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SNA ASSIGNMENT

Exercise Chapter-16

Ans→1.a→ For first person, there is no prior signal. So, his private signal will be responsible for taking decision whereas, person two have two option, first if his private signal is same as person 1 action, then its easy for him to take decision, and if it have diff signal than 1st one than person 2 will be indifferent between 1 & 2, than 2 will follow its own private signal.

Ans→1.b→ Person 3 have the knowledge of per2 action & his own private signal, So, here its condition is same as Person 2 in previous question, like, if 2's action and 3's Private signal are same then Per3 will go for it easily, And if it's diff then also he will go for his own private signal.

Ans→1.c→ Here in this condn P3 can't infer anything from Per-1 signal, as P3 only have sees the action of n-1 i.e, P2, which is ~~independ~~ choosing decision based on his own signal.

Ans→1.d→ This is same case as P2 and P1. So, here if P3 sees high signal and P2 is accepted, so, he'll accept. And if P3 is diff than P2 action, then he'll choose action independly.

Ans→1.e→ for this given condition, cascade will never form as diff of two signal will never be ≥2, which is a condn for cascade to occur. Also, each time we only have access to the previous one's only. So, each time same condition as P1 & P2 will be there.

Ans→2.→

a) Take the situation for 3 Persons

→ So, condition for 1st Person.

— He will have no Prior info, therefore he will accept or reject based on his private signal.

→ And for Second Person, he have two signals one his private and other is P1 payoff. So, we have seen previously there will be two condition and for both condition P2 will accept or reject independily.

→ For Person 3, he have 3 signal, his own private signal and P1's & P2's payoffs. So, if P1 & P2 have +ve payoffs than cascading will occurs as n(Positive payoff) > n(-ve payoff) and P3 will accept or reject without thinking about if the Product is actually bad or good.

whereas if P1 have -ve Payoff and P2 accepted and he have +ve payoff, So, average payoff = 0,

So, P3 will accept or reject the product independly of P1 & P2 i.e, by his own private signal.

b) Yes, for this condition also, cascading of rejections can occurs as, lets take P1 accept it but give -ve payoff, and P2 also accepts it and gives -ve payoff (its decision will be independend as we've seen previously). So after this P3's decision will depend on P1's & P2's decision and P3 go for cascading and reject the Product.

Ans→3→a) So, here given Prob. are.

$P_r(\text{Good/Accept}) = 1/2 \quad P_r(H/G) = P_r(L/B) = 3/4$

$P_r[\text{Accept}) = P_r[H)$ and given G is true.

So, if G is true So, Person will accept only when signal is high

So, $P_r[H/G] = 3/4$

Similarly for rejection also, reject when good is true will be $1 - P_r(H/G) = \frac{1}{4}$.

b) So, Given, Good is true.

$Pr[A,A] = P_2[H/G] * P_2(H/G) = 3/4 \cdot 3/4 = 9/16$

as, both are accepting.

& $P_2[A,R] = 3/4 \cdot 1/4 = \frac{3}{16}$

$P_2[R,A] = 3/16$ & $Pr[R,R) = (1-3/4)(1-3/4) = \frac{1}{16}$

c) Cascade will occur when ~~number of~~ diff of no. of accept and rej is ≥ 2 then acceptance cascade & no. of rejects and accept is ≥ 2 then reject cascade. So,

if we observe (A,A) or (R,R) then cascading will occurs.

$Pr(\text{cascading}) = P(A,A) + P(R,R)$

$= 3/4 \cdot 3/4 + 1/4 \cdot 1/4 \Rightarrow \frac{10}{16} = \frac{5}{8}$

Ans → 4 → a) Given, $P(G) = 1/2$ $P(H/G) = 2/3$, $P(L/B) = 2/3$

For 10'th Person, to occur all previous R cascades can happen when P_1 & P_2 have Rejected. or Low signal.

So, $P(G/L,L) = \frac{Pr[L,L/G]\,P[G]}{\text{same} + Pr(L,L/B) \cdot P(B)}$

$\Rightarrow \frac{1/3 \cdot 1/3 \cdot 1/2}{1/3 \cdot 1/3 \cdot 1/2 + 2/3 \cdot 2/3 \cdot 1/2} \Rightarrow \frac{\frac{1}{16}}{\frac{5}{16}} \Rightarrow \frac{1}{5}$

b) Let's take 8 people observed Low signal & 9th Person observes high signal, So, last 3 Person's signal will be

L L H → 9th Person.

So, now let's say 10th Person receives H signal. So,

$n(L) - n(H) = 0$, So, Person 10 will choose action depend on his own Private signal, i.e, H or accept.

& if 10th Person takes L signal, then

$n(L) - n(H) \Rightarrow 3-1 = 2$ then cascading will occur and 10th Person will reject the Product independend of this own Private signal.

Ans → 4.c → If I choose R ↑. i.e, P10 choose R

So, Now, P11 knows all P1 - P10 choosen R i.e, Low Signal. So, he will follow the cascade and choose R, irrespective of his own private signal.

And if P10 choose A, So, Now P11 knows P9 signal

9th, 10th

L H

So, if P11 has H signal, then

$|n(H) - n(L)| = 1 \leq 2$

So, cascade will broke and P-11 choose A as the signal observed by his private signal.

& if P-11 choose L

So, L H L

$|n(H) - n(L)| = 1 \leq 2$

then also cascade is broken and P11 will choose R by observing his own signal.

Ans → 5 → a) I can tell this was happened because of cascading as first two member of committe choosen A, then after that Rest member also choose A irrespective of thinking about their own choices.

b) The other procedure could be to not ask each member one by one, which may leads to cascading. So, instead of that, we can choose some method So, that any member don't have any information about which candidate his collegs have choosen, As we can ask them to write on a paper or Press some kind of button both without telling/showing anyother one.

Ans -> 6.a) Since majority of expert recommended A, so, we can say that $n(A) - n(\text{other}) \geq 2$, that means cascading might have occured.

But we can't be confident about this choice as we don't know the exactly when cascading occur, As we don't know the order of recommendation too. So, Hence can't be sure with going for A or any such decision as cascading may be correct or incorrect.

b) for Procedure 1, when bringing all experts in a room and sequentially asking each opinion.

So, In this case possibility of cascading is there as if expert 1 & 2 have similar opinion, than resp 3 will also have similar opinions,

for Procedure 2, when asking separately each one, than, their private opinion won't be affected by any others and each expert will give personal true opinion based on their own expertise,

So, procedure 2 will provide us the maximum information.

Theoram: A complete cascade can't occur on a network having cluster of density greater than $1-q$, where q is the threshold of adoption.

If the density of the cluster is $d > 1-q$, then max^{in} fraction of connection of any node outside the cluster outside the cluster with that of node inside is $< q$.

As, the fraction of connections outside the cluster for any node in cluster is $< q$, even if every neighbour of node outside it's cluster are all part of cascade won't adopt the cascade as the threshold word be not i.e, $\geq q$

∴ No, complete cascade possible