**Disease classification from lead-limited ECGs**

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ECG is the abbreviation of Electrocardiography, which is a graph that reflects the condition of the heart. Generally speaking, ECG is 12-lead. In that situation, the doctor will place ten electrodes on the patient's limbs and chest and from twelve different angles to measure the electrical potential of the patient's heart. Sometimes, 6-lead ECG and 2-lead ECG is also used in the medical field. In this project, we need to use 6-lead and 2-lead ECG to classify the patient's condition.

There is much paper about how to make disease classification from ECGs. In traditional machine learning techniques, researchers consider methods like Fuzzy set, Rough set and SVM. However, traditional machine learning methods cannot meet the accuracy requirements of classification, so people turn into deep learning ways. In deep learning ways, researchers trends to use models like Artificial Neural Network(ANN). Deep learning easily leads to over-fitting, resulting in low accuracy of the model on the testing set. Therefore, several scholars try to combine traditional ways with deep learning ways, such as combating Artificial Neural Network (ANN) with genetic algorithm(GA).

This project aims to deal with the situation that the leads are limited, which is to identify clinical diagnoses from twelve-lead, six-lead (I, II, III, aVL, aVR, and aVF), three-lead (I, II, V2), and two-lead (II and V5) ECG recordings. The difficulty of disease classification has increased, and the classification needs to be completed when the lead is small. This means that the accuracy of the previous model will decrease or will occur overfitting problems. In this project, it will be applied to traditional machine learning approaches to deep learning ways. Consider modifying it on the basis of the resNet neural network. Also, Momentum, RMSprop and Adam will be used to improve the accuracy development set and on the testing set.