ABSTRACT

In recent years, trillions of images have been shared on various types of social media platforms on an everyday basis. Social media's wide range of features dominates the globe by making the searching process complex; identification of relevant objects or images turns out to be impossible due to the varying redundancy levels. High-level image visuals are preferably represented in the form of feature type vectors comprising of numerical values, and hence lack semantic representation of image features. Content Based Image Retrieval (CBIR) can differentiate the images based on lower level factors like shape, spatial layout, color, and texture. The semantic gap is reduced by using machine learning techniques in existing studies. The CBIR approaches are available, which use the classic similarity measure that focuses on extraction results but less on computation time and computational complexity. Thus, the CBIR system needs effective and efficient image retrieval with minimum time and computational complexity.

Deep learning techniques are growing wider day by day in the process of Content Based Image Retrieval (CBIR). The recognition of the image is based on its shape, attributes, and tag. It is challenging to establish the connection between semantic ideas in the vast real-world applications. Social media is dominating the globe with its wide range of features, and people are finding difficulty in choosing suitable objects or images because of any redundancy. So the proposed method is based on content-based image recognition and tagging using deep learning techniques. The tagging of the image is used here for easy identification of the objects. The Geon similarity model is used to extract the maximum similarity of the different images with its accurate and rapid computation methods. The modified Grey Wolf Optimization (GWO) method and the novelty based Convolution Neural Network (CNN), ResNet-50, are applied here as a hashing technique and

classifier to get high recognition rates and minimum response time when compared to the state of the art methods. The experimental analysis reveals that the performance attributes of the modified convolutional neural network give a high value of precision, accuracy, recall, and mean Average Precision (mAP).

Due to advanced technology, multimedia issues are increasing and new research studies are currently being performed based on the retrieval of similar multimedia content. CBIR- Content Based Image Retrieval system is utilized for image retrieval associated with query images from higher databases. Due to its limited ability to retrieve features and time complexity, the CBIR system had a limited degree of efficiency. This research addressed the issues by establishing Deep Convolutional Neural Networks extraction techniques with the Inception V3 model to extract the features from pre-processed images. Here the images are obtained from the NUS-WIDE dataset. Initially, the pre-processing steps are followed with respect to RGB to Gray Mapping, image resizing, and normalization. Followed by feature extraction is performed using Deep CNN extraction. Further, the stored features undergo similarity calculation using the top similar images, using HGSO (Hone Genetic Swarm Optimization). For an image entered as a query image from the dataset, the Euclidean distance metrics are searching the related images considered as a major idea in the CBIR model. The combination of the proposed algorithms increases the similarity measure of the top similar images as well as the content-based retrieval accuracy. In this phase, the results are evaluated with respect to accuracy, precision, recall and Root Mean Square Error (RMSE) value, and they show better performance than different existing algorithms.

Keywords: Content Based Image Retrieval, Deep Learning, Feature Extraction, Grey Wolf Optimization, Deep Convolutional Network, Hone Genetic Swarm Optimization.