Supernovae

Studying Neurological differences between winning and losing a gamble

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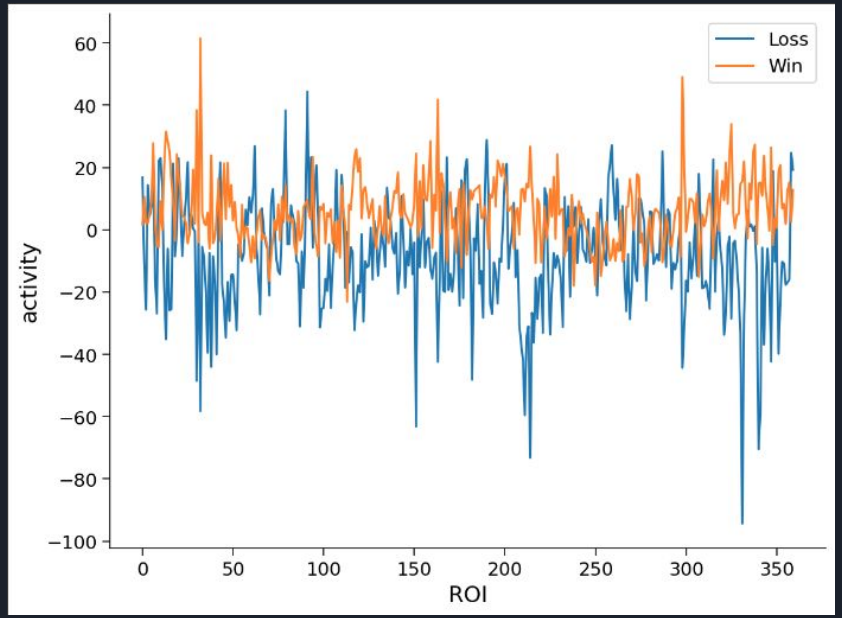
Is there a difference in the way different brain regions react to losing or winning a gamble?

We processed our data so that we would have a 360d-dimensional vector representing instances in which a subject either lost or won a gamble.

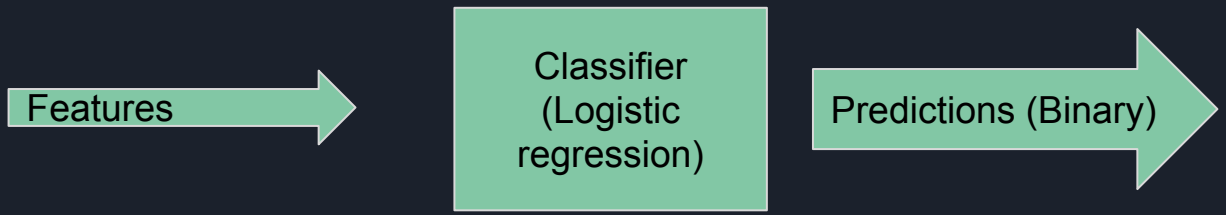
Let's look at the first subject and plot an instance in which they won and lost a gamble:



