STS-Technical Documentation of the White-Pique Segmentation Task Based on 2D Panoramic Images-c_c

1. Introduction to the competition questions and difficulties

1.1 Introduction to the competition

Find robust semi-supervised white space segmentation methods to facilitate the development of white space based on

1.2 Data Overview

In the preliminary and semi-finals, the preliminary data is not allowed for training and use;

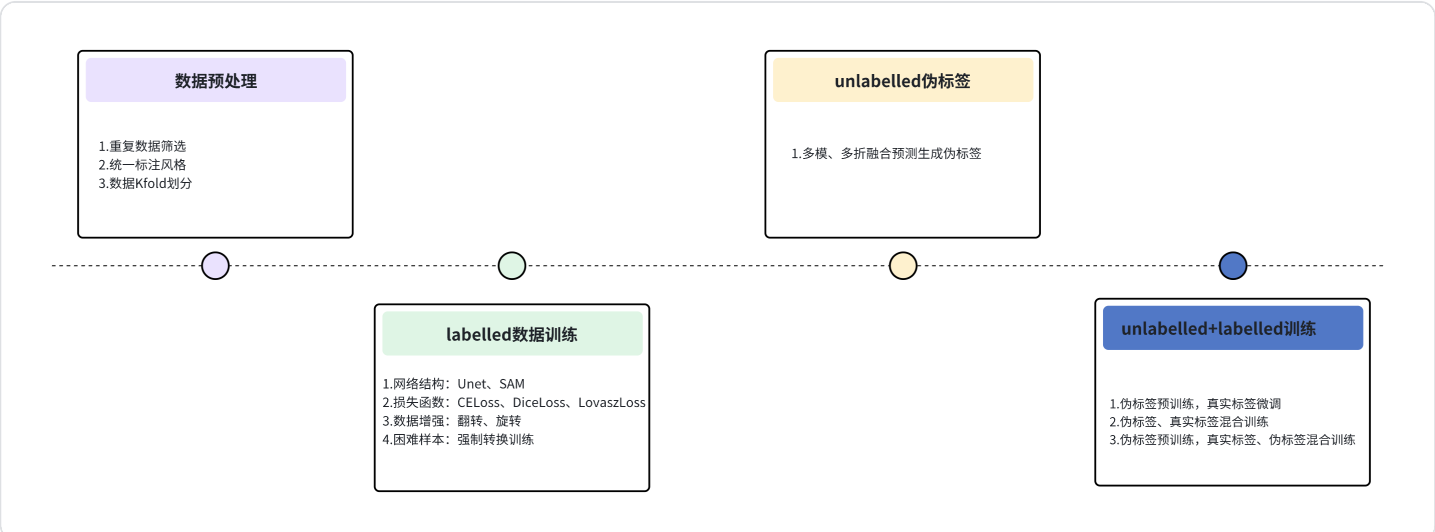
The competition provides a total of 3000 white-screen images, including 900 label white-screen images (providing the original image and the corresponding mask) and 2100 white-screen panoramic images without label white-screen images.

1.3 Data status and difficulties

In the rematch data set, the amount of data containing labels is small, and the labels are completed by different institutions and groups, and the labels of different groups vary;

The training data set has samples that appear many times and are unevenly distributed in the labelled training set and the unlabelled training set, which brings disturbance to the use of the unlabelled training set.

2. Solution



2.1 Data division

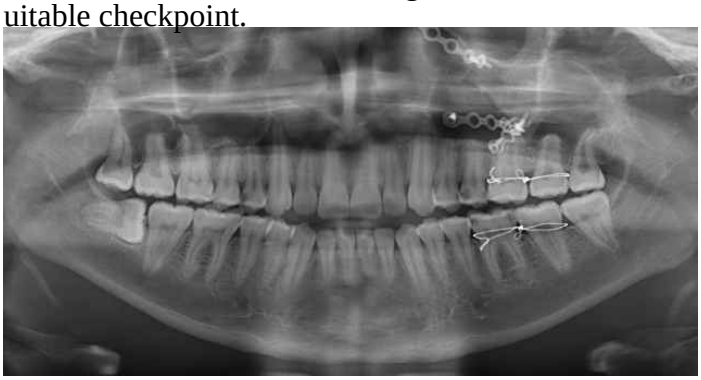
make KFold to re-divider the training data into training sets and verification sets (4:1) to ensure that the distribution c

fold0	Train	Train	Train	Train	Valid
fold1	Train	Train	Train	Valid	Train
fold2	Train	Train	Valid	Train	Train
fold3	Train	Valid	Train	Train	Train
fold4	Valid	Train	Train	Train	Train

