

## Editorial

As global priorities shift toward sustainable energy solutions, digital innovation, and improved healthcare outcomes, contemporary research plays a pivotal role in driving systemic transformation. The selected studies featured in this issue address some of the most pressing technological and societal challenges ranging from hybrid energy optimization in microgrids to the strategic integration of artificial intelligence across industries, and precision-driven diagnostic tools for breast cancer detection. Together, they represent the converging paths of sustainability, intelligence, and human-centered design in modern research.

Designing energy systems that balance efficiency, reliability, and long-term cost-effectiveness is a major challenge in microgrid development. This study evaluates the integration of a Hybrid Energy Storage System (HESS) combining batteries and supercapacitors for a 30kW microgrid. By assigning supercapacitors to manage transient energy fluctuations and reserving batteries for sustained energy delivery, the HESS configuration improves energy management, extends battery lifespan, and enhances overall system resilience. Although HESS entails a higher upfront investment than traditional Battery Energy Storage Systems (BESS), the long-term reduction in replacement costs and performance degradation positions it as a more sustainable and economical solution. The inclusion of a closed-loop control strategy, utilizing a low-pass filter, optimizes power distribution between storage components and reinforces load responsiveness. These findings underscore the critical role of hybrid storage technologies in advancing reliable off-grid and renewable energy systems [1].

Artificial Intelligence continues to revolutionize business operations by reshaping the foundational structures of industries undergoing digital transformation. Through a comprehensive exploration of AI techniques—including machine learning, deep learning, fuzzy logic, genetic algorithms, and generative AI—this study highlights real-world applications that range from supply chain optimization to automated quality assurance in manufacturing. A strategic lens is applied to executive-level decision-making, emphasizing the importance of data governance, ethical considerations, and cross-functional collaboration. Illustrated with practical case studies, the research reinforces AI's capacity to enhance operational efficiency, customer engagement, and innovation readiness. It also points to the urgent need for expanded discourse on evolving regulatory, ethical, and technological considerations in deploying AI responsibly [2].

Early and accurate detection remains a cornerstone of effective breast cancer treatment, and technological advances are expanding diagnostic capabilities at an unprecedented pace. This study introduces a high-performance hybrid model combining Principal Component Analysis (PCA) with a 1D Convolutional Neural Network (CNN) to detect breast cancer using the Wisconsin dataset. PCA is employed not only for dimensionality reduction but also to transform the feature space for enhanced class separability, while the 1D CNN architecture enables deep feature extraction and robust classification. The model achieved remarkable results, including a 99.12% accuracy and 100% precision, outperforming fourteen benchmark models in the literature. With strong validation metrics across multiple folds, the approach demonstrates a compelling fusion of classical and deep learning methods, offering a reliable and scalable solution for medical diagnostics and aiding informed healthcare decisions [3].

Collectively, these contributions reflect the spirit of modern research adaptive, interdisciplinary, and grounded in solving real-world challenges. From resilient energy storage to ethical AI deployment and intelligent healthcare systems, the studies exemplify the transformative power of innovative thinking in shaping a more sustainable and intelligent future.

## References:

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