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On the use of U-Net for dental x-ray image segmentation

Guilherme Nunes Peglow[1], Maurício Braga de Paula[1], Anderson Priebe Ferrugem[1], Dante Augusto Couto Barone[2],Jonas Almeida Rodrigues[2] ,Gabriel Leite Bessa[1] [1]UFPel, [2]UFRGS

Undergraduate or Graduate

Introduction

In this work, we use a U-Net network to perform the segmentation of dental radiographic images to simplify the representation in order to assist dentists and orthodontists in the identification of diseases, pathologies and treatments.

The proposed method

This works presents an approach for the segmentation of bitewing x-rays using U-net[2].

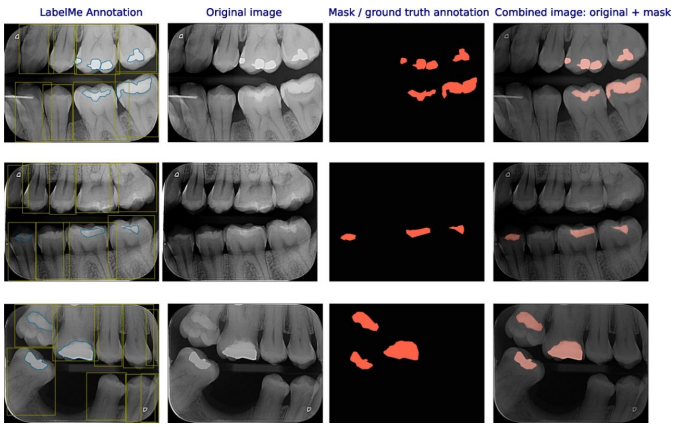

Figure 1: Image annotation using LabelMe, mask and combined image. Source: authors

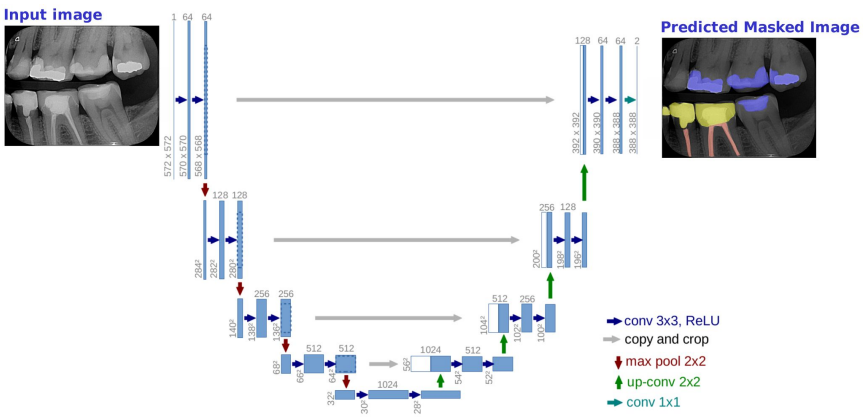

Figure 2: U-Net Architecture
Source: authors

Experimental results

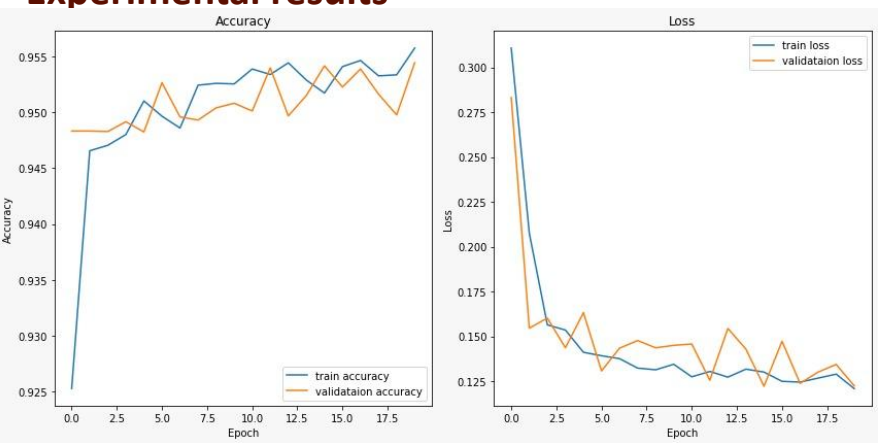

Figure 3: The training loss is consistently decreasing and the validation accuracy is not significantly different from the train accuracy.Source: authors

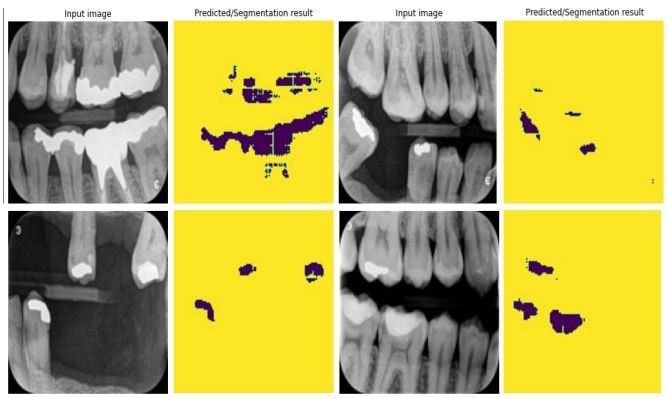

Figure 4: Example of Source image and Segmentation Result.
Source: authors

Conclusion

The presented approach yields satisfactory results, which may improve given more training data

References

[1] A. Torralba, B. C. Russell and J. Yuen, "LabelMe: Online Image Annotation and Applications," in Proceedings of the IEEE, vol. 98, no. 8, pp. 1467-1484, Aug. 2010, doi: 10.1109/JPROC.2010.2050290.
[2] RONNENBERG, O. U-Net: Convolutional Networks for Biomedical Image Segmentation).: <https://doi.org/10.48550/arXiv.1505.04597>.

Affiliation: Federal University of Pelotas - UFPEL
GAIA/CDTec
Pelotas/RS, Brazil Contact: gnpeglow@inf.ufpel.edu.br |

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