Based Billing System, Voice Billing, NLP, Paperless billing

I. INTRODUCTION

In many small shops and local markets, billing is still done manually using notebooks or basic calculators. While this traditional method may seem simple, it often results in slow service, calculation mistakes, and difficulties in maintaining accurate records—especially during peak hours. Many shopkeepers hesitate to switch to modern billing software or point-of-sale (POS) systems due to high costs, complex interfaces, language barriers, or a general lack of technical expertise.

To address these challenges and support local business owners, we propose a Voice-Based Billing System— a mobile application that simplifies the billing process using voice commands. This solution allows shopkeepers to generate bills by simply speaking the item name, quantity, and price, eliminating the need for typing or touch-based interaction. The app is built with user-friendliness in mind and includes features like voice-activated product entry, multilingual support (e.g., Hindi or Marathi), and voice-based product lookup. By streamlining billing through intuitive voice interaction, the system saves time, reduces errors, and helps shopkeepers deliver faster, more efficient service—all while promoting digital adoption in an accessible and cost-effective way.

II. LITERATURE REVIEW

Title: **Multilingual Voice-Activated Billing System**, Author: H. Kumar, 2023 Abstract: This research highlights a multilingual voice-activated billing system, designed to cater to users who speak different languages. It focuses on improving user accessibility in non-English speaking regions by allowing them to perform billing tasks through speech in their native language. Although the system is effective inmultilingual settings, it requires significant computational resources to maintain accuracy across different languages.

Title: **Speech Recognition Technology in Retail Systems**, Author: S. K. Gupta, 2022 Abstract: This study examines the application of speech recognition technology in retail billing systems to create accessible solutions for people with disabilities. The system allows users to add items to the cart and process bills using voice commands. It emphasizes the importance of multilingual support and adaptability in diverse retail environments. One challenge noted is the need for extensive training data to improve system accuracy in recognizing varied accents and dialects.

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Title: **Natural Language Processing in Voice-Based Billing Systems**, Author: M. Joshi, 2022 Abstract: M. Joshi's research utilizes natural language processing to improve the user interface of voice-based billing systems. The study explores how NLP enhances the system's ability to understand diverse commands and user queries. While it offers robust solutions for voice interaction, it faces limitations in processing more complex language inputs.

Title: **Smart Voice-Driven Invoicing for Retail Stores**, Author: N. Gupta, 2022 Abstract: N. Gupta introduces a smart voice-driven invoicing system aimed at simplifying the billing process in retail environments. The system allows users to input products and process invoices through voice commands. It includes a hybrid architecture combining cloud-based and local databases to ensure quick access to product information and seamless billing, but the system's effectiveness is affected by internet connectivity in some cases.

Title: **Voice-Assisted Shopping and Billing System for Disabled Persons**, Author: A. Banerjee, 2021 Abstract: This paper discusses a voice-assisted system designed for retail shopping and billing, enabling disabled users to interact with a store's inventory and billing system through voice commands. The system includes features such as product search, price retrieval, and invoice generation, all controlled by speech. While it demonstrates significant potential for improving accessibility, it faces limitations in handling complex shopping scenarios or large inventories.

Title: **Voice-Enabled Point of Sale for Small Retail Stores**, Author: P. Sharma, 2021 Abstract: This research focuses on a voice-enabled POS system tailored for small retail stores. It allows users to interact with the system through voice commands, helping disabled store owners and customers alike. The study points out that while the system improves accessibility, its functionality can be limited by the complexity of the store's inventory and the clarity of voice commands.

III. PROPOSED METHODOLOGY

The development of the Voice-Based Billing System follows a systematic and user-centered methodology focused on enhancing the accessibility and independence of users, particularly for individuals with disabilities. The process begins with understanding the unique challenges faced by these users and identifying features that would significantly streamline their billing experience.

