

5 结 论

本文讨论了分量法彩色形态学基本算子的 FCNN 实现,并在此基础上提出了基于 FCNN 的形态学彩色重构算法. FCNN 编程实现了彩色重构的实时处理,对于基于模拟逻辑系统的机器人视觉和硅眼有着重要的意义. 进一步地,本文应用重构算法实现了彩色图像的噪声抑制. 由于 CNN 通用机具有与图灵机相同的编程能力,FCNN 可用来实现更加复杂的实时图像处理任务. 文中方法可以推广到其它色彩空间表示.

参 考 文 献

- 1 Chua L O, Yang L. Cellular neural networks: theory and applications. *IEEE Trans on Circuits and Systems*, 1988, 35(10): 1257-1290
- 2 Roska T, Chua L O. The CNN universal machine: an analogic array computer. *IEEE Trans on Circuits and Systems*, 1993, 40(3): 163-167
- 3 Chua L O, Roska T, Venetianer P L. The CNN is universal as the turing machine. *IEEE Trans on Circuits and Systems*, 1993, 40(4): 289-291
- 4 Yang T, Yang L B. Fuzzy cellular neural network: theory. In: Proc International Workshop on Cellular Neural Networks and Their Applications (CNNA'96), Seville, 1996. 225-230
- 5 Yang T, Yang L B. Application of fuzzy cellular neural network to morphological grey-scale reconstruction. *International Journal of Circuit Theory and Application*, 1997, 25(3): 153-165
- 6 Yang T, Yang L B. Fuzzy cellular neural network: a new paradigm for image processing. *International Journal of Circuit Theory and Application*, 1997, 25(6): 469-481
- 7 Serra J. Image Analysis and Mathematical Morphology. New York: Academic Press, 1982
- 8 Serra J. Image Analysis and Mathematical Morphology, Part II: Theoretical Advances. New York: Academic Press, 1988
- 9 Haralick R M, Sternberg S R, Zhuang X. Image analysis using mathematica morphology. *IEEE Trans on Pattern Analysis and Machine Intelligence*, 1987, 9(7): 532-550
- 10 Vincent L. Morphological grey-scale reconstruction in image analysis: applications and efficient algorithms. *IEEE Trans on Image Processing*, 1993, 2(2): 176-201
- 11 Corner M L, Delp E J. An empirical study of morphological operators in color image enhancement. In: Proc the SPIE Conference on Image Processing Algorithms and Techniques III, San Jose, California, 1992. 314-325
- 12 Cruz J M, Chua L O, Roska T. A fast, complex and efficient test implementation of the CNN universal machine. In: Proc the 3rd IEEE International Workshop on Cellular Neural Networks and Their Applications, Rome, 1994