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(57) Abstract :
The present invention relates to a comprehensive, predictive analytics system for modeling the lifecycle of restaurant businesses through dynamic classification into operational states: Entry, Stay, and Exit. The system comprises advanced machine learning algorithms to forecast business viability and market transitions, leveraging multimodal data, including structured metrics (ratings, pricing, votes), unstructured reviews, temporal patterns, and geospatial information. A spatial choice demand model and location equilibrium engine simulate competitive dynamics and consumer behavior, enabling location-specific decision support. Natural Language Processing (NLP) techniques extract sentiment-driven indicators from customer feedback, enhancing prediction accuracy and uncovering early signals of success or decline. Integrated explainability features, such as visual heatmaps, feature importance plots, and lifecycle transition diagrams, facilitate actionable insights for non-technical users. Real-time adaptability is achieved via cloud-based deployment, allowing continuous retraining from publicly available data sources. This invention offers a scalable, interpretable, and data-driven solution for stakeholders in the restaurant industry, urban planning, and investment analysis.

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