IDENTIFICATION OF TREES IN THE SHADE OF HOUSES IN RESIDENTIAL AREAS USING AIRBORNE MULTI-SPECTRAL IMAGES

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1. BACKGROUND AND PURPOSE

- Trees around houses make comfortable microclimate in residential spaces
- Considering the distribution of trees is important for the urban planning
- Land cover classification using airborne MSS data is effective to grasp the distribution of trees
- Trees in the shade are unable to be identified using previous methods

Proposing a classification method which can identify trees in the shade using surface temperature data observed by airborne MSS

2. CLASSIFICATION METHOD

(1) Classification result of the HC method

- Conduct a land cover classification using HC method and extract the shade class pixels
- In the extracted pixels, calculate the difference of the nighttime surface temperature (Subtract the summer nighttime surface temperature from that of winter)
- (This method is applied for evergreen trees because of using summer and winter data)

(2) Discrimination of the trees from other materials

①Conduct a land cover classification using HC method and extract the shade class pixels
②In the extracted pixels, calculate the difference of the nighttime surface temperature (Vegetation Cover Ratio in a Pixel), but can’t identify trees in the shade
③Discriminate the trees from other materials using the calculated difference value (The tree pixels have large difference value because of the characteristics shown in above)
④Remove some pixels from the tree class pixels which have small vegetation index value.

3. Study area and MSS data used in the verification

- Study area: The proposed method was verified in a detached housing area in Zushi city
- Enlargement of a house (below)
- Land cover classification image by the HC method (whole area)

- Tree resembles non-tree in spectrum shape in the shade
- Many trees are unidentified in the shade

4. Verification of the proposed method

(1) Classification result of the HC method

- State roof: Roof tile, Tin roof, NC roof
- Vegetation: Bare soil, Shade in tree crown

(2) Distribution of the surface temperature in the shade class pixels

- Vegetation index value isn’t large
- Nighttime surface temperature of green tree crown is lower in the shade

(3) Discrimination of the trees from other materials

- Calculate the difference of the surface temperature
- Use this difference to discriminate trees from others
- The threshold is the mean difference value of the vegetation class pixels in the HC method

5. CONCLUSION

- A new classification method for identifying shaded evergreen trees using surface temperature data is proposed as an improvement on the HC method
- 70% of the shaded evergreen trees which are identified by the HC method are able to be identified using proposed method and the misclassification ratio is 20%
- Small trees and trees exist in the low sky view factor area are difficult to be identified