Homework 2

Dutch auction protocol

2012

Mehran Nasseri & Mahboobeh Abdal Mahmood Abadi

KTH

11/12/2012

1. **Instruction of execution**

To execute the program the JADE.Boot -gui must be run. Then an artist manager agent must be added to the to the container along with n number of curator agent, where n >0. As soon as adding artist manager a GUI form appears, so artist manager can input the detail of artifact and its price to bid. By pushing the sell button, the auction starts and curators agent start to evaluate the price and make a bid if the price is reasonable for them.

1. **Bidding strategy**

To achieve an optimal biding strategy a formula, invented by David.E and Jon.K (2010) is considered as follow:

S(v)= ((n-1)/n)v.

s(v) is the strategy of bidding true value 'v' where there are 'n' number of bidders. The authors claim "if each bidder shade her/his bid (true value) down by a factor of (n-1)/n, then this is optimal behavior given what everyone else is doing". This is considered as an equilibrium strategy by the Authors. The form of this strategy highlights an important principle as the number of bidders' increases, we generally have to bid more “aggressively,” shading our bid down less, in order to win.

1. **Payoffs/Utilities**
   1. **Abbreviations**

* Actions of artist manager (am):
  + Selling high quality=SHQ
  + Selling low quality=SLQ
* Actions of curator (c):
  + Paying high price=PHP
  + Paying low price=PLP
  + Not paying=NP
* Actions of Profiler(p):
  + Paying high price=PHP
  + Paying low price=PLP
  + Not paying=NP
  1. **Artist manager and curator utility functions**

=2 =1 =4 =3 = -4 = -2

=5 =6 = 1 =4 =2 =3

* 1. **pay-off matrix of artist manager and curator**

Nash equilibrium is found as follow:

* Artist manager’s best responses to all of curator's actions are highlighted as green.
* Curator’s best response to all of Artist manager's actions is highlighted as yellow.
* Nash equilibrium exists where curator’s best response is the same as artist manager’s best response.

Therefore, the two strategies (SLQ) & (PLP) are in Nash equilibrium since, if curator chooses (PLP), artist manager can do no better than (SLQ) and if artist manager chooses (SLQ) curator can do no better than chooses (PLP).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | am SHQ | | am SLQ | |
| c PHP |  | 2 |  | 4 |
| 5 |  | 1 |  |
| c PLP |  | 1 |  | 3 |
| 6 |  | 4 |  |
| c NP |  | -4 |  | -2 |
| 2 |  | 3 |  |

* 1. **profiler and curator utility functions**

* 1. **pay-off matrix of profiler and curator**

Nash equilibrium is found as follow:

* Profiler’s best responses to all of curator's actions are highlighted as yellow.
* Curator’s best response to all of profiler's actions is highlighted as green.
* Nash equilibrium exists where curator’s best response is the same as profiler’s best response.

Therefore, the two strategies (SHQ given that PLP) & (PLP) are in Nash equilibrium since, they are best response to each other.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | p PHP | | p PLP | | p NP | |
| c PHP/ SLQ |  | 1 |  | 2 |  | 4 |
| 2 |  | 1 |  | -4 |  |
| c PHP/ SHQ |  | 5 |  | 6 |  | 3 |
| 5 |  | 0 |  | -3 |  |
| c PLP/ SHQ |  | 5 |  | 6 |  | 3 |
| 7 |  | 6 |  | -1 |  |
| c PLP/SLQ |  | 1 |  | 2 |  | 4 |
| 4 |  | 3 |  | -2 |  |

**Reference:**

David.E and Jon.K (2010). Networks, Crowds, and Markets: Reasoning about a Highly Connected World. Cambridge University Press, 2010. Retrieved 08/11/2012 from http://www.cs.cornell.edu/home/kleinber/networks-book/