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# **Voice Based Restaurant Billing System**

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Abstract: In today's fast-paced restaurant industry, efficiency and accuracy are paramount. Traditional Point of Sale (POS) systems, while foundational, are increasingly being outpaced by the demands of modern operations and customer expectations. Manual data entry in these systems often leads to delays, errors, and increased training times for staff, which in turn affects service quality and customer satisfaction. This project addresses these challenges by developing a voice-enabled POS system that utilizes advanced speech-to-text technology to transform the way restaurants manage orders, inventory, and payments. The proposed system leverages Google Cloud's Speech-to-Text API to facilitate seamless voice interactions, enabling restaurant staff to place orders, check inventory, and process payments using simple voice commands. This innovation aims to significantly reduce the time spent on data entry and minimize the potential for human error, thereby improving operational efficiency and enhancing the overall customer experience. By automating and streamlining these processes, the system allows staff to focus more on customer service and less on administrative tasks. The voiceenabled POS system integrates several key features: a robust order management module to handle all aspects of order processing, a dynamic inventory management system that updates in real-time, and a versatile payment processing system that supports multiple payment methods. The user interface is designed to be intuitive and user-friendly, ensuring that staff can quickly adapt to the new system with minimal training. Additionally, the system includes comprehensive reporting and analytics tools that provide valuable insights into sales trends, inventory levels, and customer preferences

Keywords: Voice-enabled POS, Speech-to-Text technology ,Order management, Payment processing, Real-time updates, Google Cloud Speech-to-Text API

### **I. INTRODUCTION**

In the rapidly evolving world of technology, the restaurant industry is continually seeking innovative ways to enhance operational efficiency and improve customer service. One significant technological advancement in this realm is the integration of voice technology into Point of Sale (POS) systems. Traditional POS systems, which rely heavily on manual input, can be both time- consuming and prone to errors, particularly during peak hours. This project aims to transform a conventional POS system into a voice- enabled application, utilizing modern speech-to-text capabilities to streamline restaurant operations and enhance service quality.

The need for efficiency and accuracy in order processing has never been more critical, as restaurants strive to meet the high expectations of their customers while managing their resources effectively. Voice recognition technology, once a futuristic concept, has now become accessible and highly reliable, making it an ideal solution for modernizing restaurant operations. By enabling staff to interact with the POS system using voice commands, we can significantly reduce the time required for order entry, minimize errors, and create a more engaging and efficient working environme

### **II. LITERATURE REVIEW**

1. PAPER NAME:-Traditional Billing Systems

\* YEAR::- 2015

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<sup>\*</sup> AUTHOR NAME:- Goyal, A. et al.



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\* SUMMARY::- limitations of barcode-based billing systems and highlighted the need for automation to reduce operational costs and improve efficiency.

2. PAPER NAME:- RFID-based Billing Systems

- \* AUTHOR NAME:- Kumar, R. et al.
- \* YEAR:2017

\* SUMMARY::- RFID-based billing system integrated with a central database. The system demonstrated a significant reduction in billing time and enhanced inventory management.

3. PAPER NAME:-IoT-enabled Smart Shopping Carts

\* AUTHOR NAME:- Patil, S. et al.

\* YEAR:2019

\* SUMMARY: smart cart prototype using IoT and RFID technology, showcasing a 30 percent reduction in checkout time compared to traditional systems.

4. PAPER NAME:- Computer Vision-based Billing Systems

\* AUTHOR NAME:- Zhang, Y. et al.

\* YEAR:2021

\* SUMMARY: a computer vision-based billing system using convolutional neural networks (CNNs). The system achieved an accuracy of 95 Percent in identifying products from a dataset of 1,000 unique items.

5. PAPER NAME:- Self-checkout Systems

\* AUTHOR NAME:-Singh, D. et al.

\* YEAR:2020

\* SUMMARY: implementation of self-checkout systems in grocery stores. The study reported a 20 percent increase in customer throughput and highlighted the

importance of user interface design in adoption rates.

