ISBI 2011 Paper Submission

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Paper Title: AN ANALYSIS OF BLOOD-OXYGEN-LEVEL-DEPENDENT SIGNAL PARAMETER ESTIMATION USING PARTICLE FILTERS

Abstract Text: The Blood-Oxygen-Level-Dependent (BOLD) signal that is measured by functional magnetic resonance imaging (fMRI) has been the subject of extensive research since the first development of the balloon model. While there are definite benefits to moving from the Canonical Hemodynamic Response function to a physiologically inspired BOLD model, significant barriers remain. Optimizing even the simplest balloon model requires searching within 7 dimensions, and even more complex models exist. Whereas traditional methods of analyzing fMRI aims to determine where activation occurs, BOLD models seek a parametric representation of the signal. Unfortunately, the nonlinear nature of these models makes it difficult to analyze, therefore this work demonstrates the use of a particle filter to regresses the simplest form of the BOLD model. The results show that the system of equations are not observable, leading to a large range of parameters that are consistent with the measurements.

Category	Topic
Methods	Probabilistic, statistical, and Monte-Carlo methods
Modalities	Functional magnetic resonance imaging
Applications	Functional imaging
Applications	Brain imaging

Authors:

1. Micah Chambers, Virginia tech (*)
2. Chris Wyatt, Virginia tech (*)

(*) denotes author will be included in status emails, update requests, etc.

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