

# 手機拍攝文件影像之馬賽克式鑲嵌研究

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## 摘要

影像之馬賽克式鑲嵌(image mosaicking)是影像處理的重要議題，主要應用在飛機的空拍圖上。目前手機多具備拍照功能，使用者常隨意利用手機拍攝文件或景物，但常會因為物體或景物範圍過大，而分為多次拍照以記錄完整景物。本研究提出文件影像之馬賽克式鑲嵌方法，即是將兩張以上的手機所拍文件影像合併成為一張包含完整文件之全新影像。如此一來，使用者就不再受到手機拍攝的範圍限制，能以手機拍攝多張影像，再經過特殊比對和鑲嵌處理後，可得到一張大範圍的完整影像。本論文首先將針對由手機所拍照文件影像，作二值化處理，經過相連元件擷取後，抽取各元素的特徵並進行比對，找到最佳的鑲嵌位置，再進行影像的鑲嵌，最後再修正接合處而得到影像鑲嵌結果。

關鍵詞：影像二值化；相連元件；特徵抽取；影像鑲嵌

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## 參考文獻

- Abutaleb, A. S. (1989). Automatic thresholding of gray-level pictures using two-dimensional entropy of the histogram. *Computer Vision, Graphics and Image Processing*, 47, 22-32.
- Brink, A. D. (1992). Thresholding of digital images using two-dimensional entropies. *Pattern Recognition*, 25, 803-808.
- Can, A., Stewart, C. V., Roysam, B. & Tanenbaum, H. L. (2002). A feature-based, robust, hierarchical algorithm for registering pairs of images of the curved human retina. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 24, 347-364.
- Correia, E. N., Carvalho, M. & Sabourin, R., (2002). On the performance of wavelets for handwritten numerals recognition. *Proceedings of the 16th International Conference on Pattern Recognition (ICPR'02)*, 3, 30127.
- Chhabra, A. K., Balick, Z., Cerf, G., Loris, K., Sheppard, P., Smith, R., & Wittner, B. (1993). High-order statistically derived combinations of geometric features for handprinted character recognition. *Proceedings of the Second International Conference on Document Analysis and Recognition*, 397-401.
- Cho, S. H., Chung, Y. K. & Lee, J. Y. (2003). Automatic image mosaic system using image feature detection and taylor series. *Digital Image Computing: Techniques and Applications*, Dec. 549-556.
- Dunn, S. M., Harwood, D., & Davis, L. S. (1984). Local estimation of the uniform error threshold. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 6, 742-747.
- Dornaika, F., & Chung R. (2004). Mosaicking images with parallax. *Signal Processing: Image Communication*, 19, 771-786.
- David, M., Nathan, S. & Jacqueline, L. (2004). Efficient algorithms for robust feature matching. *Pattern Recognition*, 32, 17-38.
- Hsieh, J. W. (2004). Fast stitching algorithm for moving object detection and mosaic construction. *Image and Vision Computing*, 22, 291-306.
- Heutte, L., Paquet, T., Moreau, J. V., Lecourtier, Y., & Olivier, C. (1998). A structural/statistical feature based vector for handwritten character recognition. *Pattern Recognition Letters*, 629-641.
- Hinsamooth, N., Cheevasuvit, F., Dejhen, K., Mitatha, S., & Somboonkaew, A. (1998). Mosaicing of multi-resolution satellite images. *The 1998 IEEE Asia Pacific Conference on Circuits and Systems*, November, 24-27.
- Hsu, C. T. & Rob, A. B. (2000). Multiresolution feature-based image registration. *Visual Communications and Image Processing 2000*, 4067, 1490-1498.
- Jung, K., Kim, K. I., & Jain, A. K. (2004). Text information extraction in images and video: a survey. *Pattern Recognition*, 37, 977-997.
- Kim, D. H., Yoon, Y. I., & Choi, J. S. (2003). An efficient method to build panoramic image mosaics. *Pattern Recognition Letters*, 24, 2421-2429.
- Liou, C. Y., & Yang, H. C. (1999). Selective feature-to-feature adhesion for recognition of cursive handprinted characters. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 21, 184-191.
- Mclauchlan, F. & Jaenicke, A. (2002). Image mosaicing using sequential bundle adjustment. *Image and Vision Computing*, 20, 751-759.
- Martin, K. (2000). Twin snakes for determining seam lines in orthoimage mosaicking. *International Archives of Photogrammetry and Remote Sensing*, 33, 454-461.
- Niblack, W. (1986). *An introduction to digital image processing*, New Jersey: Prentice-Hall.
- Otsu, N. (1979). A thresholding selection method from gray level histograms. *IEEE Transactions on Systems Man and Cybernetics*, 9, 62-66.
- Rafael, C., & Richard, E. (2001). *Digital image processing*, New Jersey: Prentice-Hall.
- Shridhar, M., & Badreldin, A. (1996). Recognition of isolated and simply connected handwritten numerals. *Pattern Recognition*, 19(1), 1-12.
- Schmid, C., & Mohr, R. (1997). Local grayvalue invariants for image retrieval. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 19, 530-535.
- Schechner, Y. Y. & Nayar, S. K. (2002). Generalized mosaicking: wide

field of view multispectral imaging. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 24, 1334-1348 Sangwine, S. J., & Ell, T. A. (2000). Colour image filters based on hypercomplex convolution. *IEEE Proceedins – Vision, Image and Signal Processing*, 147, 89-93. Tian, G. Y., Gledhill, D., & Taylor D. (2003). Comprehensive interest points based imaging mosaic. *Pattern Recognition Letters*, 24, 1171-1179 Wang, J., & Wang, G. (1992). A new approach for recognition of unconstrained handwritten numerals. *Second National Workshop on Optical Character Recognition*. Yanowitz, S. D. & Bruckstein, A. M. (1989). A new method for image segmentation. *Compute. Vision Graphics Image Process*, 46, 82-95.