

### **REVIEW ARTICLE**



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# Delving into the Depths of Image Retrieval Systems in the Light of Deep Learning: A Review

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# Abstract

**Objective:** The objective of this study is to conduct a comprehensive review of existing research and literature in the field of Content-Based Image Retrieval (CBIR). This review highlights the key challenges associated with the extraction and representation of visual semantics of images. This paper discusses the measure used computing similarity and ranking of retrieved images by CBIR system. The review discusses limitation of traditional approaches and also highlights the challenges with the current deep learning methods in semantic feature representation, defining the similarity metrics and indexing. This paper also highlights scalability and generalization challenges in implementing real environment. Methods: A thorough literature review was conducted on wellestablished databases, including Scopus, Web of Science, IEEE Xplore, ACM, and Science Direct, employing appropriate keywords. Mention the period of coverage. Pertinent search terms encompassed local feature representation, global feature representation, low-level features, high level features, semantic gap, image embeddings, handcrafted features, deep learning, image descriptors, similarity, and image indexing, with the aim of exploring content-based image retrieval systems. Comparative analysis was performed on the chosen articles, taking into account factors such as algorithms, methodologies, datasets, and evaluation metrics. The results discussed using comparative analysis, ensuring a comprehensive overview of recent literature on content-based image retrieval, offering valuable insights and highlighting emerging trends in the field. Findings : The research uncovers the novelty in the realm of contentbased image retrieval (CBIR) by highlighting the challenge of high-level visual semantics when comparing images, as perceived by humans. It emphasizes that feature extraction methods and choices significantly influence CBIR system performance, stressing the importance of selecting suitable features and similarity measures based on image dataset characteristics and application requirements. The study underscores the persistent obstacle of the semantic gap between low-level visual features and high-level semantic concepts, encouraging exploration of diverse approaches like deep learning, relevance feedback, and ontology-based methods to bridge this gap. Particularly, deep learn-