Highly Accurate Image Reconstruction for Multimodal Noise Suppression Using Semisupervised Learning on Big Data

Abstract

- Impulse noise corruption in digital images fre-quently occurs because of errors generated by noisy sensors or communication channels, such as faulty memory locations in devices, malfunctioning pixels within a camera, or bit errors in transmission.

- Although recently developed big data streaming enhances the viability of video communication, visual distortions in images caused by impulse noise corruption can negatively affect video communication applications.

- Additionally, sparsity, density, and multimodality in large volumes of noisy images have often been ignored in recent studies, whereas these issues have become important because of the increasing viability of video communication services.

- To effectively eliminate the visual effects generated by the impulse noise from the corrupted images,

Existing

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Proposed

- To effectively eliminate the visual effects generated by the impulse noise from the corrupted images, this study proposes a novel model that uses a devised cost function involving semi supervised learning based on a large amount of corrupted image data with a few labeled training samples.

- The proposed model qualitatively and quantitatively outperforms the existing state-of-the-art image reconstruction models in terms of the denoising effect

HARDWARE REQUIREMENTS

- Processor   :Intel Pentium IV 1GHz

- RAM   :256MB (Min)

- Hard Drive   :5GB free space

- Monitor   :1024 * 768, High Color inch

- Mouse   :Scroll Mouse(Logitech)

- Keyboard   :104 keys

SOFTWARE REQUIREMENTS

- OS : Windows XP/7/8

- Front End : Visual Studio 2010/ netbeans 7.1

- Back End : SQL Server 2005/ heidisql 3.2

- Browser : Any Web Browser

Conclusion

▸ This paper presented a new image reconstruction model for the IN removal problem.

▸ The imaging characteristics of large volumes of noisy images were analyzed. Three cate-gories of features, namely global, local, and social contexts, and their combinations were proposed in the linear model.

▸ The calculation of the parameters of the proposed model by using the semisupervised cost function enables the proposed model to robustly manage the reconstruction of noisy images from a large volume of imaging data suffering from the problems regarding Sparsity, Density, and Multimodality.

▸ The qualitative and quantitative assessments demonstrated that the proposed model is capable of generating visually pleasing images from large-scale image sets.

Reference

[1] X. Song, X. Peng, J. Xu, G. Shi, and F. Wu, "Distributed compressive sensing for cloud-based wireless image transmission," IEEE Transac-tions on Multimedia, vol. 19, no. 6, pp. 1351–1364, June 2017.

[2] D. A. Huang, L. W. Kang, Y. C. F. Wang, and C. W. Lin, "Self-learning based image decomposition with applications to single image denoising," IEEE Transactions on Multimedia, vol. 16, no. 1, pp. 83–93, Jan 2014.

[3] D. R. K. Brownrigg, "The weighted median filter," Commun. ACM, vol. 27, no. 8, pp. 807–818, Aug. 1984. [Online]. Available: http://doi.acm.org/10.1145/358198.358222

[4] T. Chen and H. R. Wu, "Space variant median filters for the restoration of impulse noise corrupted images," IEEE Transactions on Circuits and Systems II: Analog and Digital Signal Processing, vol. 48, no. 8, pp. 784–789, Aug 2001.

[5] S. J. Ko and Y. H. Lee, "Center weighted median filters and their applications to image enhancement," IEEE Transactions on Circuits and Systems, vol. 38, no. 9, pp. 984–993, Sep 1991.