

# Learning-based Feature Selection and Fusion for Content-based Medical Image Retrieval

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## **Abstract:**

In recent years, there has been a significant increase in the use of images in clinical medicine and biomedical research, which has underscored a compelling need for efficient image searching and retrieval techniques. Our research focuses on Content-Based Image Retrieval (CBIR) of medical images. We explore and evaluate CBIR methods for retrieval of digitized spine x-ray images through use of vertebral shape profiles. The images were collected in the second National Health and Nutrition Examination Survey (NHANES II) conducted by the National Center for Health Statistics (NCHS). This poster presents our recent R&D that applies machine learning to feature selection and fusion for as a strategy for optimizing CBIR retrieval performance. The extracted features include measurements on the whole vertebral shape profile (global features): geometric features, Fourier descriptors with complex coordinates, Fourier descriptors with Centroid-Contour-Distance-Curve, Coefficients of Fourier Expansion of Bent function, moment invariants; and partial shape measurements (local features): turn angle and Distance-Across-the-Shape. The experimental results on a subset of vertebral shapes show proper multi-feature fusion schemes achieve significantly improved retrieval performance over traditional methods. The experimental results show that the retrieval mean average precision (MAP) can be improved by up to 41.92% using the proposed scheme compared with the conventional similarity measurements.