Discussion

22-12-2021

* Stability of the System.

→ Game theoritic equilibrium.

- There are two types of peers in the syetem.
  1. Altrustic Peers
  2. Bad Peers → Free riders
     → Malicious Peers

Assumption:- Majority of peers are altrustic.

→ In case of good peers- They will simply report true value of reputation.

⇒ They will also serve as per capacity of its own.

⇒ There is nothing to think about any strategy for altrustic peers because whatever rules, we have implemented for system to work, they simply follow that.

→ In case of bad peers –

① Free riders – ~~If the~~

→ If they meet altruistic peers, they will be reported to other peers about their true reputation value. So, in this type of transaction, they can be easily detected through their reputation value.

→ If they meet bad peers → Bad peers either report their true value or some nonsense value. but for that here we have aggregation formula come into picture, because if we considering majority of peers are altruistic and sending correct reputation

⟹ Malicious collective will not play any role.

(2) Malicious peer -

→ They are sending wrong reputation

→ If they meet altruistic peers — They send their wrong reputation, but again aggregation of majority comes into picture.

→ Also we have a scenario that sending peer can look into his reputation value send by receiving peer and from there he will get to know about this malicious peer and he will kicked him out.

⟹ Now according to above scenarios. If we draw a payoff matrix then—

Player 1 \ Player 2	Good peer	bad peer
Good peer	1, 1	1, 0
bad peer	0, 1	0, 0

[1] - Means their reputation value play a role in aggregation.

→ means whatever reputation they are sending has been considered (majority)

[0] - means their reputation value has not been considered

→ They are sending some reputation, but their reputation will not affect aggregation.

Let us see what can be the equilibrium.

→ If a peer gets higher payoff. he will not deviate from it.

Or.

→ If a peer will deviate from equilibrium, he will at a loss.

→ Altruistic peers - They will gain as -

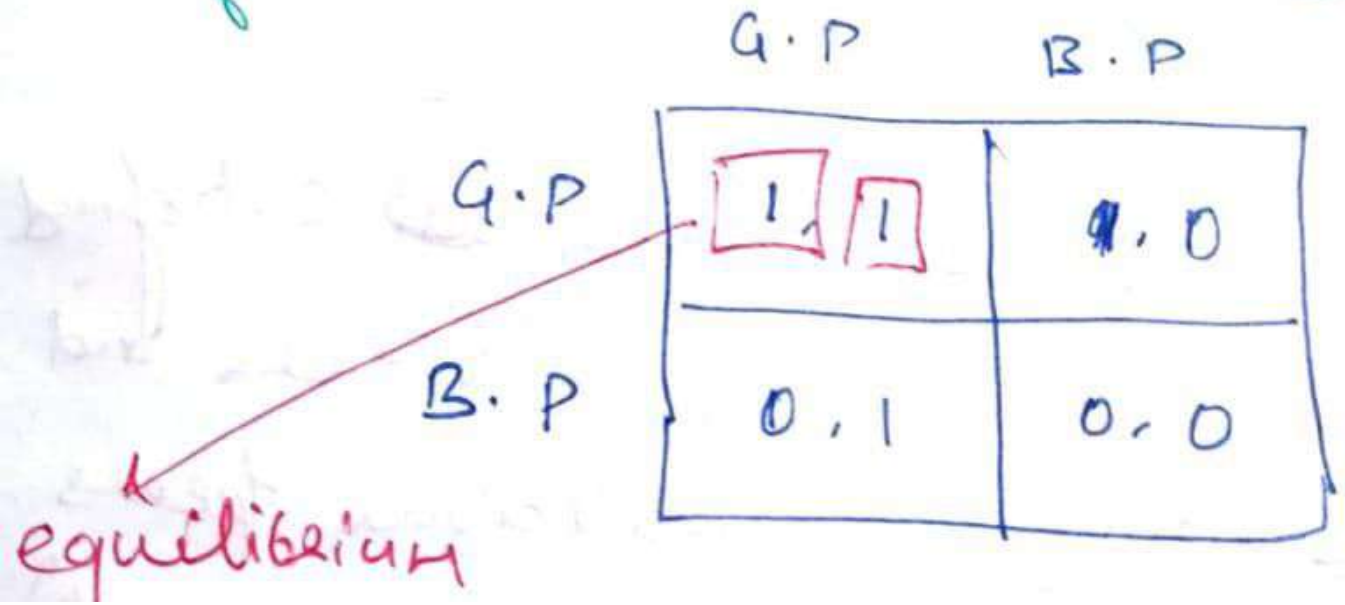
→ they are serving, so their reputation will ~~also~~ ~~always~~ always be higher.

→ They are sending correct reputation of others, their contribution in aggregation has been considered (majority)

→ Free riders - They are in loss as, they are not serving. So their reputation will decay, and ultimately kicked out of the system.

→ Malicious peers - They are also in loss, as not their reputation will play any role in aggregation. Their malicious intent will fail because of majority.

⟹ If peer wants to deviate from good peers to bad peers, they are in loss. So, if they want to stay/gain from the network, they will not deviate



Now, from above statements, we can say that —

- We are trying to eliminate free riders or malicious peers from the system. Or we can say that we are giving incentive to motivate peers to contribute more.
- As, no. of altruistic peers will increase in the system, performance in terms of quality of streaming and delay (which is major factor in live streaming) will improve tremendously.

- Performance of system will get improve ultimately. alternate peers will get satisfied & their reputation will increase (upto 1) and their demands are also fulfilled.

- Concluding point -

At equilibrium, → higher Payoff

↓

Peers satisfied (free riders and malicious peers are kicked out)

← System will be stabilized in terms of satisfaction.

⇕

Performance of system improve drastically.

* Note:- Right now, I am assuming system ~~sat~~ stability in terms of satisfaction, peers ~~satisfied~~. (topology ~~and~~ may or may not be stable).