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(54) **LEARNING METHOD AND LEARNING DEVICE FOR IMPROVING IMAGE SEGMENTATION AND TESTING METHOD AND TESTING DEVICE USING THE SAME**

(57) A learning method for improving image segmentation including steps of: (a) acquiring a (1-1)-th to a (1-K)-th feature maps through an encoding layer if a training image is obtained; (b) acquiring a (3-1)-th to a (3-H)-th feature maps by respectively inputting each output of the H encoding filters to a (3-1)-th to a (3-H)-th filters; (c) performing a process of sequentially acquiring a (2-K)-th to a (2-1)-th feature maps either by (i) allowing the respective H decoding filters to respectively use both the

(3-1)-th to the (3-H)-th feature maps and feature maps obtained from respective previous decoding filters of the respective H decoding filters or by (ii) allowing respective K-H decoding filters that are not associated with the (3-1)-th to the (3-H)-th filters to use feature maps gained from respective previous decoding filters of the respective K-H decoding filters; and (d) adjusting parameters of CNN.

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