DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY

Machine Learning in Medicine

Report 2

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1 Introduction

This report presents Practical 2 of Machine Learning in Medicine, where a publicly available Kaggle dataset is analyzed to understand its structure and features before developing a regression model. The study involves a detailed description of the dataset, including its features, sources, and preprocessing steps. A deep learning approach is implemented to build the regression model, and its performance is thoroughly evaluated. The results are then compared to those reported in the original research paper to assess the effectiveness of the proposed model.

2 Dataset

The dataset comprises a training set with 999 images and a test set with 335 images. Each 2D ultrasound image has a resolution of 800×540 pixels, with pixel sizes ranging from 0.052 mm to 0.326 mm. The pixel size information for each image is provided in two CSV files: `training_set_pixel_size_and_HC.csv` for the training set and `test_set_pixel_size.csv` for the test set. Additionally, the training set includes images with manual head circumference (HC) annotations, created by a trained sonographer. The corresponding HC measurements, recorded in millimeters, are available in the `training_set_pixel_size_and_HC.csv` file. Although the training set contains 999 images, the filenames only go up to 805. This discrepancy is due to some ultrasound images being captured during the same echoscopic examination, resulting in nearly identical appearances. These duplicate images are distinguished by an additional identifier in their filenames, placed between "_" and "HC" (e.g., `010_HC.png` and `010_2HC.png`).

3 Model Architecture

4 Result