

Dam and reservoir extraction based on adaptive remote sensing images with multi-scale features

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Objectives

Dams and reservoirs play an important role in achieving the Sustainable Development Goals and global climate goals. Obtaining the accurate geographical location of dams and reservoirs is a current research hotspot. Aiming at the low accuracy of traditional remote sensing image extraction method of reservoir dam and the problem of "sawtooth" at the edge of reservoir, an adaptive remote sensing image extraction method of dam and reservoir integrating multi-scale features is proposed.

Methods

(1) In view of the low extraction accuracy caused by the different scales of dams and reservoirs, a feature pyramid network suitable for the extraction of dams and reservoirs of different scales is constructed. It is composed of feature extraction layer and several pooling layers of different scales.

(2) Considering the limited ability of existing code networks to utilize context information, more detailed features can be obtained by constructing pyramid pool module combined with void convolution in the network to expand receptive field and make full use of context information.

(3) To solve the problem of "sawtooth" on the extracted edge of the reservoir dam, a feature fusion module is embedded at the end of the network to link the shallow detailed features with the high level features to make up for the differences generated by feature fusion.

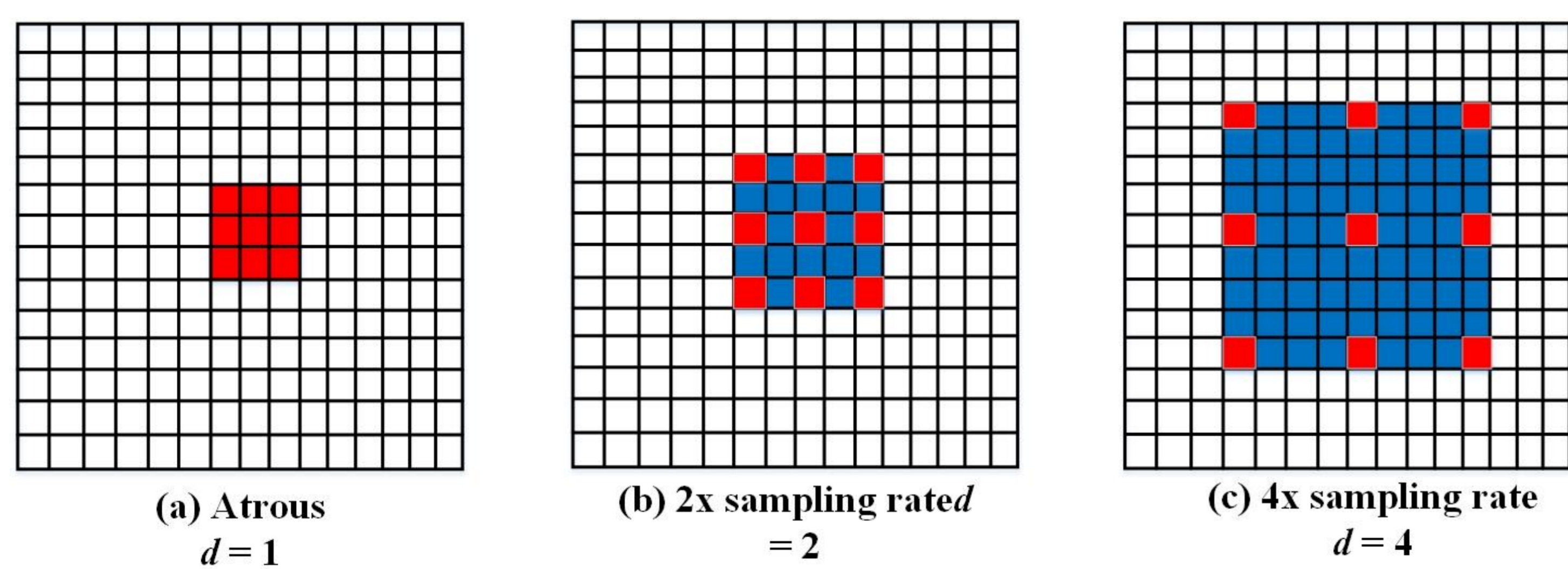


Figure 1 Atrous diagram

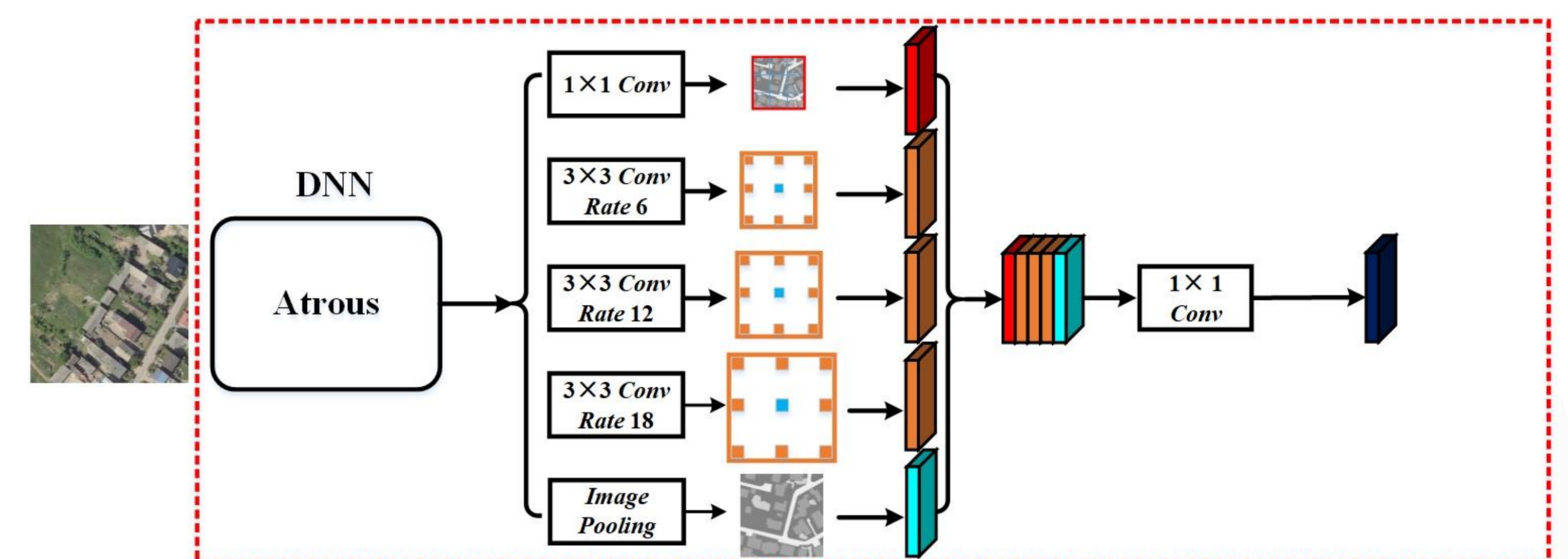


Figure 2 Text network diagram

Results

The results show that compared with the comparison method, the proposed fusion module has improved the detection accuracy and detection speed, and the extracted reservoir edges are more complete and smooth, and the "sawtooth" phenomenon is reduced.

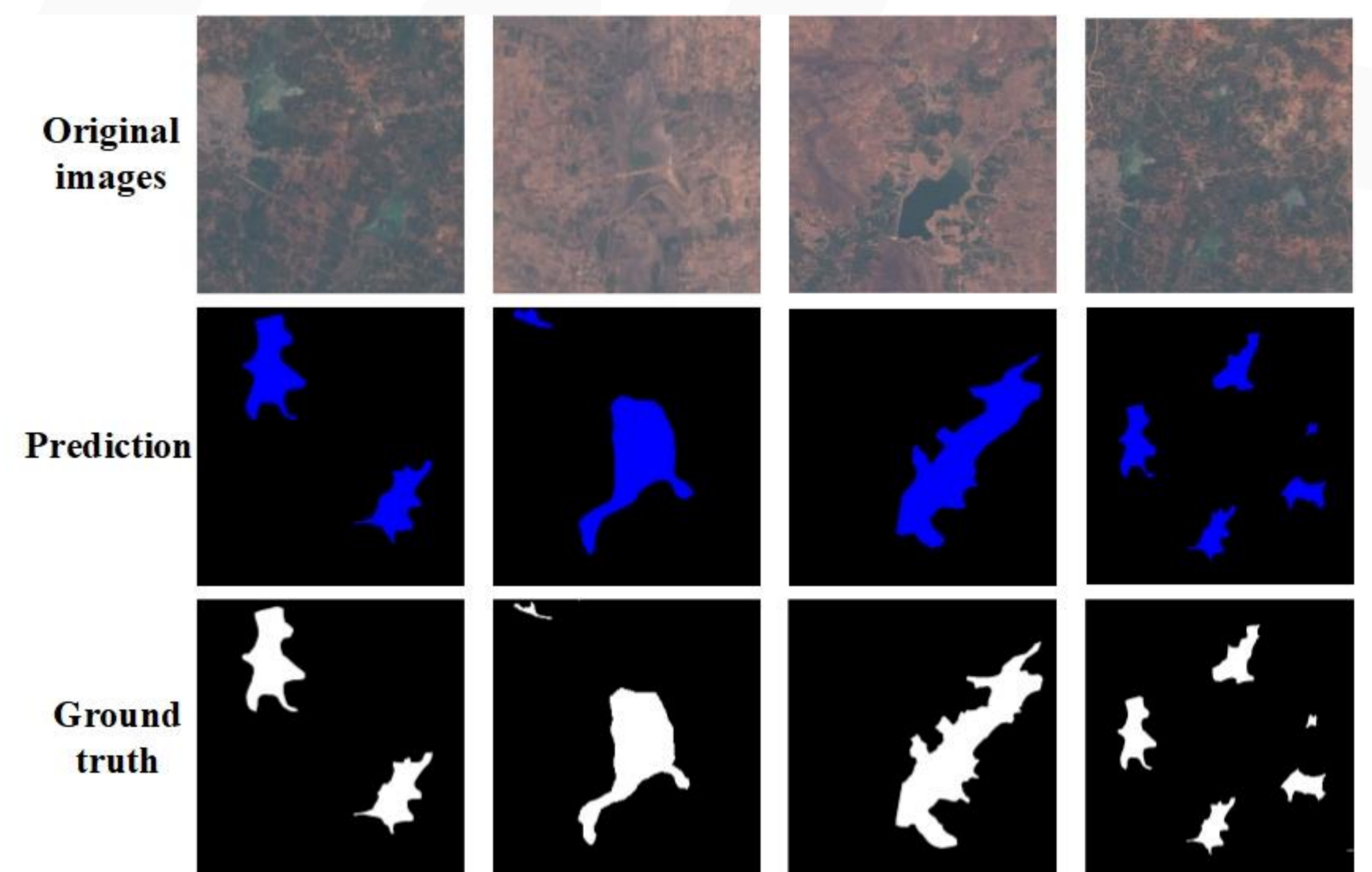


Figure 3 The method in this paper divides the results

Conclusions

The method proposed in this paper can extract the dam reservoir effectively, and the accuracy is higher than that of the comparison method, and the segmentation effect is better.

The phenomenon of "sawtooth" is effectively reduced, the integrity of segmentation is improved, and it can be applied in practical engineering.