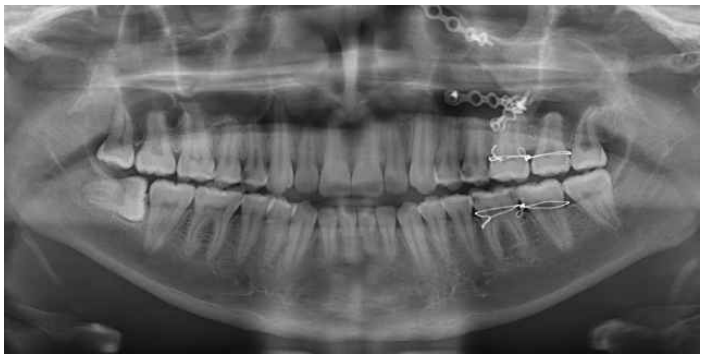
2.2 Data preprocessing

2.2.1 Repeat image filtering

After our statistical observation, there are a large number of repeated images in the training sample. When div iding the data, a set of repeated images may be divided into the training set and the verification set at the sam e time, which will lead to leakage of the verification set, inflated verification indicators, and missing a truly s uitable checkpoint.



train_477.png



train_836.png

train_160.png

train_684.png

2.2.2 Multi-label sample filtering

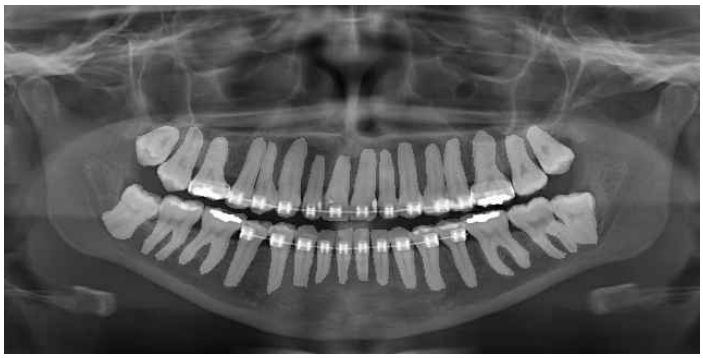
In repeated image pairs, a considerable number of data have label inconsistencies. We have tried many way s to process this type of data:

1. Keep both cases at the same time, but are located in the training set or test set at the same time

2. Delete samples of two tags at the same time

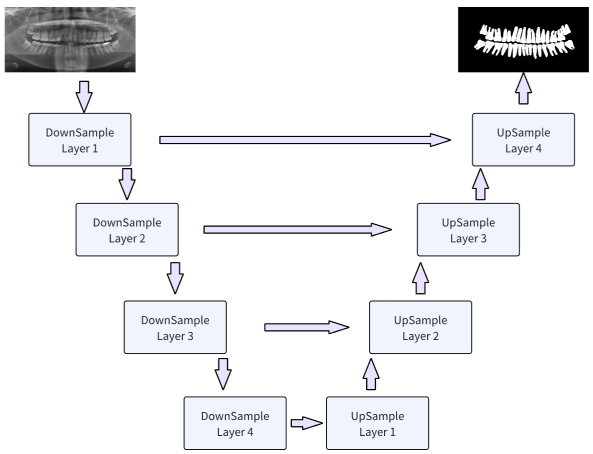
2. Delete one of them and keep the other

After experimental testing, the finer ones are retained, and the test set performs best

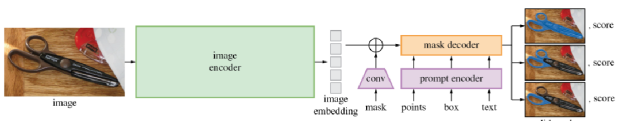


2.3 Model Framework

After preprocessing, the image is uniformly resize to 1024*1024, or 640,1280 feet are sent to the encoding laye r to extract features, and the extracted features are sent to the decoding layer to obtain prediction results.



