**Autoencoder-based Feature Extraction for Scene Search**

**in Live Nature Camera**

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**Keywords: neural network, auto-encoder, Feature Extraction clustering**

1. **Introduction**

The importance of earth observation is world widely increasing due to the effect of global climate change and so on. In order to protect the global environment, it would be useful to offer archives of video data of monitoring natural environment in as many spots as possible. To provide such a facility, construction of monitoring environment with live nature cameras is very significant.

In this study, we propose a method for extracting and indexing image feature vectors to reduce the computational cost of image retrieval using an autoencoder model.

1. **Proposed method**



Fig. 1. Feature extraction by autoencoder

The process of our proposed method of extracting and indexing image featureis as follows:

**Step-1:** An autoencoder model is trained witha set of nature images such as landscape, animals, and plants.

**Step-2:** Image data from live nature camera is sent to the trained autoencoder model in Step-1, and the feature vector is extracted (Fig. 1).

**Step-3:** The feature vectors extracted in Step-2 are classified based on the vector similarities.

**Step-4.** A representative feature vector such as centroid vector is extracted in each cluster (Fig. 2).

**Step-5.** Each representative feature vector is indexed for the image search.



Fig. 2. Indexing feature vectors by representative vectors

In the image retrieval process, for an input query image, first, the similarity scores between the feature vector of query image and the indexed representative vectors are calculated, and the top-*n* image clusters based on the similarity scores are selected. Then, images in the selected clusters are shown as the image retrieval results.

1. **Conclusion and future work**

Currently, we are implementing the prototype of monitoring natural environment. We will evaluate the feasibility and effectiveness of the proposed system in our future work.

In addition, we are facing many environmental changes such as destruction of coral reefs, progress of desertification, sea level rises due to ice melting in the pole area. Our scene search system will contribute to allow us to share such critical information by the fast scene search capability.

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**Biograph**

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