Chapter 7

Conclusion

7.1 Conclusion

As intelligent automatic exposure system is required to meet the demand for taking picture easily in digital still cameras, achieving accurate light metering is the main issues. With a light metering system, the luminance of photographic scene can be detected, and the proper exposure parameters can be obtained immediately. Therefore, an accurate light metering system is essential for AE system. Since special lighting conditions such as: backlighting, strong frontlighting, highlight and dark environment usually reduce the light metering accuracy, developing a scene analysis method is needed to enable the performance of AE system.

For improving the light metering system under different luminance of photographic scene, a modified luminance detection model was proposed. In the modified model as presented in **Chapter 6**, we can find more constant K and offset values compared with Kuno model. In the light metering, the inclination angular tolerance 10° can be obtained, and the mean metering deviation of 6% can be achieved. According to this modified model, the scene luminance can be easily detected by using imaging sensor without other photometers, and the captured image quality under different scene luminance can be improved.

To improve the light metering system in special lighting conditions, a 2-D scene analysis method was proposed. The optimization results of threshold parameters are presented in **Chapter 6** which are (61,194) and (46,192). Then, the corresponding database and fuzzy rules base are determined according to the optimization results. The bound parameters (61,194) are chosen as test parameters. According to the 2-D scene analysis method, special lighting conditions such as backlighting, strong backlighting, strong frontlighting, highlight and dark environment can be detected and compensated. Through simple calculations of angle (ratio of dark to bright areas in a whole picture) and distance (total ratio of dark and bright areas in a whole picture) and fuzzy inference process, the compensation amount can be determined for different lighting conditions. In the performance test, the compensation results in different lighting conditions are well compared with other light metering methods. The images in backlighting, strong frontlighting and dark environment situations can be defined with proper exposure compensation. The images in normal and highlight situations can be retained with proper brightness. Therefore, the light metering accuracy in special lighting conditions can be much improved.

From the experimental results, it can be concluded that the modified luminance detection model can effectively improve the light metering system under different scene luminance, and the 2-D scene analysis method can improve the light metering ability in special lighting conditions.

7.2 Future Work

In this thesis, the light metering systems have been improved by proposed algorithms. About the future work, we have some ideas for further improving the light metering system. According to the 2-D scene analysis method, in the backlighting and dark environment regions the positive compensation amounts are needed, but in the strong frontlighting situation the negative compensation amounts are needed. To prevent error compensations in the overlapping region as shown in **Fig. 7-1**, the scene luminance should be taken into consideration to separate the overlapping area. Then, the scene analysis method will become a 3-D model to alleviate this issue.

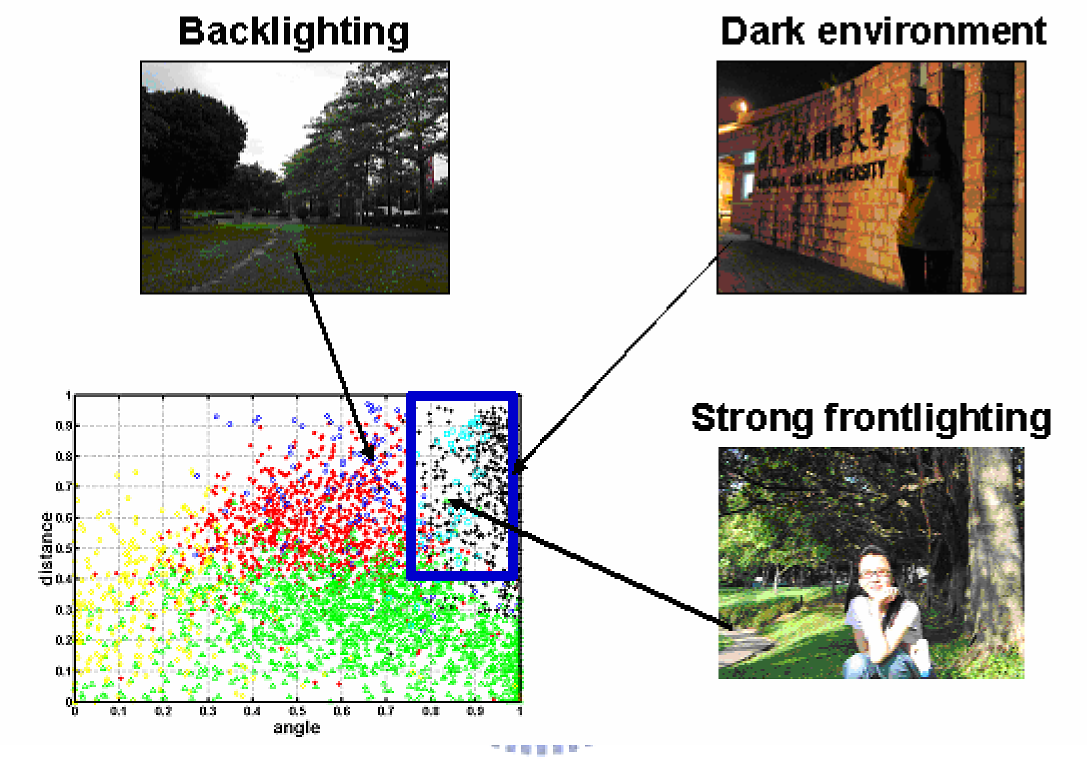

Fig. 7-1 Pictures and database in the transition region