

INFORMATICS INSTITUTE OF TECHNOLOGY

In Collaboration with

UNIVERSITY OF WESTMINSTER



University of Westminster, Coat of Arms

Sri Oryzaugur

Multivariate Time Series Forecasting for Rice Prices in
Sri Lanka

A dissertation by

Mohammed Luqman Farhat Rumaiz

W1761767 - 2018130

Supervised by

Mr. Gihan Liyanage

Submitted in partial fulfilment of the requirements for the BEng (Hons) in
Computer Science degree at the University of Westminster.

May 2023

ABSTRACT

Rice is the staple food item for the people of Sri Lanka, and it is a major part in the diet of all Sri Lankans. It is also a source of livelihood for various Sri Lankans. Forecasting prices of commodities are important to an economy as it will aid various stakeholders such as farmers, agribusinesses, and government policy makers to anticipate costs and predict price fluctuations to make better informed decisions. Unfortunately, it is quite troublesome to forecast rice prices accurately, especially in a developing country like Sri Lanka as prices are subject to various factors like supply, demand, production and so on. There are systems and frameworks built to forecast rice prices, although the models that have been developed by that research is univariate time forecasting models. Such models would not be able to grasp the complex nature of prices in developing countries and for a critical commodity like rice especially for Sri Lanka.

Sri Oryzaugur augurs or forecasts medium grain rice prices in a multivariate approach using covariates that are specific to Sri Lanka, moreover, uses a state-of-the-art transformer model know as Temporal Fusion Transformer that was built specifically for time series forecasting.

This study demonstrated the superiority of the selected transformer model over univariate approaches and statistical models. It yielded an **MAPE of 2.52, MAE of 2.30 and an RMSE of 2.77**. The utilization of multivariate covariates and TFT models have proven to greatly enhance the accuracy of forecasts involving rice prices in Sri Lanka. This increased accuracy can be incredibly beneficial for those involved in the rice industry and can potentially stimulate economic stability within the country.

Keywords: Time Series, Multivariate Time Series, Price Forecasting, Data Science, Machine Learning

Subject Descriptors:

- Mathematics of computing → Probability and statistics → Statistical paradigms → Time series analysis
- Applied computing → Operations research → Forecasting
- Applied computing → Law, social and behavioral sciences → Economics