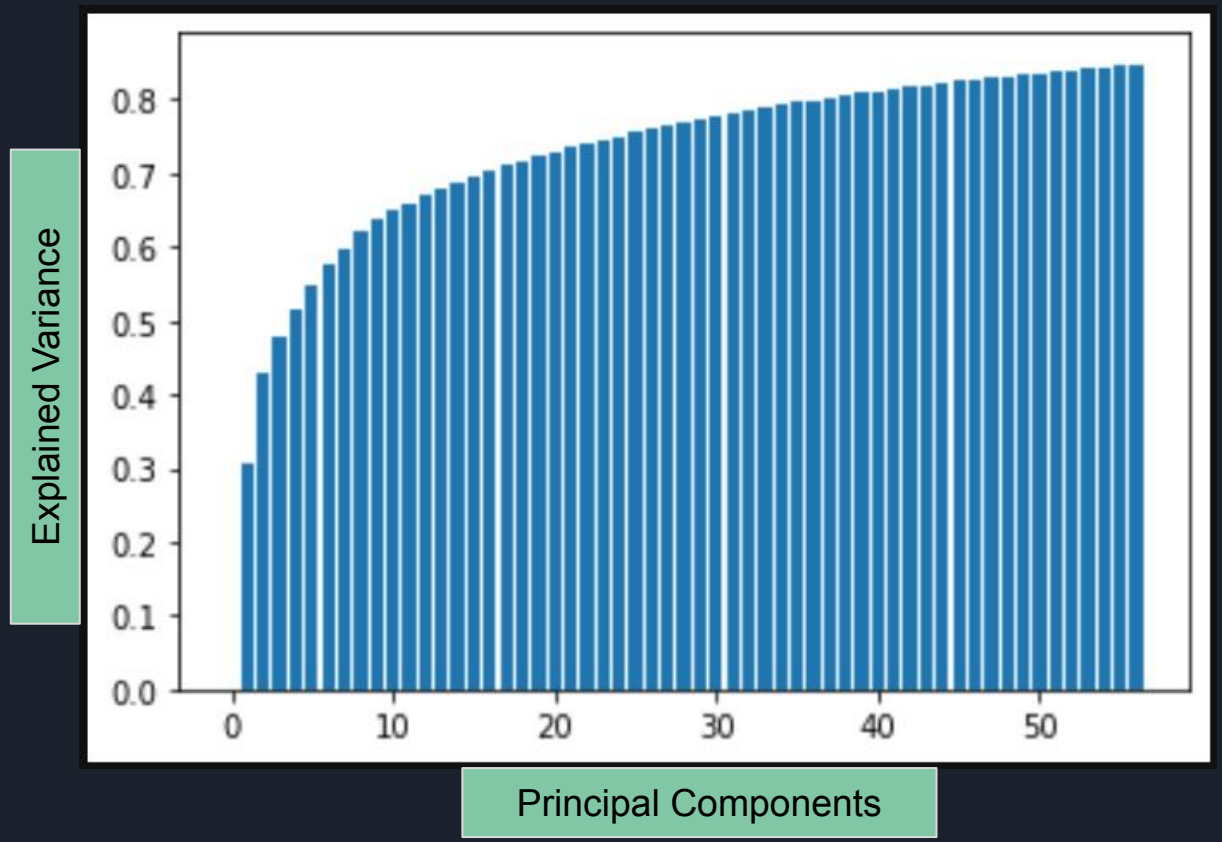
Methodology

A = [x_1 , x_2, x_3,...,x_n] n: size x: 360 dimensional vector representation of the brain.

