Draft Proposal for the Initiation of Research work for Ph.D Degree

Title of the Proposal:

"An Edge-Optimized Hybrid CBIR using Explainable Deep Learning and Fast Indexing"

In recent years, Content-Based Image Retrieval (CBIR) has evolved with the integration of deep learning, enabling more accurate and intelligent image search capabilities. An edge-optimized hybrid Content-Based Image Retrieval (CBIR) system that combines deep learning with explainable AI and fast indexing. The system uses deep learning models to extract detailed and meaningful image features, while explainability methods make the retrieval process transparent and easy to understand. Fast indexing techniques are applied to speed up searches, ensuring low-latency responses suitable for edge computing environments. By integrating both deep and handcrafted features, the framework narrows the semantic gap between human and machine understanding of images. The approach balances accuracy, speed, and interpretability, making it practical for real-time use in areas such as healthcare, surveillance, and mobile applications. Experimental results on benchmark datasets show that the proposed method outperforms traditional CBIR systems, achieving higher retrieval accuracy and faster response times. This demonstrates its effectiveness and suitability for modern, resource-constrained, and real-world edge computing scenarios.

Keywords: CBIR, Deep Learning, Explainable AI, Fast Indexing, Edge Computing.