Auto-Dispenser Failure Diagnosis using Probabilistic Neural Network

H. Lu[1], H. Dauod[1], P. Balasubramanian[2], and S.W. Yoon[1]

[1]Department of Systems Science and Industrial Engineering
State University of New York at Binghamton
Binghamton, NY 13902, USA

[2]Innovation Associates
Johnson City, NY 13790, USA

Corresponding author's Email: yoons@binghamton.edu

Abstract: This paper presents a failure diagnosis tool for auto-dispensers using probabilistic neural networks (PNN). The auto-dispenser, which is a key element in large central fill pharmacies, is an electro-mechanical device designed to count and dispense different types of medications. When a dispenser unit fails, it usually generates different patterns of error. These patterns along with other collected data, such as counting process attributes (counting speed, number of orders, etc.), medication information, and mechanical configuration, can be used to identify the failure root cause. In this research, PNN is employed to identify the root cause of failure based on this data. The proposed PNN is compared to a multi-layer perceptron with backpropagation training (MLPBP) network. Experimental results indicate that PNN can effectively predict the failure root cause with an accuracy of 90%.

Keywords: Reliability, Root Cause Analysis, Probabilistic Neural Networks