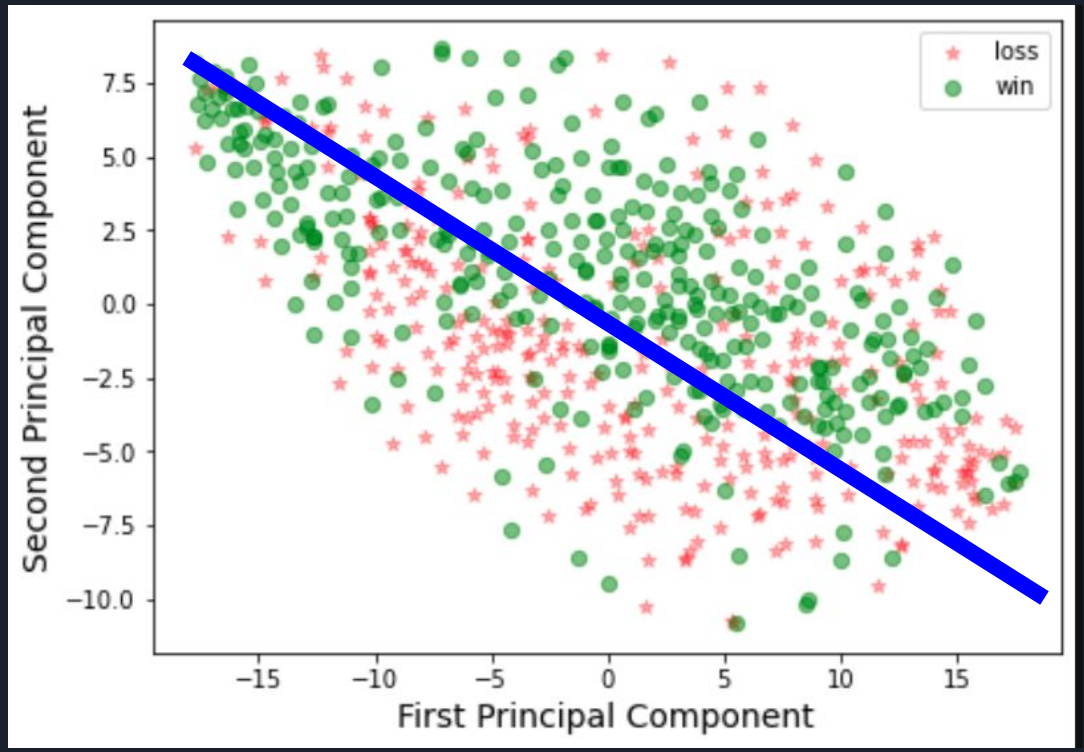
y =[1,0,1,0,..,y_n] 1: win , 0: loss



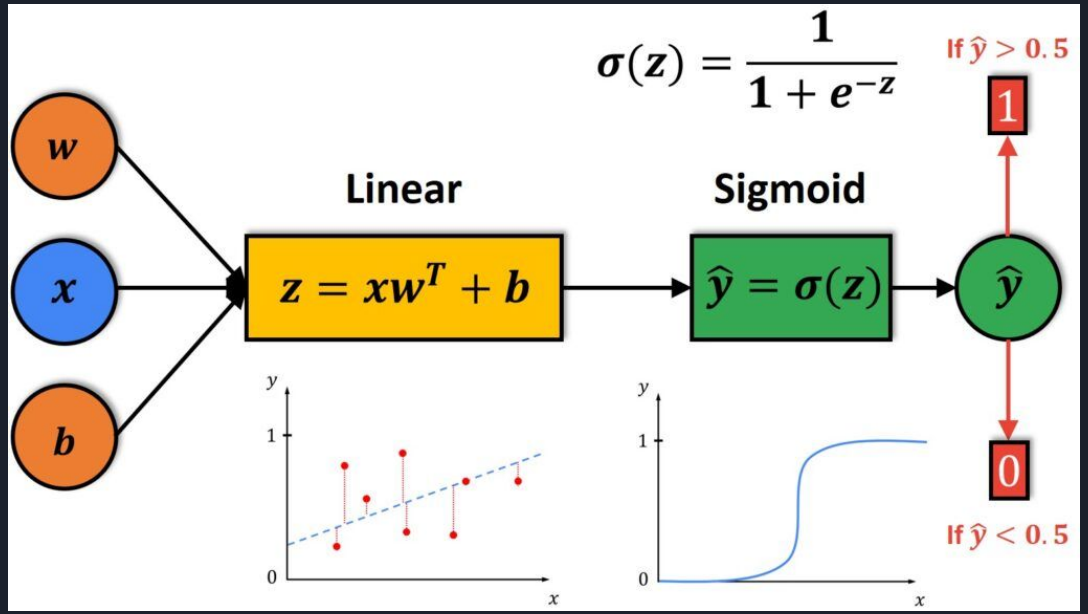
PCA


Explained Variance
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0
10
20
30
40
50
Principal Components

