**Lab 4 - Emergence of Network Dynamics (Stochastic Actor-Oriented Models)**

***CompSci 396-0: Social Networking Analysis* *Win 2022***

Student Name: Jiaqi Guo NetID: JGR9647

* **Responses to Question**

**In this lab, you’ll be building, estimating, and interpreting actor-based longitudinal network models using RSiena. RSiena is used to model stochastic actor-oriented models (SAOM) in order to examine the effects of network ties over time on a certain behavior, or the effect of a certain behavior on tie formation over time.**

文本

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* + **Part I: Constructing Hypotheses**

**Relational Hypotheses:**

1. **Low Outdegree Density/ outdegree**

Hypothesis 1: The probability of having friendship relation between students will be lower

over time than expected by random chance.

1. **Reciprocity/reciprocity**

Hypothesis 2:

Reciprocity their friendship between students so here. comparing the probability of having a reciprocity friendship ties between students and the random chance.

1. **Transitivity/gwespFF**

Hypothesis 3:

The friends of friends relations are essentially so the probability the probability of having friends of friends, this kind of relationship between students and a random chance.

1. **Ego’s drug behavior/ egoX**

Hypothesis 4:

So, this is look at if drug users will name more friends than non-drug users. The probability for drug user to have friendship ties compared with the probability for non-drug user

1. **Alter’s drug behavior/ altX**

Hypothesis 5:

The probability of drug users should be regarded as friends by someone. Or the probability as opposed to the probability for non-drug users to be regarded as friends by someone else.

1. **Homophily on the basis of drug behavior/sameX**

Hypothesis 6:

given a truth on the individual attributes of to up to people. And you want to see if this to people are more likely to have a friendship or have a relationship between each other over time.

**Drug Behavior Hypothesis**

1. **Homophily on the basis of drug behavior/sameX**

Hypothesis 7:

what you have given here is a relationship in the first place. you want to see over a period, if this two people are more likely to have the same individual attributes or have the same drug use and behavior in this case. specify the direction of the relationship if it's higher overtime oh it's lower overtime

* + **Part II: Hypothesis Testing**

1. **(10 points) A visual inspection of the adjacency matrices may help in highlighting how friendship changes at the three time. Include the sociometric plots in your report. Discuss what you observe from the plots (e.g., How does friendship change over time? Are the plots becoming denser over time? Is friendship between students mutual? Is there anyone who is nominated a lot by others? Is there anyone who nominates a lot of friends?)**
2. **(4 points) Create a Siena data object including the longitudinal friendship networks and the drug behavioral variable. Then run print01report function which creates an output file in your working directory. Using your text editor, open the output file (if you use the provided script, s50\_3\_init.out) where you can see data descriptions. In the output file, how many friendship relations were created and dissolved between period 1 and 2? How many students increased their use of drug or decreased the use of drug between the same periods?**

图示, 示意图

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Distance=所有发生改变的节点数量之和

Jaccard=how similar are these two network, >0.3 good, 如果相似度不够我们很难从时间1去估计时间2

图示, 示意图

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it's very straightforward on down we'll just be the decreasing and use of drugs and up will just be increasing the use of drugs and constant will just be like the keep constant from Ontario one to period to.

1. **Using your hypotheses, you can begin to construct a list of parameters (effects) to test using your Siena model. Create a data frame of effects using the getEffects function. The created data frame will include several extra properties for use with RSiena. Include the effects of triadic closure, the effects of drug use on friendship formation (i.e., the effects of the ego drug behavior, the alter drug behavior, and if ego and alter are the same in their drug behavior –both drug user and non-drug user).**
2. **Include the effects of all of a node’s friends’ drug behavior on the node’s own drug behavior, the specified model and effects to the data using the function siena07. A new window labeled “Siena07” with a picture of an old building should pop up, showing the iterations of simulations R goes through. The window should close after the simulations complete.**
3. **(46 points) Type ans1 to view your results.**
   1. **Include a table including convergence t-ratios and overall maximum convergence ratio in your report.**

表格

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* 1. **Explain whether your variables and model are converged based on your convergence ratios and overall maximum convergence ratio. See the hint (\*)**

that the absolute value for this tea ratio ideally would be less than point 1.1.

文本, 信件

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* 1. **Include another table including the estimates, standard errors and p-values (or estimate/standard error) in your report.**

表格

描述已自动生成

可以确保模型收敛

* 1. **Use the estimates and p-value (or estimate/standard error) to explain whether your hypotheses (7 hypotheses in total) are supported or not. Provide interpretations of the estimates and discuss if the results make sense. When you interpret the results, you should convert log-odds ratios (estimates) into either log-odds or probabilities.**

表格

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1. **(10 points) Report the goodness of fit for your model regarding in-degree and out-degree distributions. Include the plots and interpret the results of each plot.**

图表

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The model is a good fit or not risk regard to the its integrated distribution and the good thing about our sienna is that.