Project Initiation

- **Problem Statement Definition**: Clearly define the problem of traditional billing methods and the limitations they pose for disabled individuals, emphasizing the need for an inclusive voice-based application.
- **Objective Setting**: Establish clear objectives to develop a mobile application that supports voice commands for adding products, generating invoices, and confirming transactions.

Requirements Gathering

- **User Research and Interviews:** Conduct interviews with potential users, including disabled individuals and small business owners, to gather insights on their specific needs and preferences.
- **Feature Specification:** Based on user feedback, outline essential features, such as voice command recognition, product search, invoice creation, multi-language support, and offline functionality.

Design and Prototyping

- **User-Centric Design**: Prioritize accessibility and ease of use in the app's design, ensuring that navigation and interactions are intuitive for all users.
- **Prototyping:** Create prototypes of the user interface to visualize key functionalities and gather user feedback. Iterative design improvements will be made based on this feedback.

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Development

- **Technology Selection**: Choose appropriate technologies and frameworks for mobile application development, including Kotlin for the Android platform.

Algorithm Implementation:

- **Voice Command Recognition:** Implement speech-to-text functionality using Speech-to-Text API.
- **Product Identification**: Use SQL queries to retrieve product information from a local SQLite database.

User Input and Interaction

- Voice Command Reception: Start the interaction by capturing voice commands from users to add products or query information.
- Image Capture (if applicable): Integrate functionality to capture images of products using the device's camera for visual recognition (if needed).

Processing and Feedback

- **Product Recognition**: Process the user's voice input and search the local database for matching products, confirming details through text-to-speech responses.
- **Invoice Creation**: Automatically create an invoice based on the products added, providing users with a real-time total.

Output Presentation

- **Voice Feedback:** Deliver results and confirmations through voice output, ensuring users understand the current state of their billing.
- **Text Output**: Provide a summary of the invoice in text format for reference.

Testing and Iteration

- **User Testing:** Conduct usability testing with target users to identify areas for improvement.
- **Feedback Loop**: Gather feedback and iterate on the design and functionality to enhance the overall user experience.

Deployment and Support

- **Launch:** Deploy the application on relevant platforms (e.g., Google Play Store).
- **Ongoing Support:** Establish a plan for user support and regular updates based on user feedback and technological advancements.

System flowchart

This flow chart represents the working of our **Voice-Based Billing System**, which is designed to make the process of generating invoices quicker and easier using voice commands. It all begins when the user logs into the system. After logging in, they are taken to the invoice screen where they can speak the item details instead of typing them. The system then converts this voice input into text using speech-to-text technology.

Once the data is captured, it goes through a processing stage and is saved in the database. The system then calculates the total price based on the entered items. After calculating the total, it continues to process the information and automatically generates a bill. The final steps involve updating the system records with the new billing information, ensuring everything is stored properly for future reference. The process ends once all tasks are completed.

This flow ensures that the billing task is done efficiently, with minimal manual effort, and provides a smoother user experience by reducing the time spent on traditional data entry.

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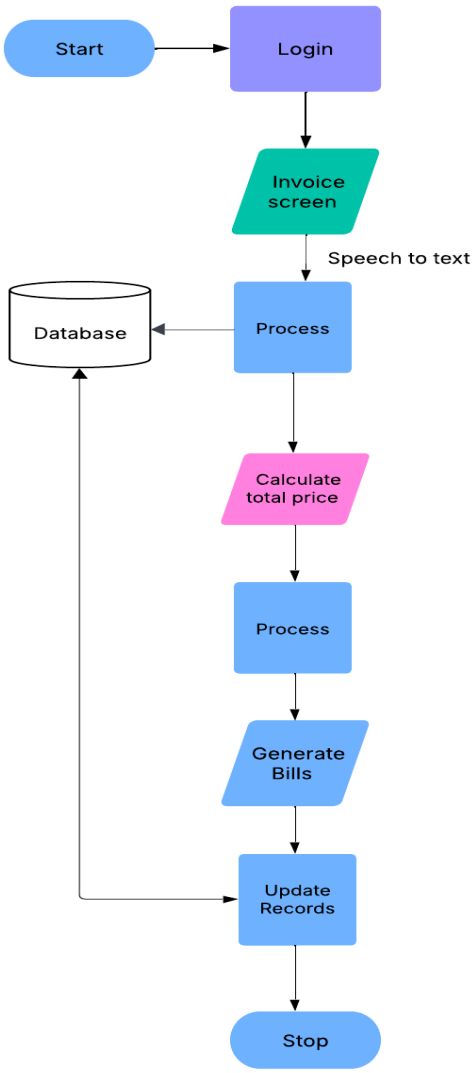

