

Designing of an Automated Platform for Workforce Scheduling Optimization Under Demand Uncertainty

**Madiha Rafaqat, Abdulaziz Ramiz Yousef Alswailem, Mohammed Saad Essa Jumaiah,
Shaker Sami Mohammed Mardini, Tirad Abdulkarim Thamer Almu and Mohammed**

Ibrahim Jameel Aref

Al Yamamah University

Saudi Arabia

m_rafaqat@yu.edu.sa, 202211032@yu.edu.sa, 202111038@yu.edu.sa, 202111161@yu.edu.sa,
202211019@yu.edu.sa, 202011119@yu.edu.sa

Abstract

In this design project an automated workforce platform is designed to optimize workforce scheduling under uncertain demand conditions. Multiple industries face labor shortages, overstaffing, and increased operational costs due to inefficient scheduling of workforce. The focus is on optimizing staffing levels for different branches of online grocery store. The project involves a multi-step approach, beginning with demand forecasting using time series analysis and regression techniques. MAPE (Mean Absolute Percentage Error) is used to assess the accuracy of the forecasts. A mathematical model is developed in Excel to simulate the staffing needs, taking into account key variables such as 24-hour demand variations, order picking time, PFD (Personal, Fatigue, and Delay) allowances, and order volume per picker. The proposed solution computes the optimal workforce size needed at different times and categorizes staffing conditions as overstaffed, understaffed, or optimal using a decision-support column.

Keywords

Automated Platform, Uncertainty, Personal, Fatigue