Progress Report for Project Alpha

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Background

The Paper

- From OpenFMRI.org (ds009)
- "The Generality of Self-Control" (Jessica Cohen, Russell Poldrack)

The Data

- BART study with event-related neurological stimulus (balloon demo)
- 24 subjects, 3 conditions per subject
  - Condition 1: Inflation
  - Condition 2: Pop Pop
  - Condition 3: Cash out dem monies
- Download, decompress and check hashes of data

Convolution: Worked with problems with event-related stimulus model

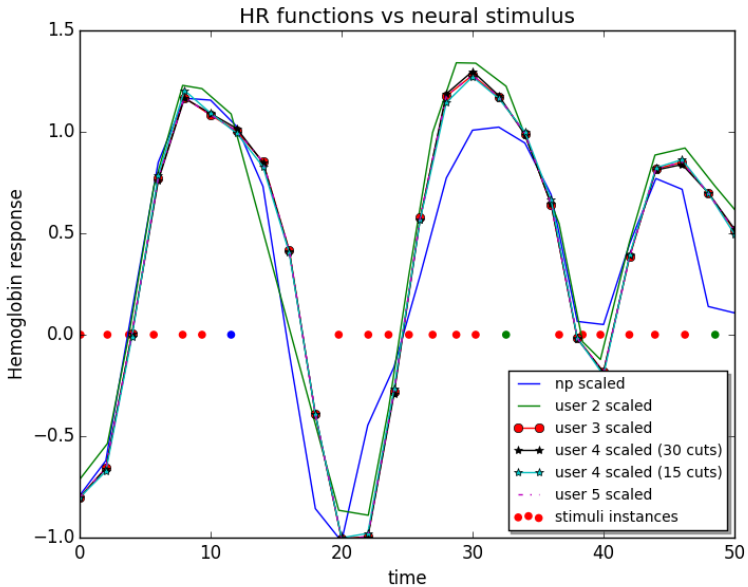
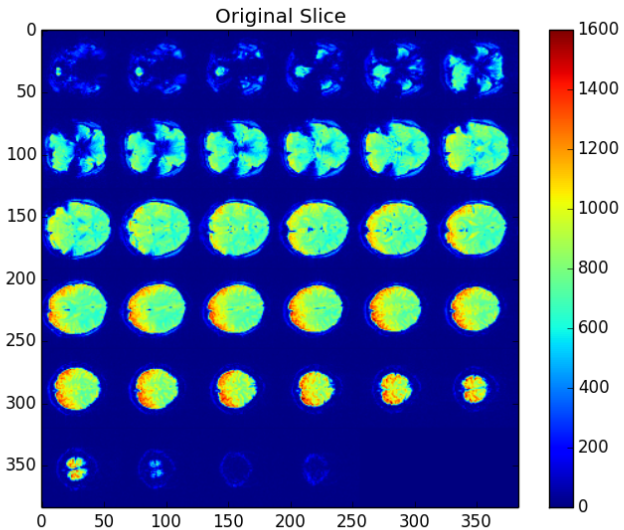


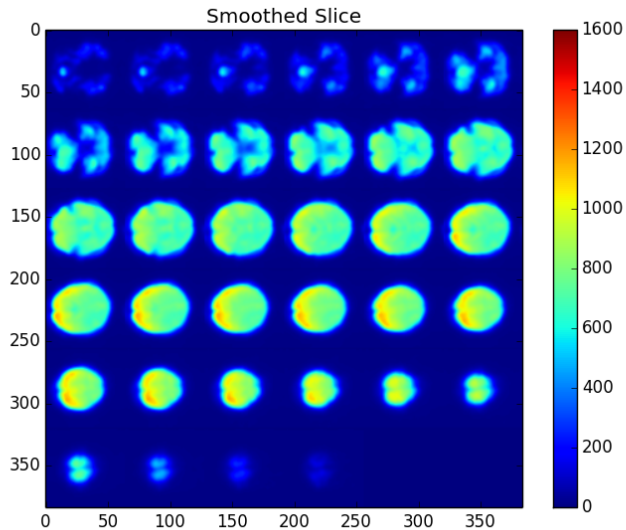
Figure 1:Different convolution functions vs. the Neural stimulus

name in graph	Speed per loop
np	14.4 µs
user 2	972 ms
user 3	1.15 s
user 4 (15 cuts)	98.3 ms
user 4 (30 cuts)	185 ms
user 5	110 ms

