Assignments No 11

released: 22.01.2014  due: 28.01.2014, 12:00h

Task 1: Data Collection  9 points

You are planning to analyze the development of friendships within a group of university freshmen which are initially mutual strangers.

(1) What is a good schedule to collect your data, keeping in mind that each survey is costly and you should collect enough information on network changes?

(2) You also want to analyze the co-evolution of friendship and alcohol consumption. What is now a good schedule to collect your data?

(3) Would you collect other data (covariates) to study the coevolution of friendship and alcohol consumption?

Task 2: Behavioral Objective Function  6 points

Consider the depicted network with 5 actors where ties indicate friendship. The behavior $z$ denotes the sporting activity level with the following possible values:
1: no sports at all
2: sport once a week
3: sport twice a week
4: sport more than three times a week
Let us assume that Actor 2 has the opportunity to change his behavior in the current micro step. The current values of \( z \) are \((2, 3, 1, 3, 4)\). The following parameters and statistics are given:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>outdegree</td>
<td>( \beta_{\text{out}} = -1.3 )</td>
</tr>
<tr>
<td>reciprocity</td>
<td>( \beta_{\text{rec}} = 2.1 )</td>
</tr>
<tr>
<td>transitive Triplets</td>
<td>( \beta_{\text{tran}} = 0.4 )</td>
</tr>
<tr>
<td>quadratic shape effect</td>
<td>( \gamma_{\text{quad}} = 0.1 )</td>
</tr>
<tr>
<td>linear shape effect</td>
<td>( \gamma_{\text{linear}} = -0.5 )</td>
</tr>
<tr>
<td>average similarity effect</td>
<td>( \gamma_{\text{avsim}} = 0.6 )</td>
</tr>
</tbody>
</table>

(1) Assume that we are considering the two basic shape effects. What is the most probable change in Actor 2’s behavior?

(2) Assume now that we are considering the average similarity effect. What is now the most probable change in Actor 2’s behavior?

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**Task 3: R: Behavioral Objective Function**

Write the following function in R:

(1) The function `objfct.behavior` should return the vector of probabilities of all possible behavioral changes that an actor \( i \) can make. The arguments should be an actor id \( i \), a vector \( \gamma \) of the parameters for the basic shape effects, where \( \gamma_1 \) is the quadratic shape effect and \( \gamma_2 \) is the linear shape effect and actor \( i \)’s current behavior.

Send your R-Script to david.schoch@uni-konstanz.de