# Pre-Proposal: Grocery Sales Inventory Management and Forecasting with Viral Food Trend Integration

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The retail industry, specifically grocery stores, heavily influenced by a more varying consumer behaviors. It is estimated that 83% of Americans view food or recipe content on social media platforms, and of those Americans, 89% reported that it influences their cooking [1]. While these viral, trendy recipes may not last forever, they create a temporary surge for specific items, and that quick burst of demand can cause stores to sell out of those items [2]. The stores aren't able to meet demand if they sell out, so they aren't able to capitalize. These stores would be able to increase profits if they were able to predict market and viral trends before they hit their peak.

To solve this problem, we propose Grocery Sales Forecasting and Inventory Management Dashboard. We aim to build a user-friendly, interactive dashboard that integrates machine learning models for predicting retail demand and inventory levels optimization. The unique differentiator of this project is its ability to track and respond to growing viral trends before they hit their peak, particularly trends popularized through social media platforms like TikTok and Instagram. This feature will enable grocery store owners to anticipate sudden shifts in consumer demand and subsequently manage inventory to capitalize on emerging market opportunities.

For the foundation, we will base the project on publicly available datasets from Kaggle. We will utilize 2 datasets call Instacart Market Basket Analysis [3], and Groceries Data [4]. The Instacart dataset offers extensive information on over 3 million grocery orders, and in combination with the Groceries Dataset, we will be able to extract comprehensive analysis into consumer purchase patterns. To ensure we track viral food trends, we will take advantage of Google trends [5], which contains valuable insight into growing consumer trends. To develop these, we will use Python for the backend logic and machine learning models. We will access the google trends data using a Python library, we will use the Spoonacular API for ingredient data, we will also use another API to scrape ingredient lists from relevant online websites [6] when Spoonacular API does not have it directly, and we will use open source libraries like PyTorch or TensorFlow to implement the machine learning models. Next, we will use JavaScript (React), HTML, and CSS for the frontend development. Finally, we will deploy the dashboard to a cloud platform like AWS or GCP for easy access and scalability.

Finally, the end goal is to develop a tool that grocery stores can use to increase their sales and improve inventory management in times of viral food trends. The dashboard will also provice proactive suggestions to store manager to stock extra inventory of items that will likely surge in demand. This not only allows stores to improve inventory waste and turnover, but it also increases profits of store owners. This project provides an innovative blend of traditional retail data with modern social meda analysis which can be used a base for similar concepts.

# References

[1] https://www.supermarketnews.com/online-retail/sure-tiktok-fun-can-it-drive-sales

[2] https://www.nbcnews.com/news/asian-america/trader-joes-kimbap-tiktok-rcna103403

[3] https://kaggle.com/competitions/instacart-market-basket-analysis

[4] https://www.kaggle.com/datasets/heeraldedhia/groceries-dataset

[5] https://trends.google.com/trends/explore?geo=US&q=recipe&hl=en-US

[6] https://spoonacular.com/food-api/docs#Extract-Recipe-from-Website