A Rule-Based Method for ECG Quality Control

Benjamin E Moody*

Cambridge, MA, United States

The ubiquity of smart phones and similar mobile computing devices makes it possible to collect ECGs using portable and inexpensive hardware, even for users who lack the expertise to interpret the signals themselves. To aid in this process, it is helpful for the mobile device to analyze recordings as they are made, and provide feedback to the operator about their quality. For this analysis to be as useful as possible, it needs to be performed in real time, while the recording is being made, so that the operator can correct the problem immediately. Furthermore, it should provide guidance to an inexperienced operator by indicating the likely causes of a poor-quality ECG.

An algorithm is presented to assess ECG signal quality using a set of heuristic rules. These rules are intended to identify the problems that are commonly encountered, and are designed to be fairly simple to evaluate, requiring a minimum amount of computation on the mobile device. To ensure that the algorithm is fast enough to run in real time on a wide variety of mobile devices, it is designed to avoid floating-point arithmetic and minimize memory usage, without compromising its accuracy. In addition, the tests are designed to provide useful feedback to the operator about the most likely causes of a poor-quality recording. This algorithm received a preliminary score of 0.850 in the 2011 PhysioNet/CinC Challenge.