Unet



Sam

2.4 Pseudo-label

Our 5fold cross-validation score has the same up and down trend as the test set score, and use the best local m odel trained in the labelled dataset to reason about the unlabelled dataset and get a pseudo-label.

For the use of pseudo-labels, we conducted experiments on common usage methods:

1. Real tag + pseudo-tag mixed training;

2. Pseudo-label pre-training + real tag training fine-tuning;

3. Pseudo-label pre-training +real tag+pseudo-label mixed training fine-tuning;

Labelled data	Pesude data	Pesude Pretrain	Cross valid
√	×	×	0.9477
√	×	√	0.9538
√	√	×	0.9546
√	√	√	0.9559

2.5 Difficult sample training

Add data with the lowest 10% of the validation set score to the training set for training to increase the ability to captur

2.6 Model training parameter configuration

2.6.1 Loss function CELoss +Dice Loss+Lovasz Loss

2.6.2 Optimizer AdamW

2.6.3 Learning rate

3e-4

2.6.4 Learning rate decline strategy Cosine decay

2.7 Model prediction

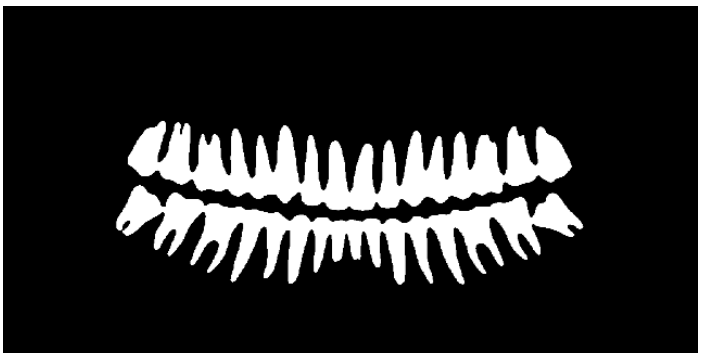
2.7.1 Multimode and multi-scale fusion

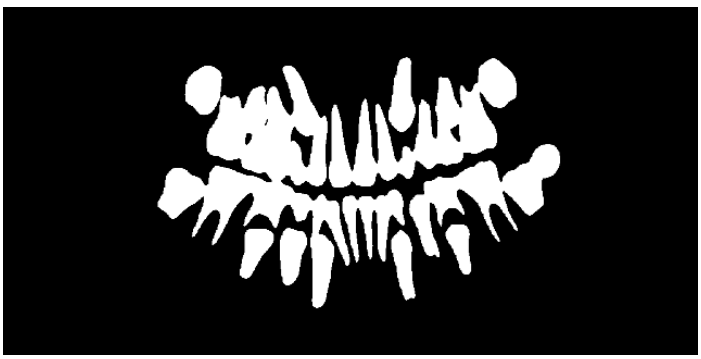
Training sample is conducted using 1024*1024 and 640*1280 scales for Unet and Sam training, and weighted f

2.7.2 TTA

TTA is a commonly used reasoning method to enhance the test images and increase the accuracy of predictions.

3. Results display





4. Reference materials

1. Fang,Yuxin,et al. A Visual Representation for Neon Genesis - arXiv preprint arXiv: 2303.11331,2023.

2. Kirillov, A., Mintun, E., Ravi, N., Mao, H., Rolland, C., Gustafson, L., Xiao, T., Whitehead, S., Berg, A. C., Lo, W.-Y., Dollár, P., and Girshick, R., "Segment anything," (2023). 3. Tan, Mingxing, et al. Smaller Models a nd Faster Training - arXiv preprint arXiv:2104.00298,2021. 4.Zhang H , Cisse M , Dauphin Y N ,et al.mixup: Beyond Empirical Risk Minimization[J]. 2017.DOI:10.48550/arXiv.1710.09412. 5.Lee D H .Pseudo-Label: T he Simple and Efficient Semi-Supervised Learning Method for Deep Neural Networks[J]. 2013.