Figure 2:Speed to create HRF predictions for Subject 001, all conditions

Smoothing: Convolution with a Gaussian filter (scipy module)





Linear regression: Single and multiple regression with stimulus (all conditions and seperate)

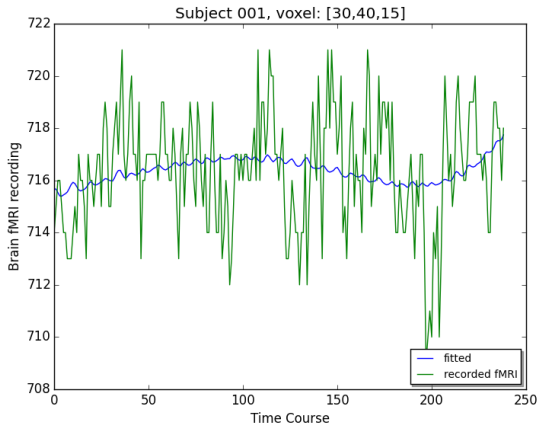


Figure 3:Fitted vs Actual

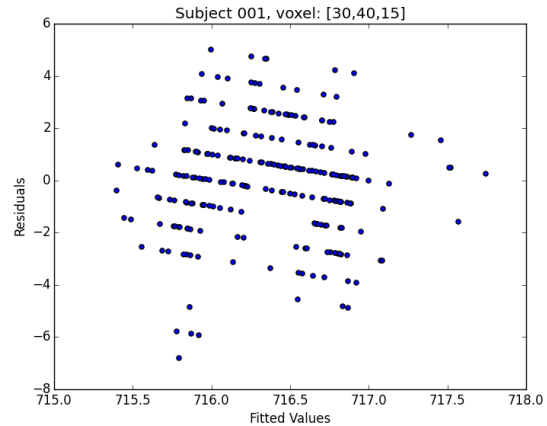


Figure 4:Fitted vs Residual

