

## Automatic Multi-Label Image Annotation System Guided by Firefly Algorithm and Bayesian Method

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**Abstract :** Nowadays, the amount of available multimedia data is continuously on the rise. The need to find a required image for an ordinary user is a challenging task. Content based image retrieval (CBIR) computes relevance based on the visual similarity of low-level image features such as color, textures, etc. However, there is a gap between low-level visual features and semantic meanings required by applications. The typical method of bridging the semantic gap is through the automatic image annotation (AIA) that extracts semantic features using machine learning techniques. In this paper, a multi-label image annotation system guided by Firefly and Bayesian method is proposed. Firstly, images are segmented using the maximum variance intra cluster and Firefly algorithm, which is a swarm-based approach with high convergence speed, less computation rate and search for the optimal multiple threshold. Feature extraction techniques based on color features and region properties are applied to obtain the representative features. After that, the images are annotated using translation model based on the Net Bayes system, which is efficient for multi-label learning with high precision and less complexity. Experiments are performed using Corel Database. The results show that the proposed system is better than traditional ones for automatic image annotation and retrieval.

**Keywords :** feature extraction, feature selection, image annotation, classification

**Conference Title :** ICSRD 2020 : International Conference on Scientific Research and Development

**Conference Location :** Chicago, United States

**Conference Dates :** December 12-13, 2020