



## **THREE-STEP REGISTRATION AND MULTI-THREAD PROCESSING BASED IMAGE MOSAIC FOR UNMANNED AERIAL VEHICLE APPLICATIONS**

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*Abstract- In the area of image mosaic for unmanned aerial vehicle (UAV) applications, the problems of precision and time consumption have drawn many scholars' attention. To address above two problems, a novel algorithm based on three-step registration and multi-thread processing is proposed in this paper. This method divides the image registration into three steps to improve the precision. Firstly, based on the SIFT features, the fast index mechanism k-d tree and the Euclidean distance are utilized to determine the common points between two adjacent images; then, the linear slope constraint model is used to filter the mismatching point-pairs; finally, the RANSAC algorithm is adopted to remove outer points from the common points to ensure matching precision of inter frames. To accommodate the real time requirement of UAV application, a parallel data processing pattern is presented. The multi-core resources and multi-thread computing method of computers are employed adequately in the new pattern to speed up the whole algorithm. Extensive experiments on precision and time consumption show the superior performance of the proposed algorithm.*

**Index terms:** UAV; image mosaic; image registration; multi-thread processing.