experiment are also exploited in this experiment. The result map is Fig. 3 (d).

From the Table 1, we can conclude that classification accuracy of NO. 3 and NO. 2 is about the same, but NO. 3 takes less time. The precision of NO. 1 far lower than that of the latter two. Although the precision improves with the number of selected principal components increases, time cost raises, too. PCA might lead to a loss of useful information in the discarded components, so the classification accuracy of NO. 1 is low. However, the method that the spectral features extracted are combined with spatial information by guided image filtering can remarkably improve precision. That's because guided image filtering can minish intraclass variations and keep interclass variations. We can see that tiny patch in (d) is much less than that in (a). PCA only uses the spectral information from 3 bands to express most of the original information of the 220 bands. Therefore, compared with NO. 2, the time NO. 3 spends is greatly reduced.

4. CONCLUSION

This paper proposes a novel hyperspectral images classification method that exploiting RF to classify with ensemble of PCA and guided image filtering. The target of this method is making the best of spatial information and spectral features to improve accuracy and efficiency of hyperspectral images classification. Table in the paper has shown that the proposed method produces high classification accuracy with OA of 94.79% and kappa coefficient of 0.9416. More importantly, this approach only takes 1.86 seconds. The use of PCA avoids "the curse of dimensionality", while the application of guided image filtering is the significant reason for high classification accuracy. Experimental results indicate that the proposed method performs better and is more efficient than the mean of only with spectral features or spatial characteristics in remote sensing image classification.

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