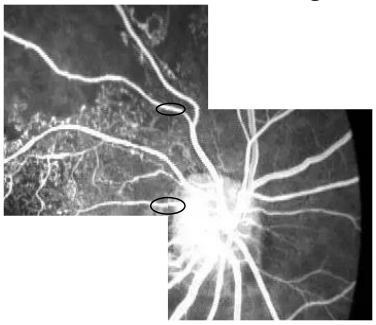
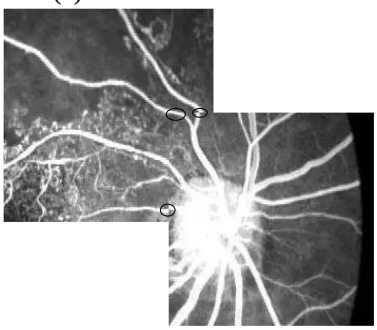
The method in this paper can not only reduce the visual field of the retina without the seam of Figure 4, but also get an excellent visual effect on the basis of image stitching. In order to further verify the excellent effect of the method in this paper on image stitching, the left eye image is taken as an example, the method based on convolution neural network in reference [6] and the method based on homography matrix compensation in reference [7] are taken as the comparison methods, and the two comparison methods are used to splice the images respectively. The results are shown in Figure 6.



(a) Method based on CNN



(b) Method with homography matrix compensation

Figure 6. Stitching results of comparison method

By analyzing Figure 6, it can be seen that the seam in the stitched image obtained by stitching with comparison method 1 is obvious (circular marked area); The seam in the stitched image obtained by stitching with comparison method 2 is more significant. Comparing Figure 4 (b) and Figure 6, we can see that the method in this paper has better stitching effect. This is because the filter reduces the noise on the accuracy, improves the accuracy of consultation image acquisition, reduces the distortion of image signal, reduces the life cycle, uses SURF algorithm to construct the scale space, determines the main direction of the feature points in the image and improves the accuracy of the image.

4. Conclusion

This paper studies the remote consultation image stitching method based on wireless sensor technology and mathematical morphology. The remote consultation image is collected by wireless sensor technology, and the filter is designed based on mathematical morphology to improve the image acquisition accuracy. Based on the image acquisition results, the image stitching method based on feature point matching is used to complete the remote consultation image stitching. The test results show that this method has good stitching performance. However, although this method solves the browsing and analysis problems of large field of view and high-power images, the analysis speed of large field of view and high-power images containing a huge amount of data and the evaluation method of analysis results are still unsatisfactory, which is a problem to be further solved in the future.

References

[1] Menter, T., Nicolet, S., Baumhoer, D., Tolnay, M. & Tzankov, A. (2020). Intraoperative frozen section consultation by remote whole-slide imaging analysis – validation and comparison to robotic remote microscopy. Journal of Clinical Pathology, 73(6), 206-261.

[2] Scheidt, S., Ramsey, M. & Lancaster, N. (2020). Radiometric normalization and image stitching generation of aster thermal infrared data: an application to extensive sand sheets and dune fields. Remote Sensing of Environment, 112(3), 920-933.

[3] Shuai, L., Shuai, W., Xinyu, L., Amir, H. G., Mahmoud, D., Khan, M. & Victor, H. C. De A. (2021) Human Memory Update Strategy: A Multi-Layer Template Update Mechanism for Remote Visual Monitoring, IEEE Transactions on Multimedia, 23, 2188-2198

[4] Liu, S., Wang, S., Liu, X., Dai, J., Khan, M., Gandomi, A. H., Ding, W. & de Albuquerque, V. H. C. (2022) Human Inertial Thinking Strategy: A Novel Fuzzy Reasoning Mechanism for IoT-Assisted Visual Monitoring, IEEE Internet of Things Journal, online first, doi: 10.1109/JIOT.2022.3142115

[5] Liu, J. & Bu, F. L. (2019). Improved RANSAC features image-matching method based on surf. The Journal of Engineering, 2019(5), 20-33.

