## 

[Thur 04/13/2017](#_ntgd2d2xhiuh)

[Wed 05/03/2017](#_vss1b2a0gc3n)

## Thur 04/13/2017

They created a FB game related to PD.

Every time there was a story and essentially it was do you want to coordinate or defect.

The data consists of these people playing a random number of games.

Goal is to fit some model of behavior

Fit a behavioral model to predict what the person will do in the next step.

No-regret algs, multiplicative alg, nash eq. How well will each of these predict?

Quantal response equilibria (exponential weight updates). Look it up.

Random perturbation are introduced to utilities sometimes. argmax{u\_i + e\_i}, then Pr[i = argmaxj{u\_i + e+i}] = Pr[exp(eta \* u\_i)]. This must have e\_i according to extreme type distribution.

I make mistakes but I play my best under these mistakes. Quantal response equilibrium.

Quantal response equilibrium.

Exponential weight updates.

P\_i = QBR(p\_[-i])

u\_ij = E\_(S~P\_[-i]) [u(j, s\_(-i))]

p\_i = QBR(u\_i)

p\_ij proportional to exp(eta \* u\_ij)

u\_1 = A\*p2

u\_2 = B\*p1

p1j prop to exp(eta\*(A\*p2)j)

eta needs to be fit from the data

in NE: p1j>= 0 iff (Ap2)j = maxk(A\*p2)k

Another thing to try to do, forgot about game theory. Based on the attributes of the players, and try to create a predictive model that predicts their next action given all the features and their previous actions. Cross-validation, etc. See what you get.

The idea is to compare what we get from a standard ML approach from what we have from game theory, etc.

## Wed 05/03/2017

Ihssan’s questions going into the meeting:

* For the machine learning model, what exactly are we trying to predict?
  + I thought about putting in all the data except the one we are predicting as features. And then the classifier is Defect/Cooperate. And we will use SGD on the 0-1 loss function to train the weights of the neural net.
* Equilibrium concepts such as nash equilibrium, spne, repeated games?
* Online learning
* Quantal response equilibrium
* Run simulations to see what to expect in no-regret, backwards induction, quantal. To see if the statistics match.