



Applying Machine Learning Techniques to Forecast Demand in a South African Fast-Moving Consumer Goods Company

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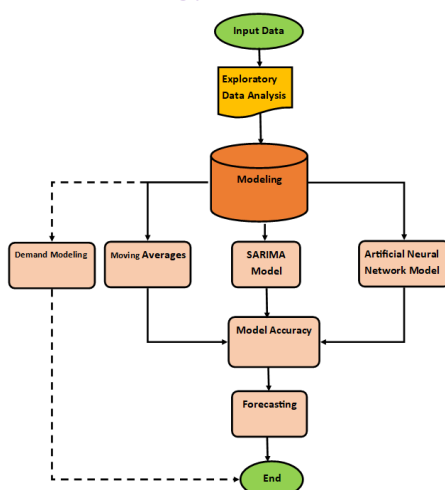
Introduction

Ever-increasing competitive environment in Fast-moving consumer goods (FMCG). A need for effective inventory planning hence a need for future demand to be forecast. Study aim was to forecast demand in complementary medicine range in the baby category using statistical techniques and machine learning models.

Literature Review

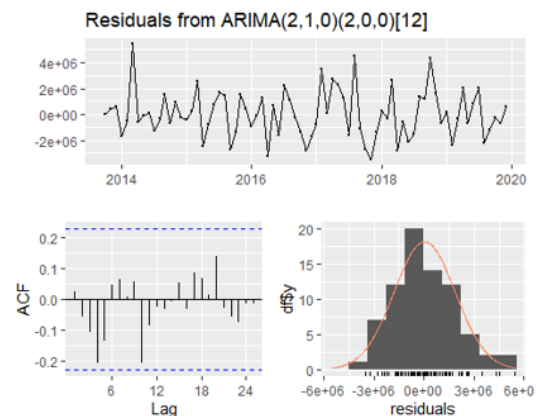
Machine learning (ML) demand forecasting, compared to traditional methods, has revealed supply-demand efficiency. This means applying ML for demand forecasting can potentially promote supply chain efficiency (Dikshit et al. 2022).

Methodology



Results

SARIMA(2,1,0) × (2,0,0)₁₂ given all the diagnostic-checking results is the best fitted model to forecasting Overall demand.



The fitted feed forward ANN model is NNAR(4,1,3)₁₂

| Model | ME | MAE | RMSE | MAPE |
|--------|-------|---------|---------|----------|
| SARIMA | 39357 | 1423226 | 1819954 | 17.87627 |
| ANN | 678 | 726782 | 920343 | 9.299668 |

Conclusions

ANN model shows the best performance in demand forecasting in the FMCG sector. We recommend the use of Auto-Regressive Integrated Moving Average ARIMAX model for modelling demand when multivariate data is present.

References

A. Dikshit, B. Pradhan, and M. Santosh, 'Artificial neural networks in drought prediction in the 21st century—A scientometric analysis', *Appl. Soft Comput.*, vol. 114, p. 108080, Jan. 2022, doi: 10.1016/j.asoc.2021.108080