



DESIGN OF DEMAND FORECASTING SYSTEM FOR ORGANIC VEGETABLE SUPPLY USING STATISTICAL, MACHINE LEARNING, AND DEEP LEARNING

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In the preparation of this work, I used the assistance of artificial intelligence, specifically Claude (Anthropic), for language proofreading, drafting sentence structures for parts of the narrative, and supporting the preparation of visualizations from historical Purchase Order (PO) and Delivery Order (DO) data. After using this tool, I reviewed, verified, and revised the generated outputs as necessary to ensure accuracy and consistency with the actual data. The forecasting model selection, data analysis, interpretation of results, and conclusions were conducted by me, and I take full responsibility for the content of this final work.

Jakarta, 20 June 2026



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HIGHLIGHTS

KINTAN AQILA FASYA RAHARJO. Design of Demand Forecasting System for Organic Vegetable Supply Using Statistical, Machine Learning, and Deep Learning. Supervised by YANDRA ARKERMAN M.ENG. and INDAH YULIASIH

1. This study designs a demand forecasting system for organic vegetables at Think Fresh.
2. Five commodities were evaluated using statistical, machine learning, and deep learning models.
3. No single model was most accurate across all commodities.
4. Model choice should reflect commodity-specific demand patterns.
5. Commodity-specific model selection supports more accurate, data-driven production planning.

SOROTAN

KINTAN AQILA FASYA RAHARJO. *Desain Sistem Peramalan Permintaan Pasokan Sayuran Organik Menggunakan Metode Statistik, Machine Learning, dan Deep Learning. Dibimbing oleh YANDRA ARKEMAN dan INDAH YULIASIH.*

1. Penelitian ini merancang sistem peramalan permintaan sayuran organik di Think Fresh.
2. Lima komoditas diuji dengan model statistik, machine learning, dan deep learning.
3. Tidak ada satu model yang paling akurat untuk seluruh komoditas.
4. Pemilihan model perlu disesuaikan dengan pola permintaan tiap komoditas.
5. Pemilihan model spesifik komoditas mendukung perencanaan produksi berbasis data.

ABSTRACT

KINTAN AQILA FASYA RAHARJO. Design of Demand Forecasting System for Organic Vegetable Supply Using Statistical, Machine Learning, and Deep Learning. Supervised by YANDRA ARKERMAN M.ENG. and INDAH YULIASIH

Organic vegetable supply planning is affected by demand uncertainty, production lead times, and product perishability. This study aimed to design a demand forecasting system for Think Fresh by comparing statistical, machine learning, and deep learning approaches. Weekly demand data for Caisim, Selada Keriting, Pakcoy, Daun Bawang, and Kailan Baby were analysed using Naive Forecasting, Moving Average, ETS-Damped, CatBoost, and Neural Network models. Forecast accuracy was evaluated using several error metrics. No single model performed best for all commodities. ETS-Damped produced the best result for Caisim with a MAPE of 17.63%, CatBoost for Selada Keriting and Kailan Baby, and Neural Network for Pakcoy and Daun Bawang. The selected models were integrated into the forecasting system to support data-driven production planning at Think Fresh.

Keywords: Organic vegetables, Demand Forecasting System, Statistical Forecasting, Machine Learning, Deep Learning

ABSTRAK

KINTAN AQILA FASYA RAHARJO. Desain Sistem Peramalan Permintaan Pasokan Sayuran Organik Menggunakan Metode Statistik, Machine Learning, dan Deep Learning. Dibimbing oleh YANDRA ARKEMAN dan INDAH YULIASIH.

Perencanaan pasokan sayuran organik dipengaruhi oleh ketidakpastian permintaan, waktu tunggu produksi, dan sifat produk yang mudah rusak. Penelitian ini bertujuan merancang sistem peramalan permintaan di Think Fresh melalui perbandingan pendekatan statistik, machine learning, dan deep learning. Data permintaan mingguan Caisim, Selada Keriting, Pakcoy, Daun Bawang, dan Kailan Baby dianalisis menggunakan Naive Forecasting, Moving Average, ETS-Damped, CatBoost, dan Neural Network. Akurasi peramalan dievaluasi menggunakan beberapa metrik kesalahan. Tidak terdapat satu model yang unggul pada seluruh komoditas. ETS-Damped memberikan hasil terbaik untuk Caisim dengan MAPE 17,63%, CatBoost untuk Selada Keriting dan Kailan Baby, serta Neural Network untuk Pakcoy dan Daun Bawang. Model terpilih diintegrasikan ke dalam sistem peramalan untuk mendukung perencanaan produksi berbasis data di Think Fresh.

Kata kunci: deep learning, machine learning, peramalan permintaan, peramalan statistik, sayuran organik

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PREFACE

Praise and gratitude the author offers to God Almighty for all His blessings and guidance, through which this scientific work titled “Design of Demand Forecasting System for Organic Vegetable Supply Using Statistical, Machine Learning, and Deep Learning” was successfully completed. This study was carried out from February until June 2026 as part of the Capstone Project.

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The author hopes that this scientific work will be beneficial for readers and contribute positively to the development of knowledge.

Jakarta, 20 June 2026



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