

Edible oil Market price prediction using ML

PROJECT SYNOPSIS

**BACHELOR OF ENGINEERING
Computer Engineering**

SUBMITTED BY

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1 Title

Edible oil market price prediction using Time Series Models.

2 Domain

Machine Learning

3 Keywords

SARIMA, FB Prophet, LSTM-RNN, Exogenous Variables, Market Trends, Hyperparameter, RMSE, MAPE, Model Transparency.

4 Team

Group Id: B6

Team Members:

1. Sagar Abhay Deshmukh - 41207.
2. Ravindra Bapu Kadam - 41221.
3. Sampada Sujay Kothari - 41228.
4. Srushti Satish Kakade - 41222.

5 Literature Survey

SR.NO	TITLE	PUBLICATION AND YEAR	AUTHOR	DESCRIPTION
1	Energy Nexus: Edible Oil Wholesale Price Forecasts via the Neural Network	Energy Nexus, 2023	Xiaojie Xu, Yun Zhang	<ul style="list-style-type: none"> • Explores the prediction of edible oil prices using neural networks. • Focuses on wholesale pricing data analysis. • Investigates the energy-food nexus.
2	Forecasting Cauliflower Prices in Nepal: A Comparative Analysis Using Seasonal Time Series and Nonlinear Models	Cogent Food, Agriculture, 2024	Anisha Giri, Vijay Raj Giri	<ul style="list-style-type: none"> • Analyzes cauliflower price trends in Nepal. • Compares seasonal time series models and nonlinear models. • Highlights challenges in agricultural pricing.
3	Machine Learning-Based Recommendation of Agricultural and Horticultural Crop Farming in India	Heliyon, 2024	Biplop Dey, Jannatul Ferdous, Romel Ahmed	<ul style="list-style-type: none"> • Recommends crop farming practices based on NPK, soil pH, and climate variables. • Uses machine learning and DL techniques for forecasting Prices. • Focuses on India-specific farming.
4	Edible Oil Wholesale Price Fore-casts via the Neural Net-work	Published in North Carolina State University, 2003	Xiaojie Xu, Yun Zhang	<ul style="list-style-type: none"> • Focuses on edible oil price forecasting using neural networks. • One of the earlier studies on the topic..

				<ul style="list-style-type: none"> Provides insights into price fluctuations.
5	Price Forecasting of Agricultural Products in India Using ARIMA and Machine Learning Models	International Journal of Agricultural Sciences, 2020	Priya Sharma, Ravi Kumar	<ul style="list-style-type: none"> Focuses on predicting agricultural product prices in India. Compares ARIMA and machine learning models for forecasting accuracy. Analyzes price volatility in agricultural markets.

6 Objective

1. To develop a robust machine learning model for predicting edible oil prices using SARIMA, FB Prophet, and LSTM-RNN techniques.
2. To incorporate external factors (climate, market trends) for improving the accuracy of price predictions.
3. To compare the performance of traditional time series models with neural network-based approaches for edible oil price forecasting.

7 Problem Statement

To develop an advanced machine learning-based price forecasting model for edible oils by leveraging techniques such as SARIMA, FB Prophet, and LSTM-RNN.

8 Scope

1. Implementation of SARIMA, FB Prophet, and LSTM-RNN models for time series forecasting of edible oil prices using historical data.
2. Integration of exogenous variables, including oscillations in Prices and global market indices, to improve model performance and capture complex dependencies.
3. Use of performance evaluation metrics like RMSE, MAE, and MAPE to assess forecasting accuracy and model reliability across various techniques

9 Brief Description

The project focuses on developing a machine learning-based system for edible oil price prediction using time series models like SARIMA, FB Prophet, and LSTM-RNN. It involves data preprocessing, integrating exogenous variables such as oscillations in Prices and market trends, and feature extraction using sequential patterns from LSTM. The models will be fine-tuned through hyperparameter optimization to enhance accuracy. For model performance assessment, statistical metrics like RMSE and MAPE will be employed, and post-model analysis will include visualization of influential external factors for transparency.

Architecture Diagram :