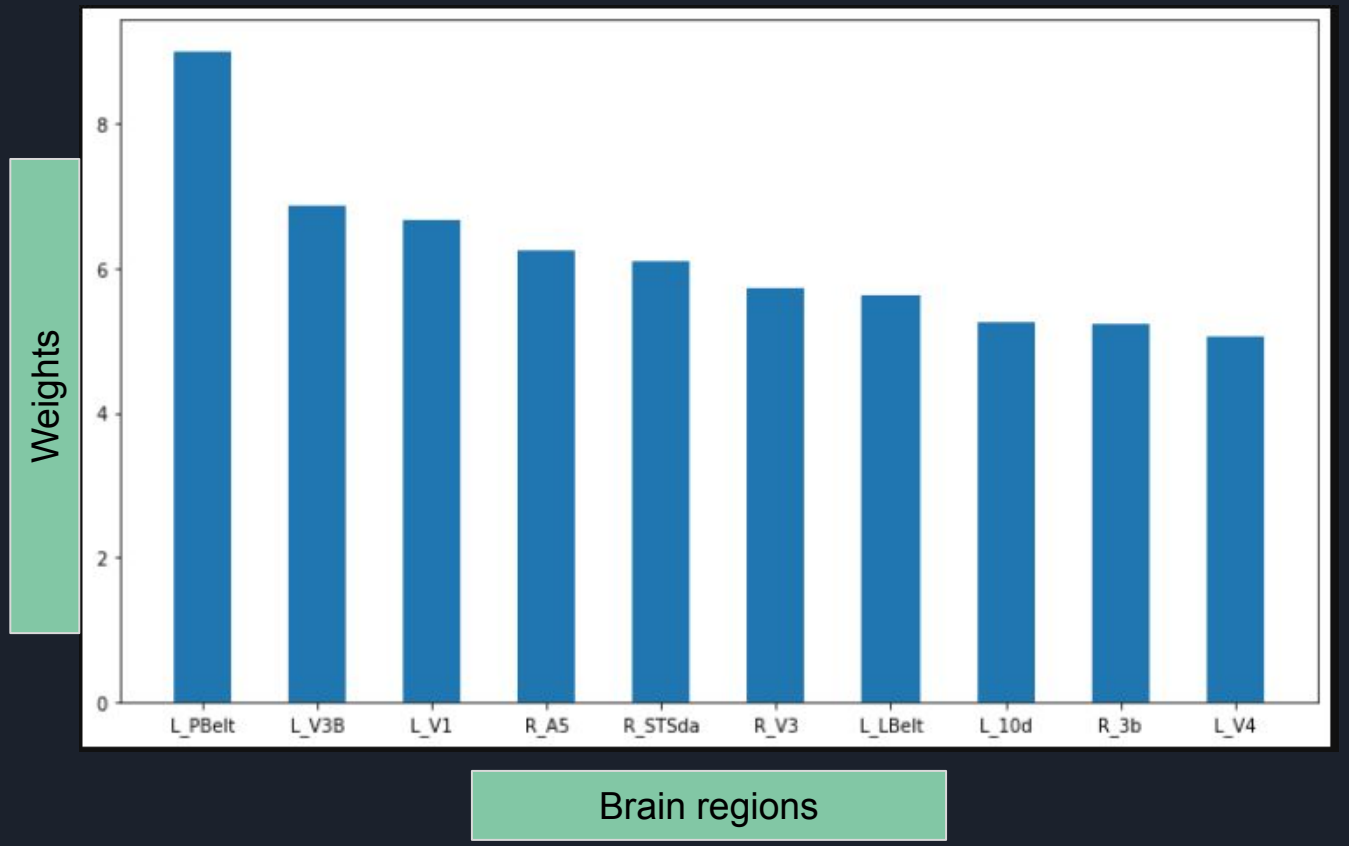
Can we classify the data using only two components



Each Feature represents a region in the brain. Let's plot the top 10 weights and see which regions are mostly responsible for determining whether a person won or lost a gamble



Weights


Weights
0
2
4
6
8
L_PBelt
L_V3B
L_V1
R_A5
R_STSda
R_V3
L_LBelt
L_10d
R_3b
L_V4
Brain regions