Towards Distributed Real-Time Physiological Processing in Mobile Environments

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May 28, 2012
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Abstract

Physiological monitoring is the practice of using sensors to read, store, process and interpret physiological data from organic beings, including biofeedback signals associated with heart, brain, muscle and other organ activity. Physiological data retrieved from the body can be used for disease diagnose and other activities, such as monitoring physical and mental stress levels of participants in physical training exercises.

In addition to monitoring individuals, physiological data can be aggregated to monitor groups. However, this kind of group-monitoring can present difficulties in mobile environments, particularly concerning how to process and transform the raw physiological data in real-time. Current techniques involve the use of either fixed processing resources (such as workstations or servers) or the use of Cloud computing, which requires a stable, uninterrupted mobile broadband communications network - neither of which are common in remote mobile environments.

This dissertation proposes to improve existing methods of physiological monitoring. This technique aims to monitor, analyse and report physiological data in real-time by leveraging mobile devices as distributed processors. The viability of this approach is evaluated by testing the implementation of a system based on these principles in a number of real-world physiological processing examples.