



ARRHYTHMIA RECOGNITION

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Motivation

Early and accurate detection of arrhythmia is important for survivability. There were attempts for automatic classification of arrhythmia with up to 87.71% accuracy. There are still differences between cardiologist's and program classification. With smarter classifications we can detect arrhythmia in early stages and decrease fatal outcomes.

Dataset

From machine learning repository
<https://archive.ics.uci.edu/ml/datasets/Arrhythmia> dataset has 452 EKG reports with 279 attributes. Dataset is not complete so I used only 420 valid EKG reports. I extracted 18 columns based on correlation from
<http://www.sciencedirect.com/science/article/pii/S2212017313004933>

I also tried to train NN with attributes based on correlation that I counted. I used attributes with correlation smaller than 0.6 (241 attribute) and I tried training NN with all attributes.



Methods

Neurolab library for python was used. I used feed forward neural network with one input, one output and one hidden layer. 80% of dataset was used for training neural network and 20% was used for testing it. I used resilient backpropagation as training function. I trained NN for classifying and NN for recognizing arrhythmia.

Results

Neural network was accurate from 65-81% in classifying and 70%-85% in recognizing existence of arrhythmia. In this cases neural network successfully classified arrhythmia in one of 16 categories. This results are similar to existing results in this field. They could be improved with choosing attributes on cardiologist's opinion or using other neural networks.

Further research

With better training of neural networks and more data accuracy can be increased. It will be an improvement if in future works we could include cardiologist's opinion on important attributes that have bigger influence in causing arrhythmia. Also it would be improvement if data was recognized from EKG photos or EKG devices and not loaded from file in text form.