ABSTRACT

Blood glucose fluctuations require precise monitoring and preventive measures to avoid clinical complications such as hypoglycemia. In response to this urgency, this study focuses on the development of an intelligent predictive system based on time-series data obtained from Continuous Glucose Monitoring (CGM) sensors. The computational approach employed utilizes the Extreme Learning Machine (ELM) algorithm to predict future blood glucose levels. The implementation process includes preprocessing through data normalization to maintain the computational stability of the matrix, temporal feature extraction using the sliding window technique, and optimization of the number of neurons in the hidden layer. The optimal architecture configuration was achieved using a combination of a sliding window of 12 and 150 neurons in the hidden layer. Under this configuration, the model achieved the lowest prediction error with an original Root Mean Square Error (RMSE) of 23.19858 mg/dL and a short training time of approximately 1.74072 seconds. The balance between a relatively low prediction error and a training time of under two seconds indicates that the ELM model demonstrates good computational performance. The results of this study suggest that the proposed architecture is sufficiently effective for blood glucose prediction based on Continuous Glucose Monitoring (CGM) data and has promising potential for further investigation in the development of blood glucose prediction systems.

Keywords : Continuous Glucose Monitoring, *Extreme Learning Machine*, Blood Glucose Prediction, Sliding Window, Time-Series