

Cash Register Queue Simulation Scenarios for a giant Retail Company

Batin Latif Aylak

Department of Mechanical Engineering
Türkisch-Deutsche Universität
Şahinkaya Cad. 86 - 34820 Beykoz / İstanbul, Turkey
batin.latif@tau.edu.tr

Hermias C. N. Hendrikse

ESTEQU
Pretoria, South Africa
h.hendrikse@esteq.com

Armand du Plessis

ESTEQU
Pretoria, South Africa
a.duplessis@esteq.com

Abstract

Nowadays, companies compete with each other for better service to their customers and this is especially true for international companies who face global opposition. One of the most basic challenges these companies face is the queuing problem. As an example, there is a giant retail company serving more than 400 stores in 15 countries with more than 180 million individual sales annually. These sales are variable for each day as well as each hour within the day with an over-all average of 700 units sold per minute. In this paper, we developed the capability to run different scenarios to solve this queuing problem based on the unique data of each shop. Taking assumptions into consideration, different scenarios are developed to better serve customers. A discrete-event simulation model is constructed using SIEMENS Tecnomatix Plant Simulation software. The model is set up so that it can dynamically be created based on input data and automatically optimize an objective function based on limiting variables. These simulation models determine the number of cash registers which should be in the store as well as when they need to be manned.

Keywords

simulation, optimization, queuing

Biographies

Batin Latif Aylak is an Assistant Professor in the Department of Mechanical Engineering at the Turkish-German University, Istanbul, Turkey. He earned B.S. in Industrial Engineering from Istanbul Kültür University, Turkey, Masters in Production and Logistics from University of Duisburg-Essen, Germany and PhD in Mechanical Engineering from University of Duisburg-Essen. He has published journal and conference papers. His research interests include logistics, simulation, optimization, supply chain management, industry 4.0, and blockchain in logistics.

Hermias C.N. Hendrikse was first exposed to Digital Manufacturing (DM) technology in 2007 at which time he was completing his Bachelor of Engineering (Industrial) at the University of Pretoria (UP). While completing his

post-graduate studies (UP) he continued implementing, training and consulting on DM solutions in industries such as Automotive, Rail, Heavy Equipment, Military, Marine and CPG throughout South Africa as well as internationally. He currently holds the position of Digital Manufacturing Manager at ESTEQ's Pretoria Office.

Armand du Plessis joined the world of Digital Manufacturing (DM) in 2017, after completing his undergraduate degree in Industrial Engineering at the University of Pretoria. His main area of expertise in DM lie within the simulation modeling space for industries such as Rail, Mining, Power and CPG. He currently holds the position of Digital Manufacturing Junior Engineer at ESTEQ's Pretoria Office, South Africa.