DOCTORATE DISSERTATION INFORMATION

Doctorate Dissertation Topic: THE SWOT APPROACH FOR LOAD BALANCING IN CLOUD COMPUTING

Major: Information System **Major Code:** 9.48.01.04

PhD. Candidate: Lê Ngọc Hiếu

Academic Supervisors:

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Training Faculty: Faculty of Information Technology

Training School: Posts and Telecommunications Institute of Technology

NEW FINDING RESULTS OF THE DISSERTATION:

1. Enhancing Cloud Computing Load Balancing Performance: Internal and External approaches. Inspired by the robust framework of SWOT analysis, the dissertation puts forward two novel approaches aimed at augmenting the efficiency of load balancing in cloud computing: the Internal and External Approaches.

2. Internal Approach: Unleashing the Power of Machine Learning. In the realm of internal strategy, we have ingeniously amalgamated prevalent machine learning techniques to develop four innovative load balancing algorithms: MCCVA, APRTA, RCBA, and ITA. MCCVA is a sophisticated blend of K-Means and SVM, engineered for enhanced clustering and classification. APRTA, rooted in the predictive prowess of ARIMA, is adept at forecasting load variations. RCBA marries the probabilistic intelligence of Naïve Bayes with the segmentation finesse of K-Means. ITA elevates the renowned Throttle algorithm to new heights of efficiency and precision.

3. External Approach: Navigating Internet and User Dynamics. Venturing beyond the intrinsic parameters, the external approach grapples with the multifaceted challenges posed by internet dynamics and user behaviors. Addressing the critical issues of network timeout and deadlock, we introduce PDOA – a groundbreaking algorithm that not only anticipates deadlock scenarios but also adeptly resolves them, marking a significant leap in network performance. From the user standpoint, the focus is riveted on task prioritization, a dimension often diverse and multifaceted. k-CTPA emerges as a game-changer, skillfully allocating requests based on a meticulously crafted priority matrix, thereby ensuring that load balancing is not just systematic but also user-centric.

APPLICATIONS, APPLICABILITY IN PRACTICE OR OPEN ISSUES THAT NEED CONTINUOUS RESEARCH:

This thesis offers practical solutions, yet empirical studies in actual cloud environments are essential for validation. Future work will focus on enhancing the algorithms to boost precision and efficiency, especially in dynamic cloud, edge, and fog computing landscapes, ensuring they are tailored to thrive amidst environmental variability, offering optimized performance that adapts and excels in diverse and complex computing ecosystems.

Confirmation of the Academic Supervisors **PhD. Candidate**