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Algorithm Development Files

This folder contains all software libraries and notebooks to develop the algorithms. It is divided into four folders:

* HeartFEV1\_thesis\_results
* saved\_models
* notebooks
* libs

Details on each folder are provided below.

1. HeartFEV1\_thesis\_results

This folder contains excel files with the true and estimated FEV1 values, FVC values, FEV1 z-scores for all models. Matlab scripts to generate results shown in the thesis are also provided.

1. saved\_models

This folder contains all the pre-trained neural network model files.

1. notebooks

This folder contains all the notebooks that implement the three main algorithms:

1. EDR Algorithm - Extract respiratory signal from ECG signals (***EDR\_Algorithm.ipynb***)
2. PDR Algorithm - Extract respiratory signal from PPG signals (***PDR\_Algorithm.ipynb***)
3. Feature Extraction for FEV1 Estimation - Extract hand crafted features from respiratory and EDR signals and infer FEV1 using a decision tree regressor (***FEV1 Estimation Using Extracted Features.ipynb***)
4. Residual Neural Network for FEV1 Estimation - Implement the deep learning approach to estimate FEV1 from ECG signals (***FEV1 Estimation Using Residual Neural Network.ipynb***).
5. Run the entire process for FEV1 Estimation using the ***Complete FEV1 Estimation.ipynb***
6. libs

This folder contains most of the functions used to develop the algorithms. For example the ***SQIs.py*** has the ECG and respiratory signal quality checks, the ***pre-processing.py*** has the steps taken to pre-process the data, the ***generate\_dataset.py*** creates all datasets used in the code.