

Supplemental materials

To ensure the entropy function to be monotonically increasing, the opposite of the entropy is adopted as the geometric constraint function. As shown in Figure 1, p_t^m is calculated based on the regularity of the rectangular shape.

$$p_t^m = \frac{|S_t|}{L_t \times H_t} \quad (1)$$

where S_t represents the total number of the pixels in the superpixel t . L_t and H_t are the length and width of the enclosing rectangle, respectively.

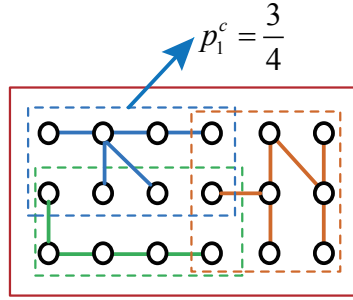


Figure 1. Compact rate based on the regularity of the rectangular shape.

According to Equation (2), $M(A)$ gets larger with the increase of p_t^c . The details are shown in Figure 2. The geometric constraint function value in Figure 2(b) is larger than that in Figure 2(a). Accordingly, the cluster in Figure 2(b) is more regular. In other words, more regular clusters can be obtained by introducing the geometric constraint function.

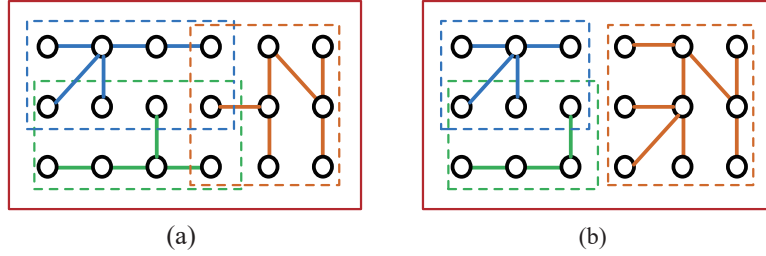


Figure 2. Geometric constraint function value. (a) -3.306 (b) -3.183.