華東師範大學 | 软件学院 software engineering institute

Automated Land Resource Classification of Electronic Photograph Based on Satellite CMOS Detector

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Self-introduction

- East China Normal University
  - Software Engineering Institute
    - Shanghai Key Laboratory of Trustworthy Computing
- Research Interests
  - Machine Learning Theory, Algorithms and it Applications

Outline

- Introduction
- Methods
- Experiments and Results
- Discussion and Conclusion

Introduction

- Typical electronic engineering application
- Traditional segmentation methods
  K-means segmentation methods
- Gray image segmentation
  Color based image segmentation
- Did semantic analysis research
  Made relevant statistics

Comparison

Comparison

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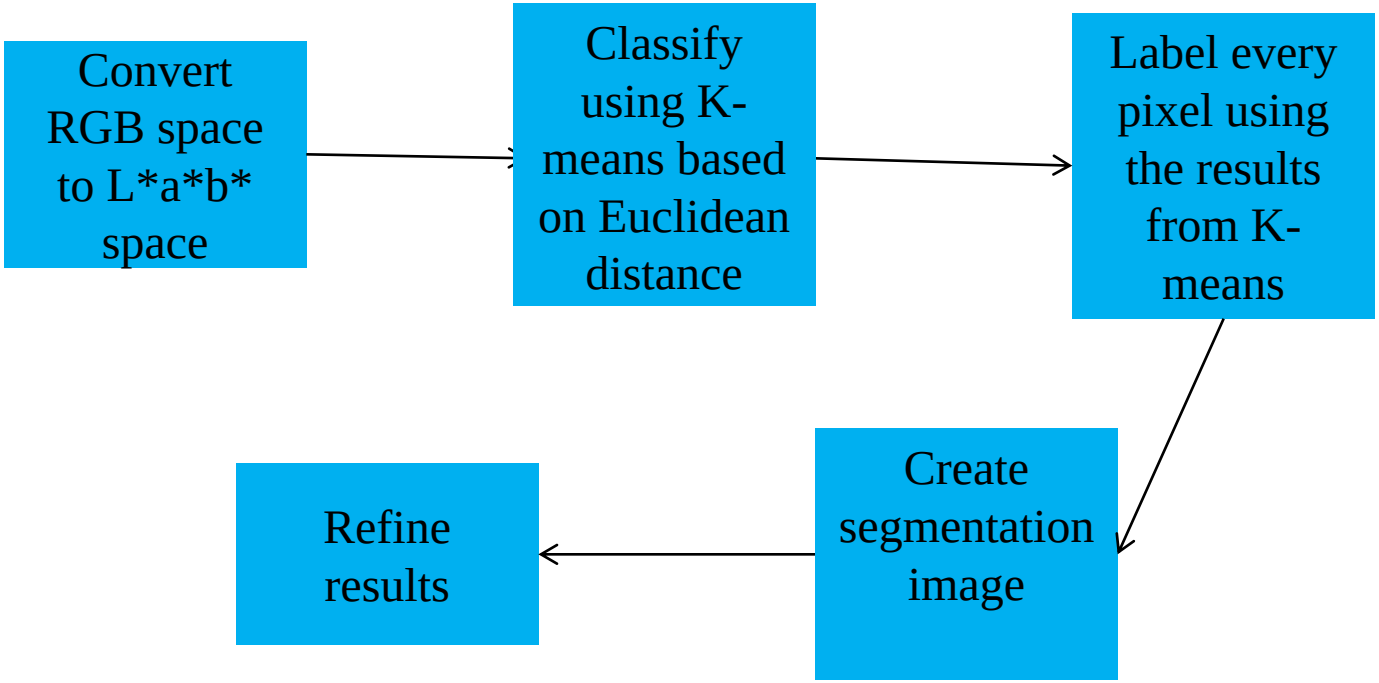
Methods

- Our experiment exemplars from Google Map
  - urban image with distinct feature

- Traditional Satellite Image Segmentation

Methods

- K-means Satellite Image Segmentation



Methods

- Satellite Image Semantic Understanding
  - defined a mapping function, mapping centroids from their 'a*b*' color space to the corresponding classes
  - the semantic understanding of image is such a subjective work, so it should be done according to concrete conditions and requirements