Hypothesis testing: General t-tests on β values, and across subject analysis

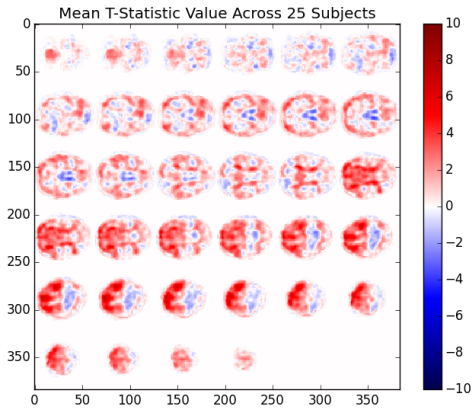


Figure 5:Smoothed t-values

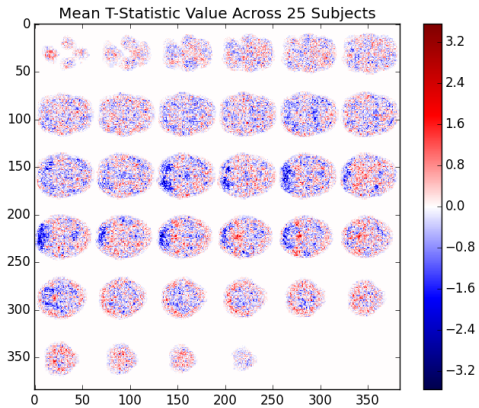
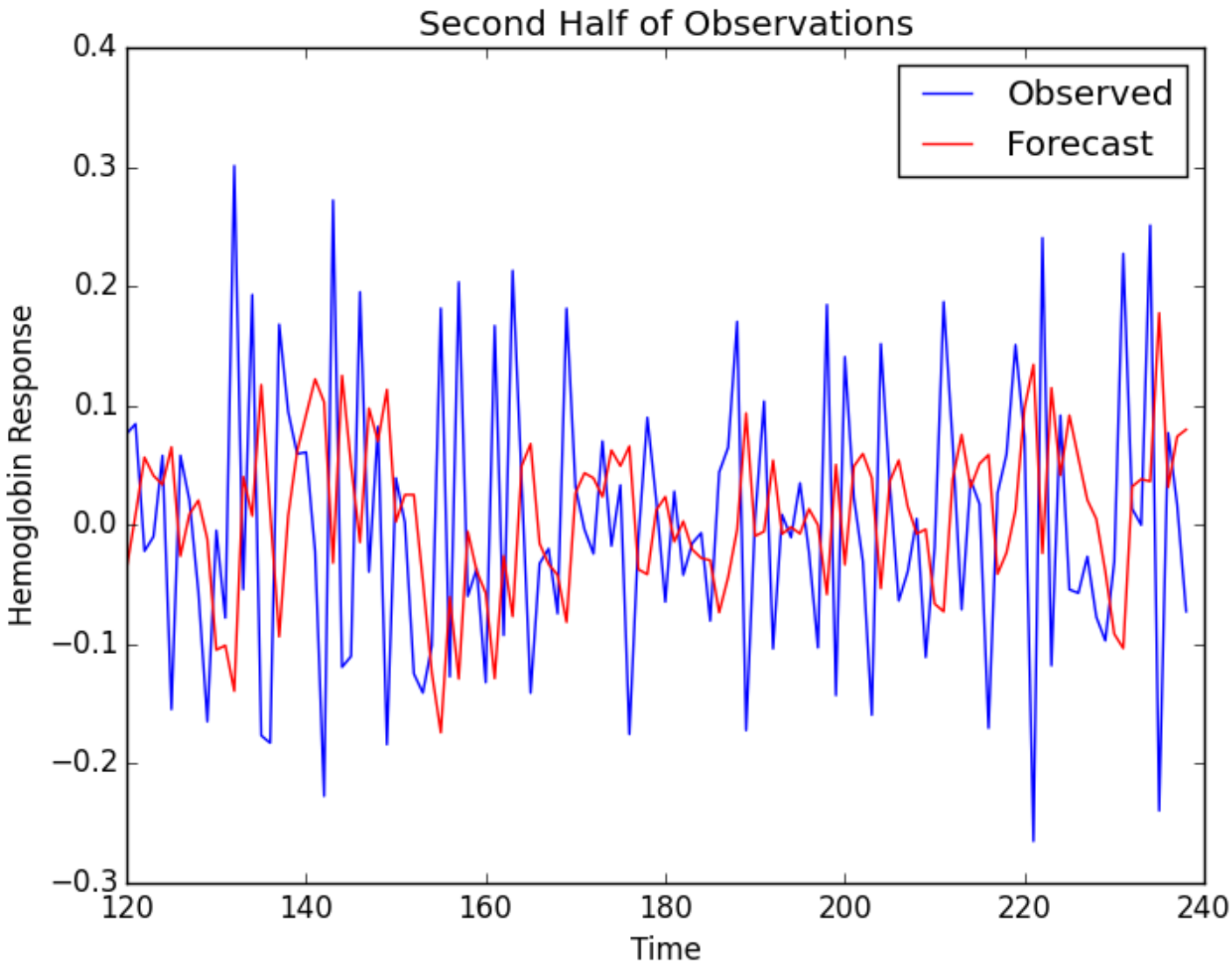


Figure 6:unsmoothed t-values

Time series: ARIMA model



Clustering

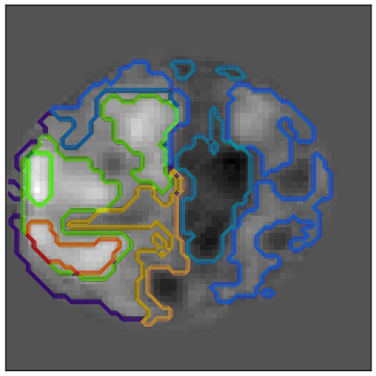


Figure 7:Clustering 1

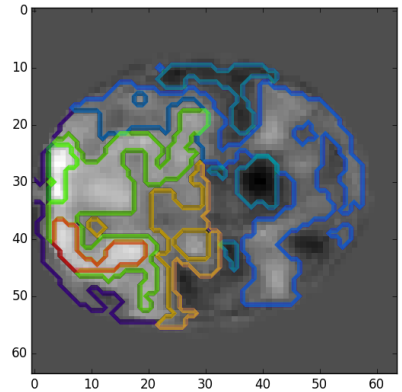


Figure 8:Clustering 2