

Automated Cardiac Disease Challenge (ACDC)



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Introduction and Dataset

- Using cine-MRI data from 150 patients, classify heart scans into 5 subgroups
- Subgroups:
 - Healthy - NOR
 - Myocardial infarction - MINF
 - Dilated cardiomyopathy - DCM
 - Hypertrophic cardiomyopathy - HCM
 - Abnormal right ventricle - RV
- Previous solutions
 - 1D CNN for practicality to use normal CPU, achieving 97% on training and 96% on testing

Methods and Results

- We created our own model with 1D CNN with a 80-20 split
- Achieved 86% training and validation accuracy
 - 33% test accuracy

Model: "sequential_1"

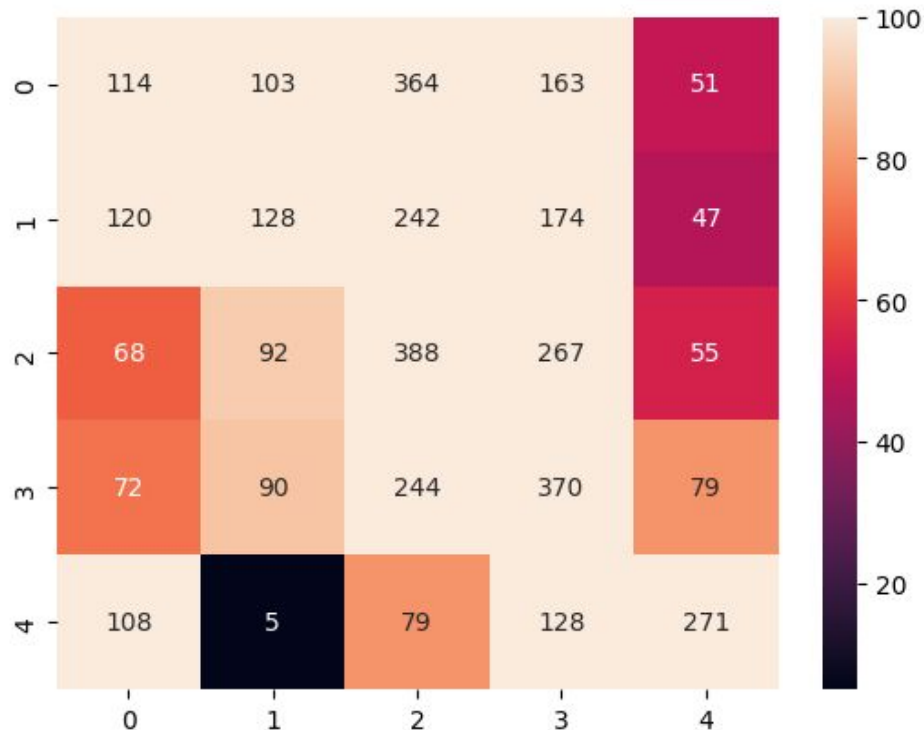
Layer (type)	Output Shape	Param #
conv1d_2 (Conv1D)	(None, 107, 9)	66537
max_pooling1d_2 (MaxPooling1D)	(None, 106, 9)	0
dropout_3 (Dropout)	(None, 106, 9)	0
conv1d_3 (Conv1D)	(None, 59, 9)	3897
max_pooling1d_3 (MaxPooling1D)	(None, 29, 9)	0
dropout_4 (Dropout)	(None, 29, 9)	0
flatten_1 (Flatten)	(None, 261)	0
dense_2 (Dense)	(None, 128)	33536
dropout_5 (Dropout)	(None, 128)	0
dense_3 (Dense)	(None, 5)	645

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Total params: 104615 (408.65 KB)
Trainable params: 104615 (408.65 KB)
Non-trainable params: 0 (0.00 Byte)

Evaluation

- Balanced accuracy score: 33.2%
- Classification report
- Confusion matrix

	precision	recall	f1-score	support
0	0.24	0.14	0.18	795
1	0.31	0.18	0.23	711
2	0.29	0.45	0.35	870
3	0.34	0.43	0.38	855
4	0.54	0.46	0.50	591
accuracy			0.33	3822
macro avg	0.34	0.33	0.33	3822
weighted avg	0.33	0.33	0.32	3822



Discussion

- Possibility of overfitting due to disparity between training and test accuracy
- Solutions:
 - Use greater amounts of data to prevent overfitting
 - Use a less complex model
 - Use cross-validation