







application in many areas, but it is not fit for the Han stone carving images.

### C. Multi-feature fusion

Because of diversity and uncertainty of objects imaging, a single feature extraction method is difficult to obtain satisfactory results for images that contain complex object. Multi-feature fusion makes the extracted features associated together; eigenvectors transform into meaningful combinations, and then analyze and process the associated features comprehensively<sup>[10]</sup>.

We studied feature extraction methods aiming at the unique features of Han Dynasty stone carving images. We discussed texture feature and shape feature, and analyzed several features including edge contour feature, region Moment Invariants, boundary moment and SIFT. And there are the following conclusions: based on the calculation of the boundary moments in contour feature extraction and combined with Hu moments of Han stone carving images, multi-feature fusion can restrict Han stone carving images' matching process; and it will improve the accuracy of image retrieval. The multi-feature fusion process is shown in Figure 2:

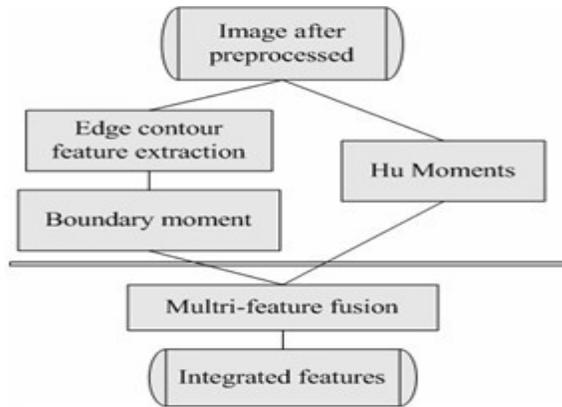


Figure 2. multi-feature fusion process

## V. CONCLUSION

The establishment of Han stone carving image retrieval system needs several steps including image collection, preprocessing, feature extraction and image matching. Feature selection and extraction directly affect the image matching

accuracy and efficiency of matching algorithm. The principle of Han Stone Carvings image feature extraction is to find the most prominent features and to get the optimal solution using minimum cost.

According to the characteristics of Han stone carving images, this paper analyzes several features including edge contour feature, region Moment Invariants, boundary moment and SIFT. Based on the boundary moments in Contour feature extraction and combined with Hu moments of Han Stone Carvings image, multiple feature fusion can be used in Han Stone Carvings image matching process.

The scheme helps to build the Han stone image digital feature library. It have the practical significance in the construction of the Han Dynasty stone carving's digital resources, the protection and development of stone carving and the Han Dynasty culture. At the same time, it also enriches the applications of pattern recognition and feature extraction techniques.

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