Designing Building Recognition Model

Introduction

An approach which can automatically recognize building façade and its components is the foundation of achieving building information from the urban multi-spectral data

The model accuracy is the foremost consideration in this task as the designed model is to support the future scalable energy and morphology analysis.

The state-of-the-art approaches designed for the general semantic segmentation purpose are all based on the deep learning technology.

Difficulty

- Current similar works only focus on small-size and highly-structured image data.
- In the urban data, architectural prior such as symmetry, co-occurrence and straight-line appearance are unusable

Motivation

- Building façades in the urban environmental image data shows extremely large inter-and intra-class size differences.
- Binary classification is naturally less complex than multi-label classification task for the same group of targets.

Outcome

- A model designed for smaller facade datasets, shown in Fig. 1
- A simplified version of the model 1, try to balance the accuracy and the training cost.

inter-class size discrepancy.





Multi-label facade segmentation

Fig.2 The simplified façade segmentation model and its confusion matrix, directly using the results from the multi-label segmentation model and morphology operation to replace the object detection model and only using the developed magnifier module on the door class.





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Normalized confusion matrix					
0.989	0.000	0.000	0.001	0.001	0.009
0.046	0.878	0.000	0.002	0.029	0.045
0.083	0.000	0.719	0.049	0.001	0.148
0.010	0.000	0.007	0.911	0.004	0.067
0.038	0.006	0.000	0.003	0.847	0.106
0.064	0.001	0.004	0.010	0.006	0.914
ckground	chimney	door Predicte	window ed label	roof	wall

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