

Thesis Title Unveiling Patterns in the Night Market: A Machine Learning and Deep Learning Approach to Customer Analysis

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ABSTRACT

This research conducts an in-depth examination of consumer behavior and business strategy by thoroughly analyzing data from the night market at Mae Fah Luang University. The main goal is to categorize customers into distinct segments to reveal complex purchasing patterns and associations among bought items, thereby illuminating customer preferences and tendencies. Using machine learning techniques, specifically customer segmentation and market basket analysis, the study employs the K-means clustering to divide customers into five segments, with the optimal number determined through the elbow method and clustering validation metrics. Four association rules were derived between products using the Apriori algorithm, with the most robust rule indicating a relationship between street food and snacks and beverages for 50% of the customers. Furthermore, the study addresses the challenge of identifying food items packaged in plastic by implementing object detection techniques, achieving a mean Average Precision (mAP) of 99.4% for unpackaged items and 99.3% for packaged ones, with a combined model mAP of 84.4%. Among various algorithms such as FP-Growth and Eclat, the Apriori algorithm yielded the highest support value of 20% and a confidence level of 50%, resulting in eight association rules with an accuracy of 84% on a new dataset. These insights are crucial for businesses in the food industry, allowing them to tailor marketing strategies and product offerings to better meet the

consumer demands, thereby enhancing the understanding of consumer behavior and product associations in the food sector.

Keywords: Night Market, Customer Segmentation, Market Basket Analysis, Machine Learning, Deep Learning, CNN, YOLOv8

