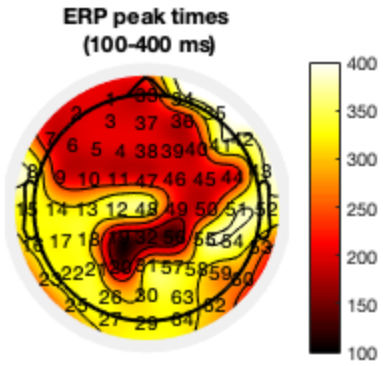
Please note that this project is from a course by Mike x Cohen

Loop through each channel and find the peak time of the ERP between 100 and 400 ms.

Store these peak times in a separate variable, and then make a topographical plot of the peak times. Repeat for a low-pass filtered ERP.

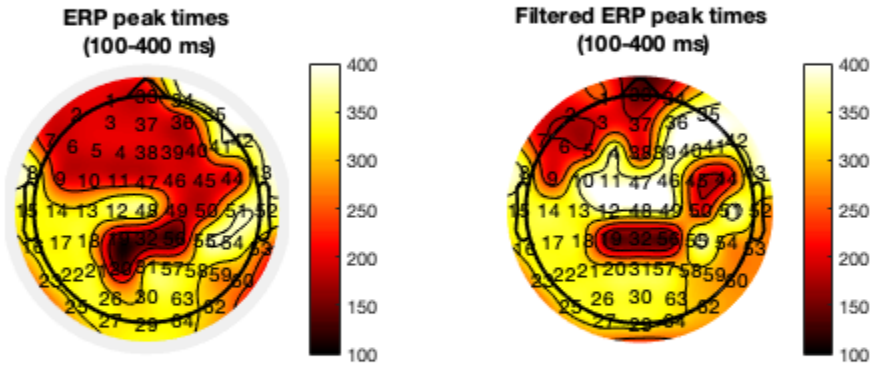
```
load sampleEEGdata.mat


% define time boundaries and convert to indices
timeboundaries = [ 100 400 ]; % in ms
timeidx = dsearchn(EEG.times',timeboundaries');

% trick! it doesn't need to be done in a loop
[~,maxERPtime] = max(mean(EEG.data(:,timeidx(1):timeidx(2),:),3),
[],2);

% convert indices back to ms
maxERPtime = EEG.times(maxERPtime+timeidx(1)-1);

% make plot
figure(1), clf
subplot(121)
topoplotIndie(maxERPtime,EEG.chanlocs,'numcontour',4,'electrodes','numbers');
title({'ERP peak times';[' (' num2str(timeboundaries(1)) '-'
 num2str(timeboundaries(2)) ' ms)' ]})
set(gca,'clim',timeboundaries)
colormap hot
colorbar
```



repeat for filtered ERP

```
% low-pass filter
lowcut = 15;
filttime = -.3:1/EEG.srate:.3;
filtkern = sin(2*pi*lowcut*filttime) ./ filttime;

% adjust NaN and normalize filter to unit-gain
filtkern(~isfinite(filtkern)) = max(filtkern);
filtkern = filtkern./sum(filtkern);

% windowed sinc filter
filtkern = filtkern .* hann(length(filttime))';


% filter
erp = zeros(EEG.nbchan,EEG.pnts);
for chani=1:EEG.nbchan
    erp(chani,:) =
 filtfilt(filtkern,1,double(mean(EEG.data(chani,:,:),3)));
end

[~,maxERPtime] = max(abs(erp(:,timeidx(1):timeidx(2))),[],2);

% convert indices back to ms
```

```
maxERPtime = EEG.times(maxERPtime+timeidx(1)-1);

% make plot
subplot(122)
topoplotIndie(maxERPtime,EEG.chanlocs,'numcontour',4,'electrodes','numbers');
title({'Filtered ERP peak times';[ ' (' num2str(timeboundaries(1)) '-'
 num2str(timeboundaries(2)) ' ms)' ]})
set(gca,'clim',timeboundaries)
colormap hot
colorbar
```



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