Fuzzy Identification and Modeling of Common Caffeine-Containing Beverages Consumption on Blood Pressure

M. Abu-Ghoush1 and M. Samhouri2
1Department of Clinical Nutrition and Dietetics, Hashemite University, Hashemite, P.O. Box 330156, Zarqa 13133, Kingdom of Jordan
2Department of Industrial Engineering, Hashemite University, Hashemite, P.O. Box 330156, Zarqa 13133, Kingdom of Jordan

Abstract: The aim of the present study was to determine the effect of moderate caffeine consumption on blood pressure, also, to construct a prediction model for blood pressure using fuzzy modeling. The blood pressure was measured for each participant at several times after drinking the beverages. An adaptive neuro-fuzzy inference system (ANFIS) was used to model and identify the systolic and diastolic of the blood pressure. Experimental validation runs were conducted to compare the measured values and the predicted ones. The final fuzzy-based FIS model for the systolic blood pressure was formed from 62 total number of parameters, 398 number of training data pairs and 32 number of fuzzy rules. The results showed that the validation was 90% modeling or prediction accuracy of systolic blood pressure. The final fuzzy-based FIS model for the diastolic blood pressure was formed from 190 total number of parameters, 398 number of training data pairs and 162 number of fuzzy rules. The results showed that the average validation was 85% modeling or prediction accuracy of diastolic blood pressure. Based on the analysis results, it was found that the prediction of the systolic and diastolic of the blood pressure based on the caffeine consumption by ANIFS is probable. This method may be used to provide a simple means for determining the blood pressure after consuming a certain amount of caffeine-containing beverages.

Key words: Fuzzy modeling, systolic blood pressure, diastolic blood pressure, caffeine consumption, caffeine-containing beverages