CHAPTER V

CONCLUSIONS

This chapter summarizes the works presented in this dissertation including conclusions and future directions.

5.1 Conclusions of The Dissertation

In this dissertation, the improved frameworks of color face hallucination are proposed. Firstly, this dissertation proposed a novel face hallucination with linear regression model in MPCA for the general color model such as RGB color model, YCbCr color model, HSV color model and CIELAB color model to improve the performance of the system. Since multilinear principal component analysis (MPCA) is more suitable for face representation than traditional method, like PCA. For better performance in super-resolution reconstruction task, higher-order tensor still be necessary.

Secondly, we apply higher-order singular value decomposition (HOSVD) in tensor space. We formulate a unified tensor in tensor patches which can be reduced to two parts: a global image-based tensor and a local patch-based multiresolution tensor for incorporating high-resolution image details. Our experiments show not only performance superiority over existing benchmark face super-resolution techniques, but also novelty of our approach in color face super-resolution.

5.2 Future Directions

- Several parameters (such as the number of standard face images, the number of shifting image and the number of classifiers) are still manually specified. The optimal values are found by experiments for the best hallucination result. Nevertheless, automatic parameter specification is necessary for the practical applications in the future research.

- Based on using the tensor MPCA subspace with regression model, we will directly perform our technique across different modality and under changing illumination conditions.

- For applications in practical scenarios where faces captured in raw color images are normally nonfrontal views at low resolution, we will develop a face hallucination algorithm for reconstruction reasonable nonfrontal facial images.