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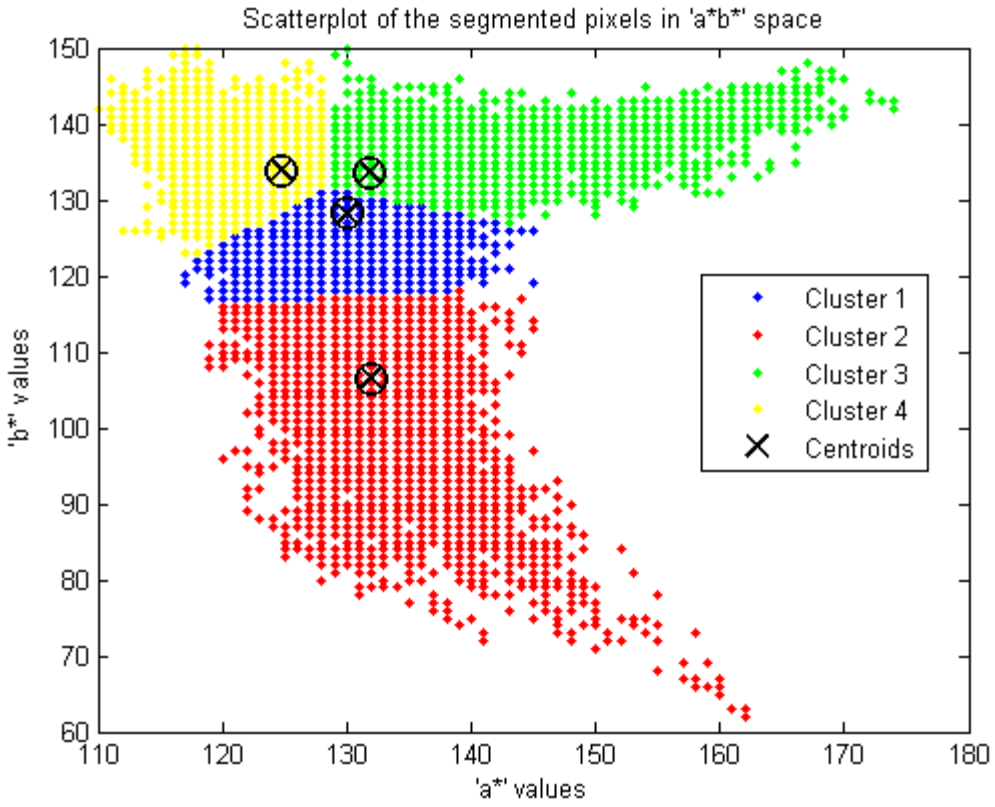
Experiments and Results

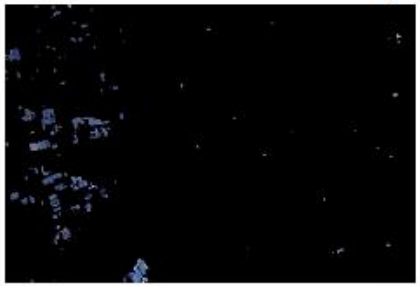


Experiments and Results

A

B

C



D

E

F

Experiments and Results

Entity Class	Coverage	Resource Understanding
Greenbelt	33.92%	The coverage of the greenbelt is large, so this region is presumed to be suburb
Roof	2.30%	The coverage of the roof is small, so the buildings with such roofs are presumed to be factories
Sandy Desertification	29.71%	The coverage of the sandy desertification is large, so these area are presumed to be construction fields
Buildings	34.07%	The coverage of the buildings is large, so these area are presumed to be development zone

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Discussion and Conclusion

- K-means clustering can get preferable results when electronic photograph has high discrimination in color scales L*a*b* values
- Statistical analysis of segmentation results has great scientific significance and practical value for both city planning and automated resource monitoring

Discussion and Conclusion

- Our recent research aims at finding out more optimized algorithms for different circumstances, which may contribute to the creation of an integrated method. The experiments show that KNN is more applicable to complex topography. On the contrary, K-means is suitable for simple topography.

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Thank You!