(72) Inventors:
• **Kim, Yongjoong**
  Gyeongsangbuk-do, 37673 (KR)
• **Nam, Woonhyun**
  Gyeongsangbuk-do, 37656 (KR)
• **Boo, Sukhoon**
  Gyeonggi-do, 14034 (KR)
• **Sung, Myungchul**
  Gyeongsangbuk-do, 37593 (KR)
• **Yeo, Donghun**
  Gyeongsangbuk-do, 37673 (KR)
• **Ryu, Wooju**
  Gyeongsangbuk-do, 37673 (KR)
• **Jang, Taewoong**
  Seoul, 06108 (KR)
• **Jeong, Kyungjoong**
  Gyeongsangbuk-do, 37671 (KR)
• **Je, Hongmo**
  Gyeongsangbuk-do, 37665 (KR)
• **Cho, Hojin**
  Gyeongsangbuk-do, 37673 (KR)

(74) Representative: **Klunker IP
Patentanwälte PartG mbB
Destouchesstraße 68
80796 München (DE)**

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

(57) A method for improving image segmentation by using a learning device is disclosed. The method includes steps of: (a) if a training image is obtained, acquiring $(2\text{-}K)_{th}$ to $(2\text{-}1)_{th}$ feature maps through an encoding layer and a decoding layer, and acquiring 1_{st} to H_{th} losses from the 1_{st} to the H_{th} loss layers respectively corresponding to H feature maps, obtained from the H filters, among the $(2\text{-}K)_{th}$ to the $(2\text{-}1)_{th}$ feature maps; and (b) upon performing a backpropagation process, performing processes of allowing the $(2\text{-}M)_{th}$ filter to apply a convolution operation to $(M\text{-}1)_2$-th adjusted feature map relayed from the $(2\text{-}(M\text{-}1))_{th}$ filter to obtain M_1-th temporary feature map; relaying, to the $(2\text{-}(M+1))_{th}$ filter, M_2-th adjusted feature map obtained by computing the M_{th} loss with the M_1-th temporary feature map; and adjusting at least part of parameters of the $(1\text{-}1)_{th}$ to the $(1\text{-}K)_{th}$ filters and the $(2\text{-}K)_{th}$ to the $(2\text{-}1)_{th}$ filters.

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