Optimization Technique of the Philippine Army Warehousing and Inventory System (PAWIS) Using Cloud and Edge Computing: Development of a Strategic Framework for All Units

Cherry D. Casuat, Arvin R. De La Cruz, Joshua Benjamin B. Rodriguez, Jan Reuelle P. Teña, Joselinda M. Golpeo and Guillermo O. Bernabe
Faculty,College of Engineering
Polytechnic University of the Philippines
Sta Mesa, Manila, Philippines
cherrycasuat2019@gmail.com, docardelacruz@gmail.com,
joshuabenjaminrodriguez@gmail.com, janreuelletena@gmail.com, jmgolpeo@pup.edu.ph,
gobernabe@pup.edu.ph

Abstract

This study presents the development of a strategic framework aimed at optimizing the Philippine Army Warehousing and Inventory System (PAWIS) through the integration of cloud and edge computing technologies. Recognizing the critical need for efficient inventory management in military logistics, the framework leverages the collaborative advantages of cloud-edge computing to enhance real-time data processing, reduce latency, and improve decision-making accuracy across all units. By employing advanced predictive analytics tailored to diverse demand patterns, the system addresses challenges such as inventory accuracy, resource utilization, and operational responsiveness. The proposed approach improves processing time, stability, and overall efficiency compared to traditional inventory methods, enabling timely and precise inventory monitoring and replenishment. This framework also supports decentralized data handling at the edge, ensuring faster response to dynamic warehousing conditions and minimizing data transmission overhead. The findings demonstrate that adopting cloud-edge collaborative computing can significantly optimize inventory management performance, reduce operational costs, and enhance service levels within the Philippine Army's logistics network. This research provides a scalable and adaptable model for modernizing military warehousing systems, contributing to sustained operational readiness and strategic resource management.

Keywords
Optimization Technique, Philippine Army, Warehousing, Inventory System, Cloud and Edge Computing, Strategic Framework.

Biographies
Arvin R. De la Cruz is an academic and researcher at the Polytechnic University of the Philippines with expertise in engineering, computer system engineering, data science, and cybersecurity. His research interests include project management, IoT applications, machine learning, and sustainable technology development. De la Cruz has published extensively on topics such as virtual project management, service robots, and waste-to-energy projects, contributing to advancements in technology and engineering fields.

Cherry D. Casuat is a faculty member and researcher at the Polytechnic University of the Philippines specializing in machine learning, image processing, data analytics, and waste minimization. She has authored numerous publications on predictive analytics, smart systems, and AI applications in education and environmental sustainability. Casuat's work focuses on developing intelligent systems to enhance operational efficiency and promote sustainable practices.

Joshua Benjamin B. Rodriguez is a faculty and researcher specializing in AI applications with integration on hybrid solar-wind technologies. He has contributed to experimental and theoretical studies aimed at sustainable energy solutions for rural communities.

Jan Reuelle P. Teña is a faculty and researcher specializing in renewable energy systems with a focus on hybrid solar-wind technologies. He has contributed to experimental and theoretical studies aimed at sustainable energy solutions for rural communities.