Chapter 8
Conclusions

8.1 Conclusion

This thesis has introduced the entire image stitching procedures and proposed a novel image stitching method which can deal with all the stitching conditions to improve the stitching performance. At the beginning of the stitching process, the camera calibration toolbox is used to correct the lens distortion. Afterward, some spatial masks are used to extract the feature points of two input images in the gradient domain. After the feature extraction method, the matching pairs are obtained by normalized cross-correlation method and the useless features are eliminated. In the image mapping technique, a useful mapping model with mapping parameter vector is applied to express the relationship between two input images and random sample consensus is utilized to choose the appropriate mapping parameter vector, which reduces about half of the calculation time. Subsequently, the image compensation method successfully solves the unmapped and overlapped problems caused from the mapping model.

Finally, the novel image stitching technique is proposed with rectangular boundary determination, determination of main cut line direction, brightness normalization, band-type optimal partition based on multiple cut lines and image blending. Rectangular boundary determination decides the rectangular boundaries for each region previously to save the calculation time. Subsequently, determination of main cut line direction utilizes the edge information to choose better direction for the main cut line. Brightness normalization regulates the brightness of two images base on the average brightness values of each image in the overlap region. Furthermore, band-type optimal partition based on multiple cut lines method generates five cut lines according to the band-type cost values and thus preserve the

smoother and lower color difference region as the transition band for image blending method. Image blending method determines the border first and smoothes it by weighted color transition within the transition band to enhance the stitching performance.

8.2 Feature Work

Although the proposed image stitching process can successfully combine images together, image warping will change the shape of the source image to match the fixed target image. The final result of the combined image will be different from the one-shot image because of warping effect. To deal with such problem, additional image regulation should be employed for the image warping effect as the future work.

In addition, the proposed image stitching process still encounters color difference along the border between two images due to the sun light reflections. To deal with such problem, additional color regulation should be employed to correct the image color before the image stitching process as the future work.