

Real-Time Document Image Retrieval with More Time and Memory Efficient LLAH

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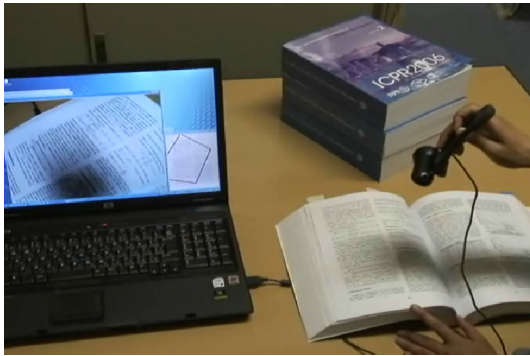


Figure 1. A scene of the demonstration.

We propose a real-time document image retrieval system using a web camera. This is an implementation of the camera based document image retrieval method presented in CBDAR07 oral session [1] as a real-time document image retrieval system. As shown in Fig. 1, the user can retrieve document images from a database by capturing paper documents with a web camera.

The overview of the proposed system is shown in Fig. 2.

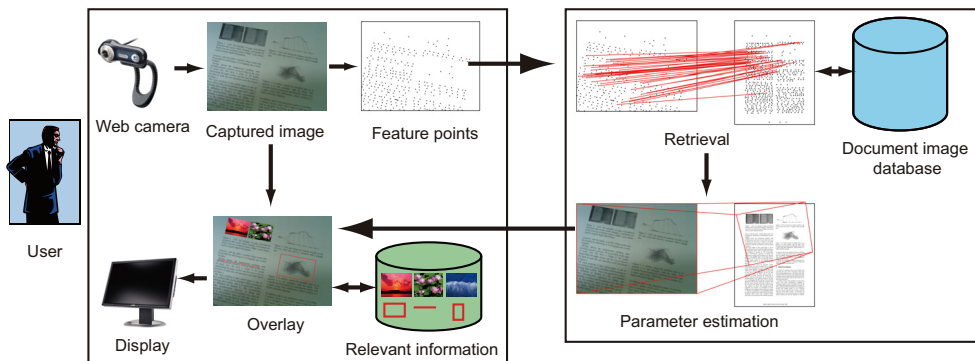


Figure 2. The overview of the proposed system.

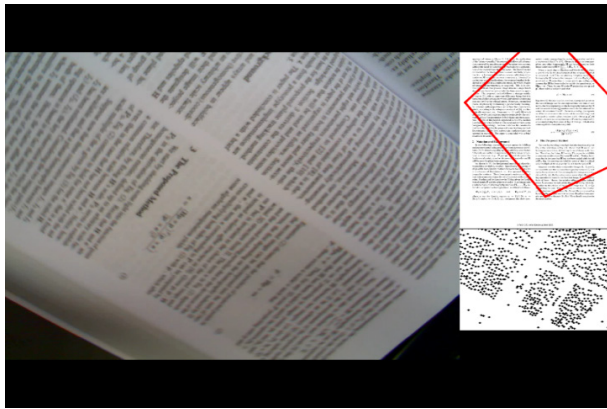
Firstly, feature points are extracted from a captured image using a web camera. Based on correspondences of feature points, a retrieval result is calculated. The retrieval result and captured region are presented to the user.

The proposed system has following two features. (1) Since the system use LLAH [1], it is robust to various types of disturbances. As shown in Fig. 3, the proposed system is robust to rotation, scaling, perspective distortion, occlusion and curvature. (2) Fast retrieval is realized even on a large scale database. In concrete terms, processing time is about 0.1 second per one query image on a database with 10,000 pages.

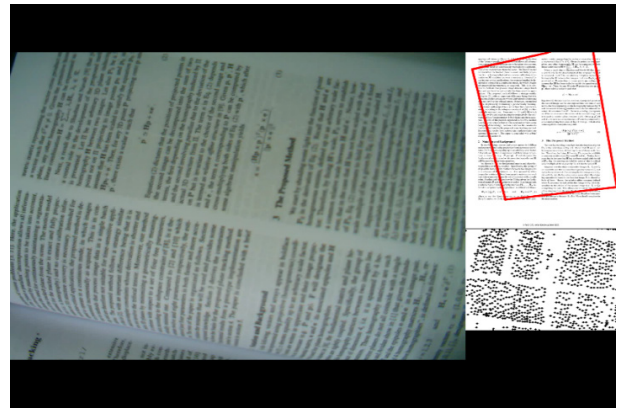
A sample program of the proposed system is downloadable from [2].

References

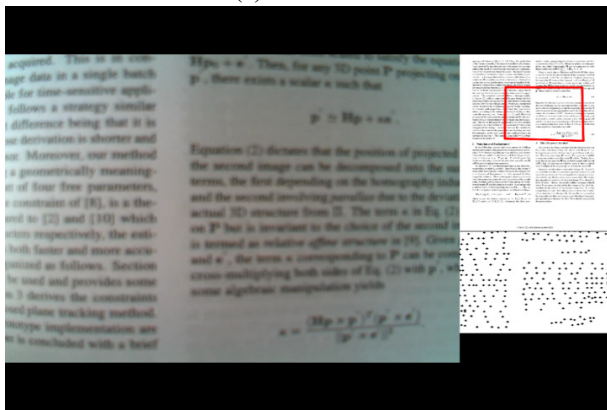
- [1] T. Nakai, K. Kise and M. Iwamura, "Camera based document image retrieval with more time and memory efficient LLAH", Proc. CBDAR07, 2007 [to appear].
- [2] <http://www.imlab.jp/LLAH/> .



