0072

Artificial Intelligence Classifies Ceramic Crown and Natural Teeth

I. Morita[1], S. Sakuma[2], Y. Nishida[2], K. Inamoto[3], S. Takami[1]
[1]Japanese Red Cross Toyota College of Nursing, Toyota, Japan, [2]Department of Fixed Prosthodontics and Oral Implantology, Aichi Gakuin University, Nagoya, Japan, [3]Department of Dental Education, Aichi Gakuin University, Nagoya, Japan

Objectives The realization of artificial intelligence (AI), which uses digital devices to capture pictures of the mouth and obtain information about prosthetic devices and oral health, will make people more interested in oral health. This study aimed to explore the possibility of the basic technology of AI classification of prosthetic devices and natural teeth, with a view to the social implementation of such AI. This study clarified the possibility of AI, especially convolutional neural networks (CNN), to classify between porcelain fused to zirconia crown (PFZ) and natural teeth.
Methods Four intraoral photographs were collected from a patient whose maxillary incisor was treated on both sides with PFZ. Of these, two intraoral photographs, the right side and front view, were divided into 24-pixel squares to obtain 26,774 images. From these image data, 1,000 and 113 pieces of training and validation data for the PFZ, natural teeth, and other oral parts, respectively, were randomly selected and used for CNN training.
This CNN model consisted of two convolutional, two max-pooling, and two fully connected layers based on the LeNet architecture. Intraoral photographs (left side and front views) different from those used in the training, divided by 24 pixels, were classified into the PFZ, natural teeth, and other oral parts using the trained CNN. The classified results were reconstructed as images such that the PFZ was red, the natural teeth were cyan, and other oral parts were green.
Results The maxillary incisors on both sides of the two reconstructed right and front images are shown in red, indicating the PFZ; most of the areas corresponding to the natural teeth were colored cyan.
Conclusions It was concluded that AI can discriminate between PFZ and natural teeth.