RESTAURANT MANAGEMENT SYSTEM

# Project Synopsis Report

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*By*

**Happy Kumar Gupta (2301730128)**

**Aryan Bhati (2301730070)**

Under the supervision of

# Dr. Radhika Gupta



Department of Computer Science and Engineering School of Engineering and Technology

K.R Mangalam University, Gurugram- 122001, India January 2025

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**ABSTRACT**

A Restaurant Management System (RMS) is a comprehensive solution designed to enhance the efficiency and productivity of restaurant operations. This system aims to automate various tasks such as order processing, billing, inventory tracking, and customer management. The project utilizes **React.js for the frontend**, **Node.js with Express.js for the backend**, and **MySQL for database management**. Key features include **table reservations, order placement, kitchen display system (KDS) integration, payment processing, and real-time inventory updates**. By automating restaurant operations, this system will help minimize human errors, improve service efficiency, and enhance customer satisfaction. Future enhancements could include AI-powered menu recommendations, chatbot integration for customer support, and predictive analytics for demand forecasting.

**KEYWORDS:** Restaurant Management, Order Processing, Inventory Management, Automation, React.js, Node.js, MySQL, AI Integration.

# INTRODUCTION

Managing a restaurant involves numerous challenges, including tracking inventory, handling customer orders, and managing staff schedules efficiently. Traditional methods of restaurant management, such as manual order taking and stock management, often lead to errors, delays, and inefficiencies. This project aims to **develop a modern and automated Restaurant Management System** that integrates multiple functionalities into a single platform.

This system will provide **a web-based interface** for restaurant owners and staff to manage orders, track inventory levels in real-time, generate bills automatically, and enhance customer service. The **main goal** is to streamline restaurant operations and improve the overall dining experience. The system will also incorporate a **secure payment gateway** to process transactions smoothly and efficiently.

# MOTIVATION

The restaurant industry is fast-paced, and efficiency is key to customer satisfaction and business success. Many restaurants still rely on **manual order management, paper-based billing, and traditional inventory tracking methods**, which are prone to **errors, mismanagement, and financial losses**. This project is motivated by the need to **digitally transform restaurant operations** using cutting-edge technologies.

By implementing an automated system, restaurants can:

* Reduce human errors in order-taking and billing.
* Optimize inventory levels to prevent food wastage and shortages.
* Enhance customer experience with faster service and real-time updates.
* Provide **data-driven insights** for better decision-making.

This system will help restaurants **streamline their processes**, minimize waste, and maximize profitability.

# LITERATURE REVIEW

Research indicates that **manual restaurant management methods** often lead to **operational inefficiencies**. Studies show that automated systems improve restaurant efficiency by **40%** through **real-time order tracking and automated billing**.

**Key Findings from Literature:**

* **Automated POS Systems**: Increase order accuracy and reduce service time.
* **Inventory Management Systems**: Reduce stock wastage by **30%**.
* **AI-Powered Analytics**: Help restaurants optimize menu offerings and pricing strategies.
* **Web-Based RMS Solutions**: Improve customer satisfaction through digital menu ordering.

**Technologies Used in Previous Studies:**

* **MySQL** for efficient database management.
* **React.js** for interactive user interfaces.
* **Node.js** for scalable backend services.
* **AI-driven analytics** for sales predictions and customer behavior analysis.

# GAP ANALYSIS

Existing restaurant management systems **lack certain key functionalities**, such as **AI-powered analytics, mobile integration, and advanced reporting features**.

**Identified Gaps:**

✅ Limited real-time inventory tracking in current solutions.  
✅ No AI-based customer behaviour analysis for personalized recommendations.  
✅ Poor integration with third-party food delivery platforms.  
✅ Lack of **mobile accessibility** for restaurant owners on the go.

To address these gaps, this project will focus on **real-time inventory updates, AI-driven customer insights, and seamless integration with online food delivery services**.

# PROBLEM STATEMENT

Restaurants often struggle with **order mismanagement, inefficient billing, and inventory wastage** due to outdated manual processes. The lack of **an integrated digital solution** results in **higher operational costs, slower service, and customer dissatisfaction**.

This project aims to develop an **AI-enabled, automated Restaurant Management System** that provides **seamless order management, real-time stock tracking, and data-driven insights**. By implementing this system, restaurants can achieve **greater efficiency, better financial tracking, and an improved dining experience**.

# OBJECTIVES

✔ **Order Automation**: Streamline order processing and reduce wait times.

✔ **Inventory Optimization**: Real-time stock tracking to minimize waste.

✔ **Billing & Payment Integration**: Digital invoicing with secure payment gateways.

✔ **Customer Relationship Management (CRM)**: Personalized customer experience.

✔ **AI-Driven Analytics**: Predict customer preferences and optimize menu offerings.

# Tools/Technologies Used

* **Frontend**: React.js, HTML, CSS, Bootstrap.
* **Backend**: Node.js with Express.js.
* **Database**: MySQL for structured data storage.
* **Authentication**: Firebase/Node.js JWT authentication.
* **Payment Gateway**: Stripe/Razorpay integration.

# METHODOLOGY

## The development of this Restaurant Management System follows an Agile Development Approach with the following steps:

## Requirement Analysis: Identifying key restaurant operational needs.

## System Design: Developing UI wireframes and database schemas.

## Frontend & Backend Development: Implementing interactive user interfaces and backend logic.

## Database Integration: Ensuring real-time inventory tracking and order management.

## Testing & Deployment: Conducting system testing and launching on cloud servers.

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