

Fetal Head Circumference Prediction using Random Forest

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I. INTRODUCTION

In this report, we will utilize the public image dataset, namely Fetal Head Circumference. The dataset consists of ultrasound images of fetal heads. The objective of the report is to calculate the fetal head circumference in millimeters from ultrasound images. This task can be formulated as a regression problem, where the input is pixel size, and the result should be the prediction of fetal head circumference.

II. DATASET DESCRIPTION

The dataset is a CSV file that contains pixel size (millimeters per pixel) and the corresponding ground-truth head circumference values in millimeters. Each row in the CSV file corresponds to an image in the training set based on the file ordering. The pixel size information enables conversion from pixel-based measurements to real-world. We then split into a training and a validation set before feeding them into Machine Learning model, with the MAE as the loss function.

III. MODEL

In this project, we use the Random Forest Regressor from `sklearn.ensemble` library, with `n_estimators=100`, `max_depth=10`, then use the `fit()` function to get the prediction.

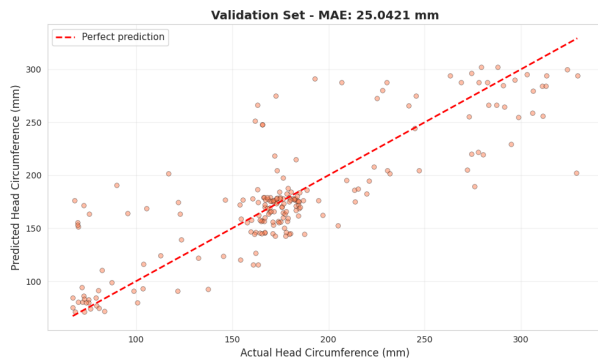


Fig. 1. Graph of Validation Set

We get the result is 25.0421 mmm with MAE metrics.

IV. RESULT COMPARISON

Comparing with the given benchmark, our result is pretty high as we use a simple machine learning model. Some report used a machine learning model but they did feature engineering which is create more columns that help the model to learn. Among all the existing work, deep learning models got the lowest MAE as they did research with not only csv file, but also images.