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A Review of a Smart Cooking Recommendation System Based on LPG Consumption, Cooking Time and Utensil Usage Analysis

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ABSTRACT

The "Smart Cooking Recommendation System Based on LPG Consumption" is a data-oriented framework designed to provide personalized cooking optimization suggestions to domestic consumers. The system gathers user information such as daily LPG usage, cooking duration, cookware category, flame intensity, and cooking frequency to generate customized recommendations for efficient gas utilization. By employing ML-based models, it analyses consumption patterns and cooking behaviour to forecast future gas demand and suggest optimal cooking practices. The platform aims to reduce fuel wastage and enhance fuel efficiency by recommending appropriate utensils and improved cooking techniques based on user habits. While most existing LPG systems primarily focus on gas level monitoring and leak detection, the proposed model emphasizes prediction and recommendation mechanisms to transform traditional monitoring systems into AI-enabled decision-support platforms for smart kitchens.

Keywords: - Recommendation System, AI, LPG Consumption, Machine Learning, Cooking Optimization, Energy Efficiency, IoT

1. INTRODUCTION

Managing household LPG consumption can be difficult, especially with increasing fuel costs and increasing daily cooking needs. Numerous households lack awareness of how their meal preparation patterns, cookware selection, and flame usage directly impact gas consumption. "Smart Cooking Recommendation System Based on LPG Consumption, Cooking Time, and Utensil Usage Analysis" is a data-driven framework designed to help households optimize gas utilization. It provides personalized recommendations based on a user's cooking behavior, time spent preparing meals, and utensils used.

The platform collects essential data like daily fuel consumption, cooking duration, cooking frequency, and the type of cookware used. Based on this collected data, it analyzes consumption behavior and predicts future gas usage patterns. Furthermore, it suggests improved cooking methods, suitable cookware options, and enhanced cooking techniques to reduce fuel wastage.

Unlike existing LPG supervision systems that only detect gas levels or leakage identification, this system focuses on intelligent prediction and recommendation. By using ML-based algorithms, the proposed system aims to support energy-efficient cooking and promote responsible gas utilization in modern households.

1.1 Literature survey

An evaluation of current LPG monitoring systems reveals several shortcomings in existing approaches. Most conventional systems focus on detecting gas levels and identifying leakages, offering basic alerts such as low-gas notifications or refill reminders. However, they do not incorporate Artificial Intelligence (AI) or Machine Learning (ML) methods for in-depth analysis, usage evaluation, or predictive forecasting. Consequently, these systems are unable to deliver personalized recommendations or reliably estimate future LPG consumption, which limits efficient fuel management.

1.2 Limitations of Existing Systems

1. Limited to basic gas level monitoring and leakage identification.
2. Provide only simple alerts such as low-fuel alerts or refill reminders.
3. Lack integration of Machine Learning (ML) and Artificial Intelligence (AI) techniques.
4. Fail to examine user cooking methods or usage patterns.
5. No predictive modelling for future LPG consumption.

6. Lack of personalized recommendation mechanisms for efficient gas utilization.

2. PROPOSED SYSTEM

The Smart Cooking Recommendation System enhances LPG usage by making it more personalized and efficient. Rather than sending the same basic notifications to all users, it studies individual cooking behaviours, including typical gas consumption, cooking time, type of cookware used, flame level, and cooking frequency. Based on this analysis, the system delivers recommendations that align with each user's specific cooking habits. The system analyses these factors to provide practical suggestions that help reduce fuel wastage and improve overall efficiency. It recommends suitable utensils, proper control of burner intensity, and better cooking methods. These features help households use LPG more efficiently and sustainably.

2.1 Research methodology

The designed system focuses on analysing and reviewing ML-powered cooking recommendation platforms based on LPG usage patterns, cooking duration, and utensil usage analysis. The framework comprises two main components:

- Consumption Monitoring Module
- Recommendation Module

To access the system, the user must first create an account. After completing the registration process, users can monitor fuel consumption and receive personalized cooking recommendations. The system continuously tracks cooking-related parameters and generates suggestions based on the given data.

2.2 System module

a) Login Activity

Login is the process by which a registered user accesses the smart cooking system.
The user must enter: Username (Email ID) and Password
After successful authentication, the user is redirected to the dashboard, where LPG consumption data, cooking time statistics, and recommendation options are displayed.

b) Registration Activity

Registration is required for first-time users to access the system.
The user must provide the following credentials:
Full Name, Date of Registration, Number of Family Members, Average Daily Cooking Frequency, Type of Kitchen (Domestic / Commercial), Valid Email Address, Password
These details help generate personalized cooking recommendations and maintain user-specific LPG consumption information.

c) LPG Consumption Tracking

The tracking module monitors and records the following parameters:
Current LPG cylinder weight (using Load Cell sensor), Daily LPG consumption, Monthly LPG usage trends, cooking duration (using timer module), Peak cooking hours
All collected data is stored in the system database or cloud platform. The system displays graphical representations of LPG usage patterns to help users understand their consumption behavior.

d) Generate Smart Recommendation

Personalized cooking recommendations are generated based on both user inputs and system-collected data.
User Inputs include: Type of utensil used (Pressure Cooker / Open Pan / Thick-Bottom Vessel) , Type of cooking method (Boiling / Frying / Simmering), Number of meals prepared per day,
System-Collected Parameters include: LPG consumption rate, Cooking time duration, Historical usage patterns, Cylinder refill prediction,
Based on the analysis, the system provides: Suggestions to reduce LPG consumption, Alerts for excessive cooking time, Recommendation of energy-efficient utensils, Optimized cooking duration suggestions, Predicted LPG refill date