Figure 1: System flowchart

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IV. IMPLEMENTATION

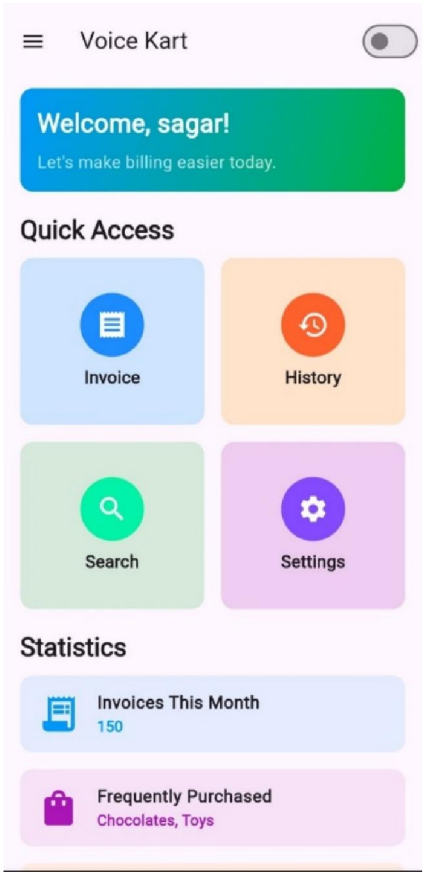

Figure 2: System design

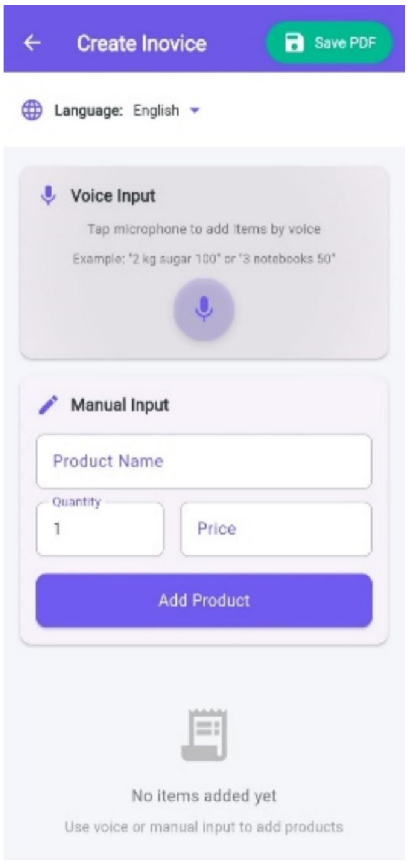

Figure 3: Invoice

Voice based billing system design to improve billing system and reduce paper work and make process fast and record every sell data. The system consists of two major sections as

1. Quick access and
2. Statistics.

In Invoice section users can see the invoice bill which they generated by adding all final items or we can say products which they want to buy.

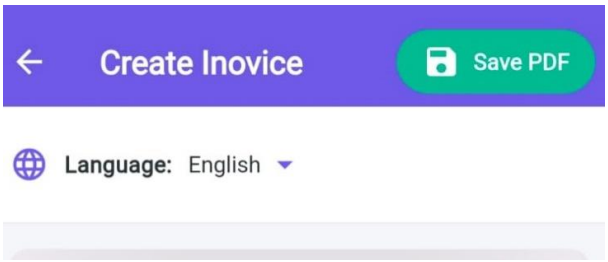

Figure 4: Save PDF

With save pdf function we can save invoice as pdf.