[6] Shi, Z., Li, H., Cao, Q., Ren, H. & Fan, B. (2020). An image stitching method based on convolutional neural network semantic features extraction. Journal of Signal Processing Systems, 92(2), 2-3.

[7] Tian, J., Wu, Y., Cai, Y., Fan, H. & Yu, W. (2021). A novel mosaic method for spaceborne scansar images based on homography matrix compensation. Remote Sensing, 13(15), 2866-2871.

[8] Chaitra R., Rajaram M G. (2020). Development of image stitching using feature detection and feature matching techniques. IEEE International Conference for Innovation in Technology, 11(1), 188-190.

[9] Ramin Z. (2020). Object-oriented image stitching. International Symposium on Visual Computing, 11(2), 240-246.

[10] Yuya N., Ryosuke H., Masahiro I. (2020). Naturalness-preserving image stitching based on optimal seam estimation considering parallax. Global Conference on Life Sciences and Technologies, 6(33), 147-149

[11] Mostafa R., Ahmad M., Mohammad F., Jamal C. (2020). Real-time SLAM based on image stitching for autonomous navigation of UAVs in GNSS-Denied regions. IEEE

International Conference on Artificial Intelligence Circuits and Systems, 17(2), 145-148.
[12] Moussaoui, H., Nakajo, A., Rinaldi, G., Hubert, M., Laurencin, J. & Herle, J. V. (2021). Modeling nickel microstructural evolution in NI-YSZ electrodes using a mathematical morphology approach. ECS Transactions, 103(1), 997-1009.
[13] Van-D. H., Diem-Phuc T., Nguyen G. N., Anh P., Van-Huy P. (2020). Deep feature extraction for panoramic image stitching. Asian Conference on Intelligent Information and Database Systems, 100(8), 914-919
[14] Liu, S., He, T., Li, J., Li, Y. & Kumar, A. (2021) An Effective Learning Evaluation Method Based on Text Data with Real-time Attribution - A Case Study for Mathematical Class with Students of Junior Middle School in China, ACM Transactions on Asian and Low-Resource Language Information Processing, online published, doi:10.1145/3474367
[15] Parham N., Shakcb D., Fernando L., Clemente I-C., Nicolas P. Avdelidis X. M. (2020). Reflectivity detection and reduction of thermographic images using image stitching technique and its applications on remote inspection. Conference on Thermosense: Thermal Infrared Applications, 45(5),762-766.
[16] Kyu-Yul L., Jae-Young S. (2020). Warping residual based image stitching for large parallax. IEEE/CVF Conference on Computer Vision and Pattern Recognition, 66(9), 129-135.
[17] Gonzalo R., Marta V., Jaime S., Gemma U., Luisa R., Manuel V., Alberto M., Eduardo J., Luis J., Miguel C., Alfonso L., César S. (2020). Hyperspectral images acquisition: an efficient capture and processing stitching procedure for medical environments. Onference on Design of Circuits and Integrated Systems, 77(19), 781-790
[18] Mukhammadali K., Jong-Ki H. (2020). Efficient stitching algorithm for stereoscopic VR Images. IEEE International Conference on Consumer Electronics - Asia, 44(18), 716-720
[19] Riza R. A., Pineda, K E., Peñas D. P. M. (2020). Automated stitching of coral reef images and extraction of features for damselfish shoaling behavior analysis. IEEE Region 10 Conference, 67(7), 239-245
[20] Anthony S., Matthew M., Charles R., Justin L., Daniel D., Peter W, E. S. (2020). Ice topography reconstruction and panoramic stitching using forward looking sonar images. Conference on Global Oceans : Singapore – U.S. Gulf Coast, 65(13), 255-261.uthor AA, Author BB, Author CC, Author DD. Title of article. Abbreviated title of journal. Year of publication; volume number(issue number):page numbers.