

# LITERATURE SURVEY

A Bayesian approach for predicting food and beverage sales in employee cafeterias and restaurants [1] developed two Bayesian generalized models for predicting future sales of menu items that enable accurate ordering of food supplies. This approach was based on data collected from POS systems. The dataset consists of multiple time series, including seasonality and trend changes collected over 20 months in a casual restaurant. The first assumes that future sales are normally distributed, the second uses the more appropriate negative binomial distribution. These models include a trend function  $g(t)$  and a seasonal function  $s(t)$ . It was implemented using the R programming language and a state-of-the-art statistical modelling and high-performance statistical computing platform.

Demand forecasting: A literature survey of different methods [2] describes different demand forecasting methods used in different industries and grouped into four categories. The first model was a traditional statistical model that uses historical sales data provided by restaurants and supermarkets to predict food. The second model is a machine learning model, including a regression model, that provides more accurate predictions than the first model, identifying hidden patterns in data, making it more adaptable to change, and creating robust systems. . The third model is the deep learning model, which has recently become capable of processing large amounts of data and modelling non-linear data. The final model, a hybrid model consisting of neural networks, was used for daily product sales forecasting. This model has been used in the hospitality industry with more accurate results.

The objective of [3] was to determine an accurate strategy for predicting bread demand in one of Indonesia's key bread-producing regions. The moving average method, the exponential smoothing method, the multiple regression method, and the SVR method (Support Vector Regression) were all tested as time-series forecasting techniques. The Mean Absolute Percentage Error (MAPE), Mean Absolute Deviation (MAD), and Mean Squared Error are three often utilised forecasting error techniques (MSE). The data mining process must support the forecasting strategy in order for the findings to achieve high forecasting accuracy.

In [4], the authors discussed about the reducing food waste requires accurate estimation of the quantity of raw materials needed. As a result, a demand forecasting system was suggested in their study that forecasts the quantity of raw materials needed, the number of consumers, and sales of particular dishes. In the suggested model, the predictions were made using the stacking technique. The MAE measure was used to analyse this model, and the results vary from 0.4 to 0.7. The suggested technique would enable the restaurant to prepare meals and purchase raw materials with the least amount of waste.

In [5], the aim was to develop models for food demand prediction based on a nonlinear autoregressive exogenous neural network. The architectures of the produced models were tested for a particular product and varied in terms of the size of the delay line, the number of neurons in the hidden layers, and the number of hidden layers. The study's findings indicate that the prediction performance varied slightly based on the type of product. Depending on the product, the results of the  $R^2$  measure ranged from 96,2399 to 99,6477. For the logical control of stocks and food production, the presented models can be incorporated into an organization's intelligent management system.

In [6], to boost their marketability and competitiveness, the corporations had concerned about spending money planning their operations and using forecasting techniques in particular. The seasonality and short perishability aspects in the food industry make it difficult to maintain stockpiles, necessitating forecasts with a high level of precision. In order to support short- to medium-term production planning, the current study consists of applying methods to forecast consumer demand for products of a food company that targets the food service market. Later, the forecasts will be assessed using the error measure MAPE and contrasted with the demand that the organisation is currently taking into consideration.

## References:

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