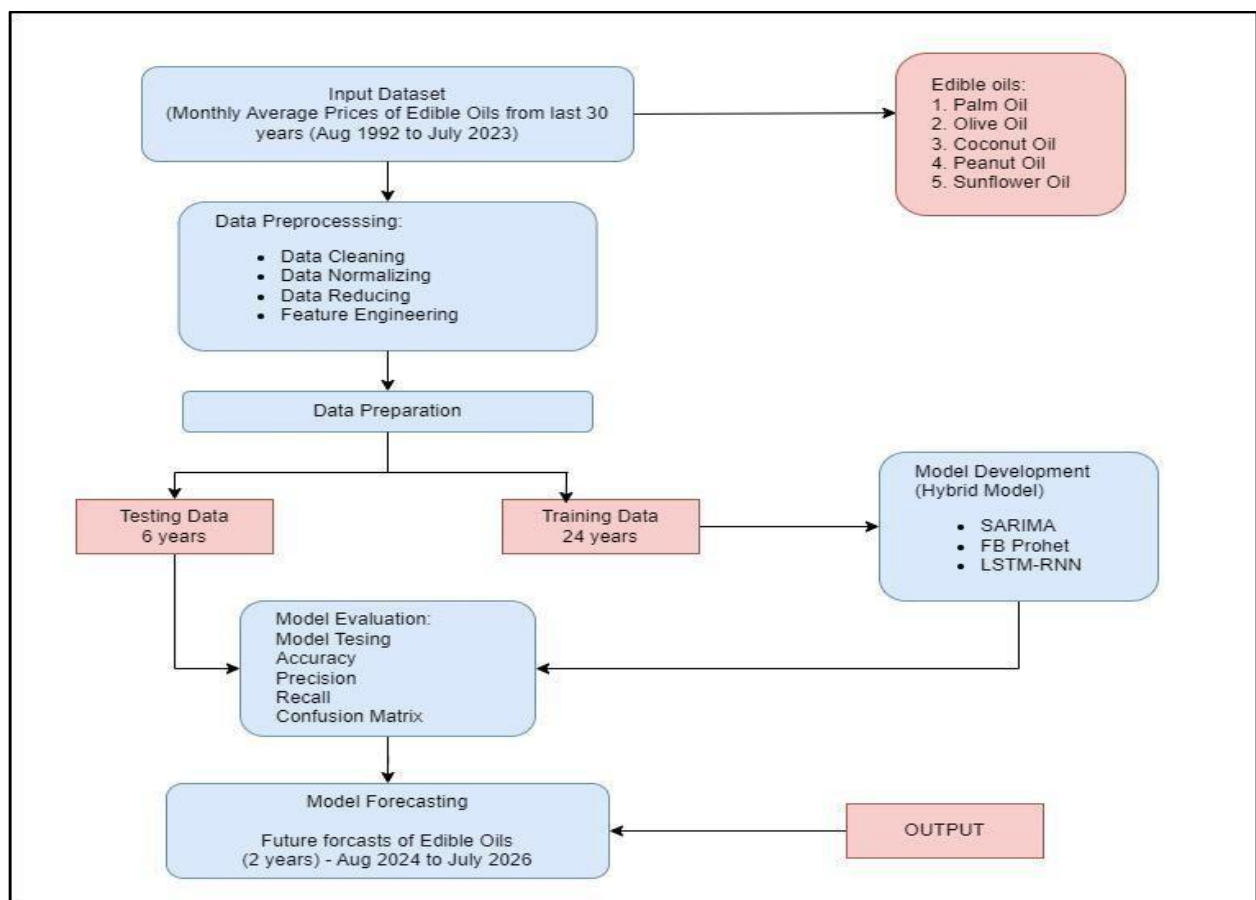


Figure 1: Architecture Diagram

10 Technical Details

Platform

1. Linux/Windows

Software Specification

1. Python 3.x

Hardware Specification

1. GPU (NVIDIA) for model training and optimization

Frameworks and Libraries:

- (a) TensorFlow, Keras, Statsmodels, Prophet, Scikit-learn, Pandas

Dataset

1. Historical Price Data of 8 Edible Oils (Commodity)

11 Probable Date of Completion

May 2025

12 References

1. Xiaojie Xu, Yun Zhang (2023). “Energy Nexus”: Edible Oil Wholesale Price forecasts via the Neural Network[1]
2. Anisha Giri and Vijay Raj Giri (2024). “Cogent Food ,Agriculture”: Forecasting Cauliflower Prices in Nepal: A Comparative Analysis Using Seasonal Time Series and Nonlinear Models[2]
3. Biplop Dey, Jannatul Ferdous, Romel Ahmed (2024). “Heliyon”: Machine Learning based Recommendation of Agricultural and Horticultural Crop Farming in India Under the Regime of NPK, Soil pH and Three Climatic Variables[3]
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5. Yong Zhang, Ming Li (2021). “Computational Intelligence”: Forecasting Agricultural Commodity Prices with Machine Learning Techniques: A Case Study on Soybean Prices in China[5]
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8. Nandita Sen, Arun Kumar (2021). “Journal of Agriculture and Food Research”: Hybrid Machine Learning Model for Predicting Rice Prices in Southeast Asia[8]
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10. Sunita Bhatt, Kiran Rao (2022). “Journal of Crop Improvement”: Seasonal Price Forecasting of Vegetables Using SARIMA and Neural Networks: A Case Study of Tomato Prices in India[10]