Explore Data with Belief Networks (Netica)

Exercise # 2

INTRODUCTION

This exercise will introduce you to a software package called Netica, which is a leading tool for creating and exploring belief networks. You will have the opportunity to interact with a "naïve" network, or a network that has one "parent" and multiple "children". This network has many of the primary datasets used in the National Science Analysis, which are expressed as different nodes within the network. The goal of this exercise is to expose you to some simple commands within Netica and to show you how to interact with the data on a basic level.

TASK(S)

Your task for this exercise is to work with a partner and complete the activities outlined below. Most activities have a related question, which you should answer and write down in the space provided.

If you have any questions about the software or run into any issues, several facilitators will be walking around the room to answer your questions.

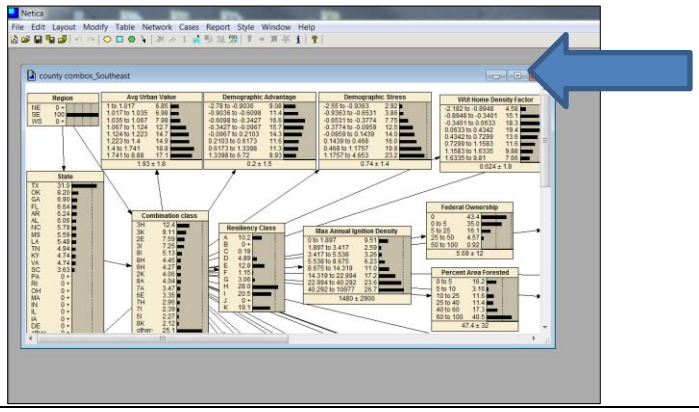
ACTIVITY/PROCESS

NAÏVE NETWORK: COMBINATIONS

Activity #1

1. Open Netica

2. Open the Netica file called "County Combos_Southeast" (File> Open…navigate to file)
3. You will need to maximize the screen by clicking in the upper right hand corner.



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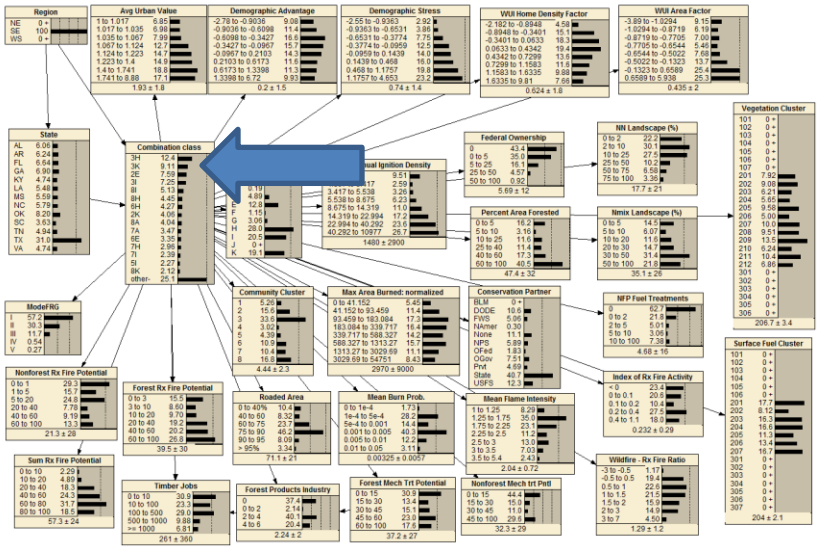
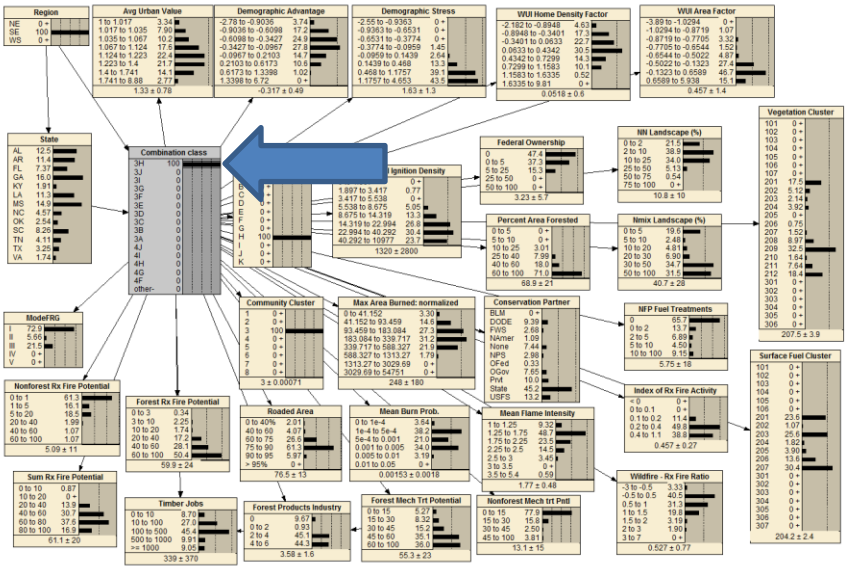
4. If you cannot see all of the nodes on the screen, go to “Window>Zoom>To Fit”.
5. Take a close look at the different nodes and see how they are connected to the “Combination Class” node. Notice the distribution of data for each of the nodes and which Combination Classes are most prominent for the Southeast.



6. In the “Combination Class” node, click on “3H”. You will see that the distributions of other nodes in the network change.



7. Now, remove your findings. To do that, you can either: a) click on “3H” again in the “Combination Class” node; or b) click on the “red x” button at the top called “Remove Case (Findings)”.