### III. PROPOSED SYSTEM

### 1. Introduction

The proposed system is a voice-enabled restaurant billing POS (Point of Sale) system designed to streamline restaurant operations by integrating advanced speech recognition technology. This system aims to address the inefficiencies and challenges associated with traditional POS systems, enhancing the overall operational efficiency and customer experience.

### 2. System Objectives

• Enhance Operational Efficiency: Reduce the time and effort required for order processing, inventory management, and payment handling through voice commands.

• Minimize Human Errors: Use voice recognition to decrease the likelihood of errors in order taking and billing.

• Improve Customer Service: Allow staff to focus more on customer interaction and service rather than administrative tasks.

• Promote Contactless Interaction: Facilitate a safer, hygienic restaurant environment by minimizing physical contact with POS devices.

### III. SYSTEM FEATURES

### 3.1 Voice Command Interface

• Speech-to-Text Integration: Use Google Cloud Speech-to-Text API to convert voice commands into text, enabling hands-free interaction.

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• Natural Language Processing (NLP): Interpret voice commands to understand user intent and execute the appropriate actions.

### 3.2 Order Management

- Order Entry and Modification: Enable staff to place and modify orders using voice commands.
- Real-Time Order Tracking: Provide real-time updates on order status, ensuring efficient kitchen operations and timely service.
- Order Confirmation: Automatically confirm orders and display them on the POS screen for verification.



Figure 1. System Architecture

### IV. SCOPE

The scope of the voice-enabled restaurant billing POS system encompasses the entire range of functionalities, features, and processes necessary to streamline restaurant operations and enhance customer experience through advanced voice recognition technology. This section outlines the specific areas the project will cover, ensuring clarity on what the system aims to achieve and the boundaries within which it will operate.

### 1. Functional Scope

The functional scope defines the primary features and capabilities of the system:

• Voice Command Interface: Development of an intuitive voice command interface that allows restaurant staff to perform tasks such as order taking, inventory checking, and payment processing using voice commands. The system will leverage Google Cloud's Speech-to-Text API for accurate voice recognition and processing.

• Order Management: Implementation of a comprehensive order management module that facilitates order entry, modification, and tracking. The system will ensure real-time updates on order status and provide a seamless interaction between the front-end staff and the kitchen.

• Inventory Management: Creation of an inventory management system that tracks inventory levels in real-time, updates stock based on order processing, and alerts staff when inventory levels are low. This feature aims to reduce stockouts and overstock situations.

• Payment Processing: Development of a versatile payment processing module that supports various payment methods, including cash, credit/debit cards, and digital wallets. The system will generate detailed receipts for each transaction and ensure secure payment processing.





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### V. MODULE

#### 1. User Registration and Authentication

- Sign up / Login
- Password reset with accessible prompts
- Two-factor authentication with voice/SMS options

### 2. Menu Browsing

- Text-to-speech integration for reading menu items aloud
- Category filters (e.g., Veg, Non-Veg, Drinks)
- Voice command support to browse through menu (e.g., "Read next item")

### 3. Order Placement

- Accessible item selection (via keyboard or voice)
- Quantity selection through voice or number input
- Add to cart / Remove from cart functions

### 4. Cart and Checkout

- Accessible review of selected items (read aloud)
- Voice-guided checkout process

### 5. Payment Integration

- Support for accessible payment gateways
- Audio feedback for success/failure
- Secure voice-enabled payment options (e.g., Google Pay, Apple Pay)

### 6. Billing and Invoice

- Generate accessible digital invoices (screen reader compatible PDFs or voice-read summary)
- Option to receive invoice via email/SMS

### 7. Order Tracking

- Real-time voice updates on order status
- Optional integration with haptic feedback devices for delivery updates

### 8. Admin Panel (Restaurant Side)

- Manage menu, pricing, and categories
- View orders and process them

#### VI. RESULT





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### VII. CONCLUSION

The development of a voice-enabled restaurant billing POS system represents a significant advancement in restaurant management technology. By leveraging cutting-edge speech recognition and natural language processing capabilities, this system aims to streamline operations, reduce errors, and enhance the overall efficiency and customer experience in restaurant environments.

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