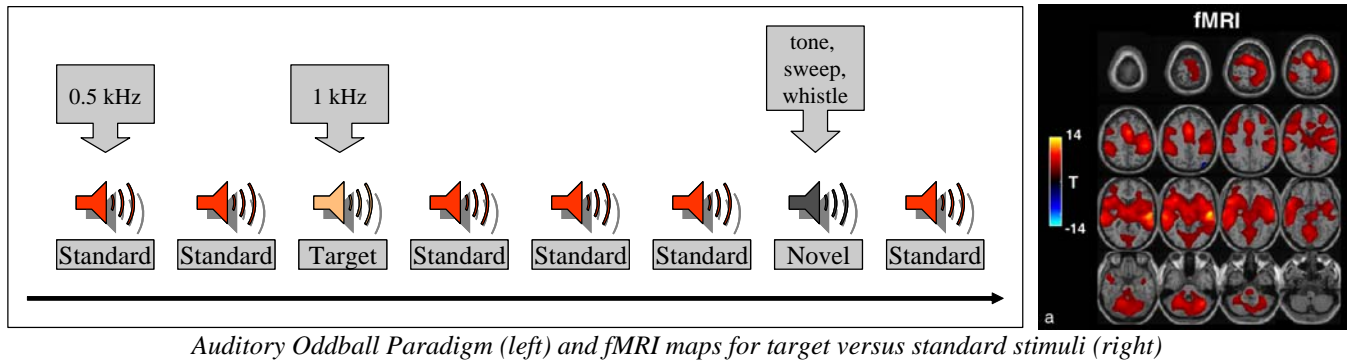


fMRI Course:
Processing of Functional Magnetic Resonance Imaging Data
Auditory Oddball Task

1. Introduction

Functional Magnetic Resonance Imaging (fMRI) data shows localized hemodynamic changes related to neuronal activation. A 3D image is collected every few seconds during the performance of a task. The task timing information can be used to analyze the fMRI data. For this competition data set, you are asked to analyze data collected during the performance of an auditory oddball task. Data from two different runs (which are typically averaged together) are provided along with the paradigm timing files for each run. The auditory oddball task is a paradigm in which infrequent, task-relevant target ‘oddball’ stimuli are interspersed with infrequent task-irrelevant novel stimuli and frequent standard stimuli.



A picture of the auditory oddball task and a target time-locked average is presented above. Typical approaches to pre-processing these data include motion correction, spatial normalization to a template, and spatial smoothing. Identification of activated areas is typically done by creating three time series regressors (one for each of the behavioral variables above) and possibly their temporal derivatives, and fitting these to the time series for each position (voxel) of the image. Often low frequency drift nuisance terms are modeled or filtered out as well.

2. Data

One data file and a behavioral file should be downloaded. Two runs were collected. For each run there are 249 files numbered *007.img through *255.img (files in ‘1’ and ‘2’ directories). The stimulus timing files are provided in a separate ASCII file for each run of target (TRG_PR_1* & TRG_PR_2*), novel (NOV_OM_1* & NOV_OM_2*), & standard (STD_OM_1* & STD_OM_2*) stimuli. The timing in the stimulus timing files is in units of scans (so a 0 would mean that a stimulus occurred during the first scan, i.e. 007*.img). For this experiment, the TR (duration of each image in time) is 1.5 seconds, the number of voxels are x=64, y=64, z=29 and voxel dimensions are 2mm x 2 mm x 5mm. If more details are desired, please contact me.