

Measurement of Fetal Head Circumference using Ultrasound

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Practical 2

1 Introduction

During pregnancy, ultrasound imaging plays a crucial role in monitoring fetal development by capturing biometric measurements. One of the key parameters assessed is the fetal head circumference (HC), which is essential for estimating gestational age and evaluating fetal growth. HC is typically measured in a specific cross-sectional view of the fetal head, known as the standard plane. In this work, I use the HC18 dataset, which includes 1334 two-dimensional (2D) ultrasound images of the standard plane, to develop a deep learning model capable of automatically estimating the fetal head circumference, thereby supporting more efficient and consistent fetal assessments.

2 Dataset

The data is divided into a training set of 999 images and a test set of 335 images. The size of each 2D ultrasound image is 800 by 540 pixels with a pixel size ranging from 0.052 to 0.326 mm.

The training set also includes an image with the manual annotation of the head circumference for each HC, which was made by a trained sonographer. The csv file includes the head circumference measurement (in millimeters) for each annotated HC in the training set.

All filenames start with a number. Although there are 999 images in the training set, the filenames only go up to 805. Some ultrasound images were taken during the same echoscopic examination and therefore have a very similar appearance. These images have an additional number in the filename, located between the

underscore (–) and HC.

3 Data Preprocessing

mask generation

4 Model

In this work, I employ the u-net structure.

5 Results

result

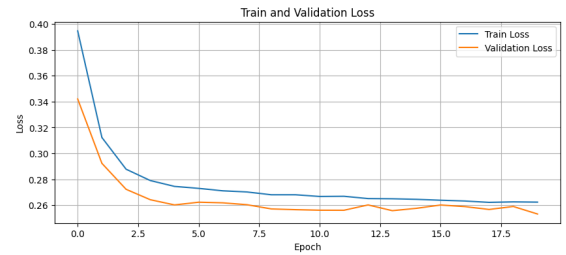


Figure 1: Train & val loss