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Intra-Category Image Classification using Texture and Shape Features.

The computer vision community is experiencing a rapid growth of data from airborne motion imagery and full motion video. The most accurate method for detecting objects of interest in these immense datasets is through human analysis. There exists a significant need for automated methods to help analysts perform accurate, content-based image retrieval in large image datasets. We are developing an algorithm with promising results that classifies bird species based on their combined shape and local image features. Working with natural and segmented bird images, we automatically build a shape model have developed a classification method that identifies birds of different shapes with high accuracy. This is performed by first using dictionary learning to extract natural image features followed by a distance kernel computation on bird segmentations. A relevance vector machine performs classification on the local features and shape distances using pairwise comparisons. This new algorithm is invariant to scale and rotation (objects of interest can be at different angles and sizes), robust to changes in lighting, uses linear low dimensional data representation (representing data in its intrinsic dimensionality), and requires few parameters to tune. (Received September 16, 2014)