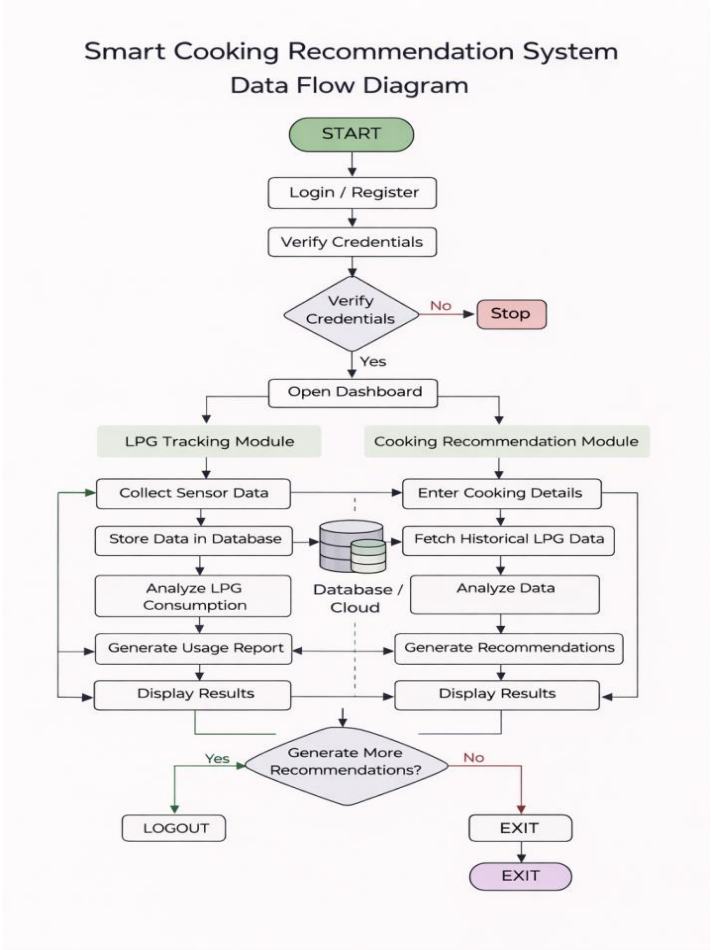

Fig: Data-flow diagram of a system

3. CONCLUSION

This research provides a detailed review of smart cooking recommendation systems that utilize LPG consumption data, cooking time, and utensil usage analysis. Traditional LPG monitoring systems primarily focus on detecting gas leaks and managing refill alerts, while giving little attention to optimizing cooking practices or improving energy efficiency. However, efficient LPG management requires not only safety monitoring but also intelligent evaluation of everyday usage patterns.

The proposed smart cooking framework emphasizes the integration of LPG consumption tracking, cooking duration measurement, and utensil efficiency assessment within a unified intelligent platform. By examining both real-time and historical data, the system can generate personalized recommendations that help reduce gas wastage, optimize cooking time, and encourage energy-efficient utensil selection.

The research emphasized the significant role of user behavior analysis in improving energy management within households. Rather than providing general suggestions, the system delivers data-driven insights tailored to individual cooking habits. Functions such as LPG refill prediction, peak consumption detection, and optimized cooking strategies contribute to improved kitchen efficiency.

Although the system is still being enhanced, the current framework demonstrates strong potential to transform conventional LPG monitoring into an intelligent smart kitchen management solution. Future improvements may include the integration of advanced machine learning models for more precise consumption forecasting, real-time IoT-based automation, and mobile application support to enhance User-friendliness

Overall, this research contributes to the development of an efficient, environmentally responsible, and technology-driven approach to smart cooking and effective LPG management.

4.FUTURE ENHANCEMENT

The system can be further enhanced by:

• Integrating advanced Machine Learning models for improved prediction accuracy
• Incorporating IoT-enabled sensors for real-time flame and temperature monitoring

• Implementing cloud-based data storage
• Developing a mobile application with push notifications
• Adding gas leak detection and automatic valve control

These enhancements would transform the system into a fully automated and intelligent smart kitchen management solution.

5. REFERENCES

[1] J. Gupta, A. Patil, S. Rajgire, and T. Kadus, "Smart LPG Monitoring and Automatic Booking System using IoT," *International Journal of Engineering Research & Technology (IJERT)*, vol. 9, no. 4, pp. 404–406, 2020.

[2] A. D. Prabhu and A. D. Pathak, "Gas Leak Detector using Arduino UNO Microcontroller," *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, vol. 5, July 2017.

[3] R. R. Hiwase, P. K. Kewate, S. P. Tajane, and J. Waghmare, "Automatic LPG Cylinder Booking and Leakage Detection using Arduino UNO," *International Journal of Engineering Science and Computing (IJESC)*, 2016.

[4] S. Imade, P. Rajmane, A. Gavali, and V. N. Nayakwadi, "Gas Leakage Detection and Smart Alerting System using IoT," *International Journal of Innovative Research & Studies*, 2015.

[5] K. Keshamoni and S. Hemanth, "Smart Gas Level Monitoring, Booking and Gas Leakage Detection using IoT," *International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering*, 2017.

[6] R. C. Pandey, M. Verma, and L. K. S., "Internet of Things (IoT) Based Gas Leakage Monitoring and Alerting System with MQ-2 Sensor," *International Journal of Engineering Development and Research*, vol. 5, 2017.