ABSTRACT

This research aims to implement the Functional Data Analysis (FDA) method based on Incremental and Progressive algorithms in the visualization and analysis of operational data, performance, and energy consumption on parallel computers. The method is compared with conventional FDA to evaluate the effectiveness in terms of computational cost, anomaly detection accuracy, and completeness of visualization. The main focus is the processing of streaming log data generated by the Turbostat tool. The Incremental and Progressive algorithm was chosen as it overcomes the high computational cost constraints of conventional FDA, while enabling efficient anomaly detection through Magnitude-Shape (MS) Plot representation. This research includes, testing the effectiveness of the method through data normalization and simulation scenarios, to the development of a real-time visualization dashboard program. Experimental results show that the Incremental and Progressive algorithm is more efficient in handling large-scale data and offers significant processing speed compared to conventional methods. The resulting system is expected to improve the efficiency of real-time data monitoring and analysis on parallel computers.

Keywords: *Functional Data Analysis, Incremental and Progressive, Turbostat, streaming data analysis, data visualization, parallel computers.*