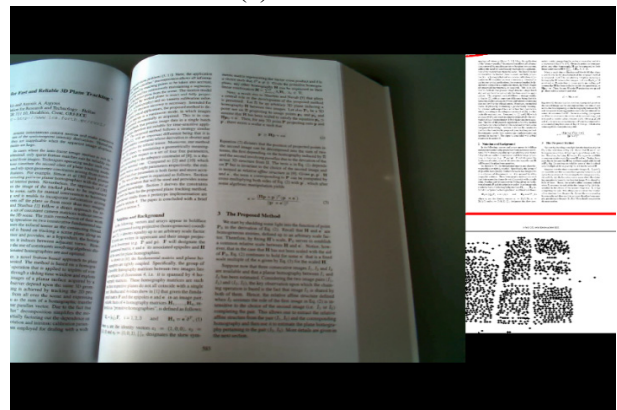
(a) Rotation 1



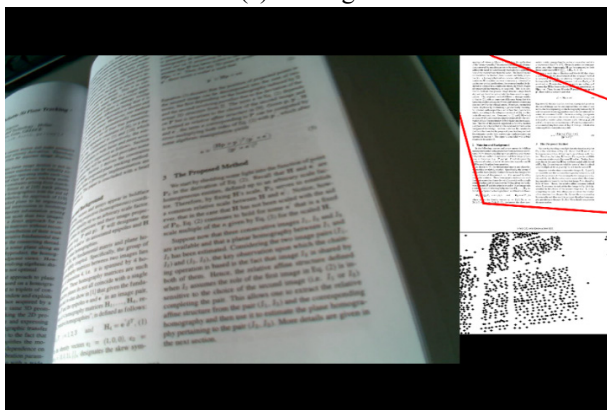
(b) Rotation 2



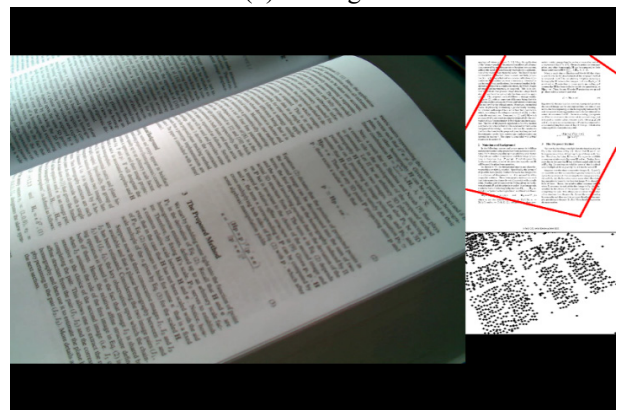
(c) Scaling 1



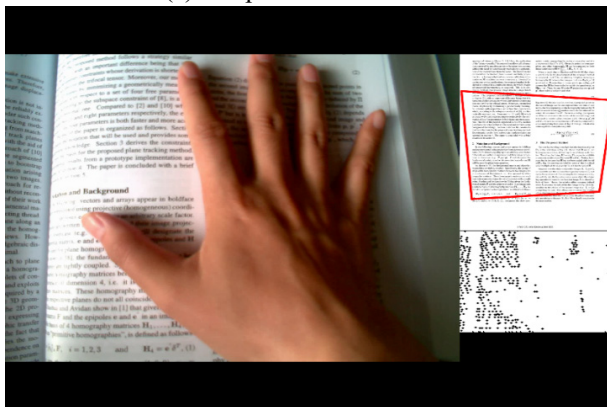
(d) Scaling 2



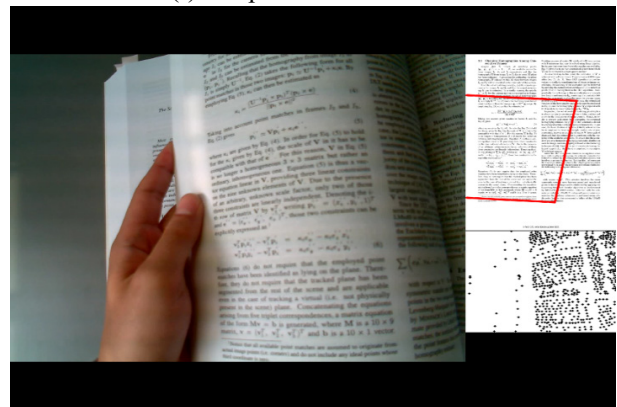
(e) Perspective distortion 1



(f) Perspective distortion 2



(g) Occlusion



(h) Curvature

Figure 3. Robustness against various types of disturbances. The left part of each figure shows a captured image. The upper right part shows a retrieval result in which the red rectangle indicates the captured region. The lower right part shows feature points extracted from the captured image.