# CinC Challenge  Assessing the Usability of ECG by Ensemble Decision Trees

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The presented work faces the task of quantifying the usability of ECG for diagnostic purposes by using decision trees. To this end, the approach detailed here relies on multiple, computational simple parameters from time and frequency domain. First of all, the creation of tree-based classifiers without restrictions on their complexity, i.e. classifiers which are allowed to rely on a wide variety of parameters, is in the scope of our work. Thereto, single decision trees are combined to ensemble classifiers. The training of the single trees relies on BAGGING (bootstrap aggregating). This procedure pursues three goals: at first, to reduce the influence of outliers; secondly, to avoid over-fitting to the present training data; thirdly, to take account of a high inter- and intra-observer variability. Beyond mere classifiers design, in order to obtain easily interpretable decision trees, the possibilities of a reduced parameter space are studied. With respect to the classification performance, the obtained Out-Of-Bag classification error is about 10 %, i.e. a classification accuracy of 90 % is reached. Considering the CinC challenge, our first submission yielded a preliminary classification accuracy of 86.3 % on Test Set B. Results until today indicate that even simplified (i.e. using a reduced set of parameters) classifiers, as targeted in the second part of our work, obtain results in similar regions. However, all results are strongly affected by a positive performance offset which results from a significant number of trivial cases (i.e. ECG which exhibit exclusively a baseline in at least one channel). Altogether, the proposed method offers a computational simple, real-time capable way to quantify the usability of ECG. From now, our work will focus on the improvement of our first intermediary result. However, the comparative studies have to be awaited for a meaningful appraisal regarding the global efficiency of the proposed ensemble classifiers.