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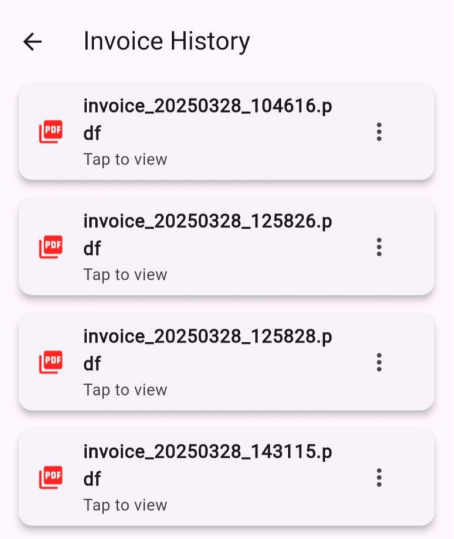

Figure 5: History

in this section users can see the previous records of invoices which they have made.

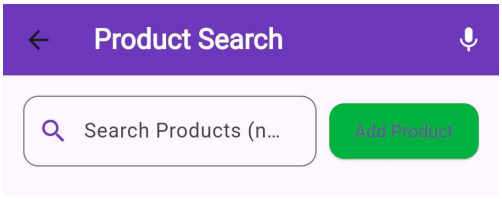

Figure 6: Product Search

in this section users can search items and their price they mentioned manually by typing what they wants to add in bill. Tey can add items which already saved in database

Figure 7: Settings

In this section users able to change settings as they wants like if they wants to use app in other language. Also, if they wants give inputs in other language.

Figure 8: Statistics

In this section the tasks options available to do for users such as given.

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i. Invoices This Month

in this section of app the users can check that actually how many invoice bills they have generated in a month . By this they can do know about their sells data accurately .

ii. Frequently Purchased

in this section users can know about what are the products they sell most time .also can know about the products that they purchased by customers most of time.as a advantage users can manage their inventory

V. FUTURE SCOPE

While the current focus of the app is on enabling voice-based billing for small supermarkets, particularly to support disabled individuals, several future enhancements could significantly broaden its functionality and improve user experience. Incorporating AI-powered voice recognition can enhance accuracy in noisy environments and accommodate diverse accents, ensuring smoother interactions for a wider range of users. The integration of payment gateways such as UPI, PayPal, Stripe, or Google Pay would enable seamless, voice-activated transactions, further streamlining the checkout process. Expanding the system to include inventory management would allow automatic stock updates, low-stock alerts, and automated reordering, enhancing operational efficiency. Integration with accounting software like Tally or QuickBooks could simplify financial reporting and bookkeeping for store owners. Additionally, the inclusion of data analytics and reporting tools would provide valuable insights into sales trends, customer behavior, and product performance, empowering business owners to make informed, data-driven decisions.

VI. CONCLUSION

In conclusion, the Voice-Based Billing System represents a significant step toward enhancing accessibility and independence for visually impaired individuals, particularly in small supermarket settings. By leveraging voice recognition, text-to-speech, and image processing technologies, the system enables usersto interact with the billing process through voice commands, making it more intuitive and inclusive. The integration of native language support and a hybrid local and cloud storage model ensures both efficiency and reliability, allowing users to access the system offline while maintaining data synchronization.

The Agile development methodology provides the flexibility to iteratively improve the system based on user feedback, ensuring that it remains adaptable and aligned with real-world needs. Ultimately, this project not only addresses the functional requirements of a billing system but also promotes inclusivity and empowers disabled individuals, allowing them to enjoy a more independent and seamless shopping experience. The Voice-Based Billing System is a practical, scalable solution that can be extended to other markets and use cases, showcasing the potential of technology to foster greater accessibility.

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