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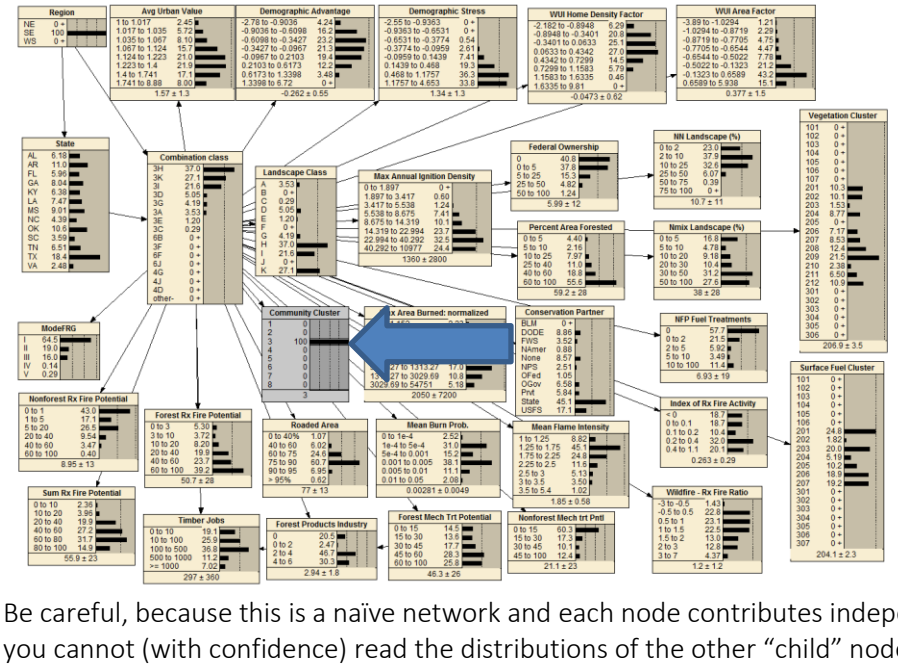
8. In the "Combination Class" node, click on "3K", examine the distribution of data and then remove your findings.
9. In the "Combination Class" node, click on "2E", examine the distribution of data and then remove your findings.
10. **Question: Of these three combination classes, which has 91% of the counties with "0-5" Percent Area Forested? _____**

Activity #2

1. In the "Community Cluster" node, click on "3". You will notice that each combination class that includes community cluster "3" appears at the top of the box. Also, notice the distribution of community cluster "3" throughout the southern states in the "State" node.



2. Be careful, because this is a naïve network and each node contributes independently to the network, you cannot (with confidence) read the distributions of the other "child" nodes. That is, there is no cause and effect relationship between "Community Cluster" and any other node besides "Combination Class".

Activity #3

1. Make sure all findings are removed from the network (click on the "red x" button at the top called "Remove Case (Findings)".
2. In the "Combination Class" node, click on "3H".
3. Now, in the top navigation bar, select "Report" > "Beliefs".
4. The output is a text file that provides the probability distributions of each of the nodes for "Combination Class" 3H. This can be helpful in the exploration of the data.

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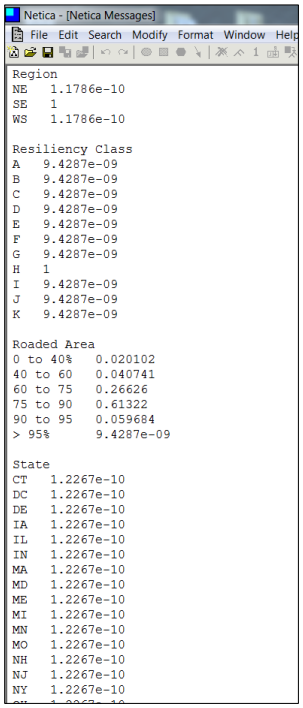
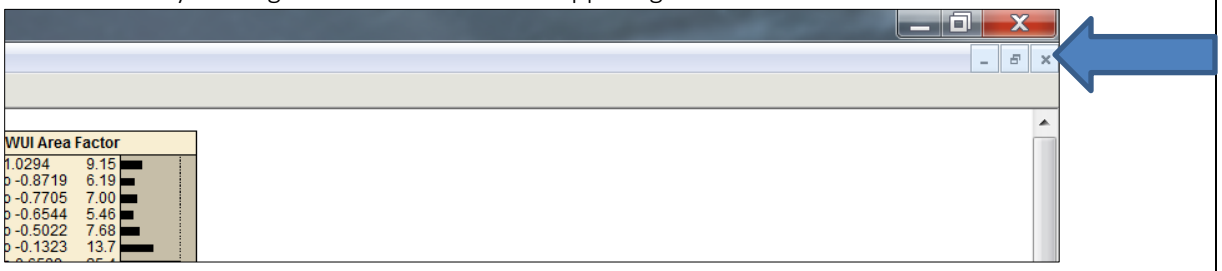


5. Question: What is the percentage of counties in Combination Class 3H that have 75-90% Roaded Area (you may need to scroll up or down to find the answer)? _____
6. Close the file by clicking on the small "x" in the upper right hand corner of the screen.



NAÏVE NETWORK: OWNERSHIP

Activity # 4

1. Open the Netica file called "USFS_options".
2. Again, if you cannot see all of the nodes, go to "Window>Zoom>To Fit".
3. Take a close look at this naïve network. Notice that the center node now is titled "USFS Ownership (%)". There are also some additional nodes to the right of the network that represent the Options from the Science Analysis.

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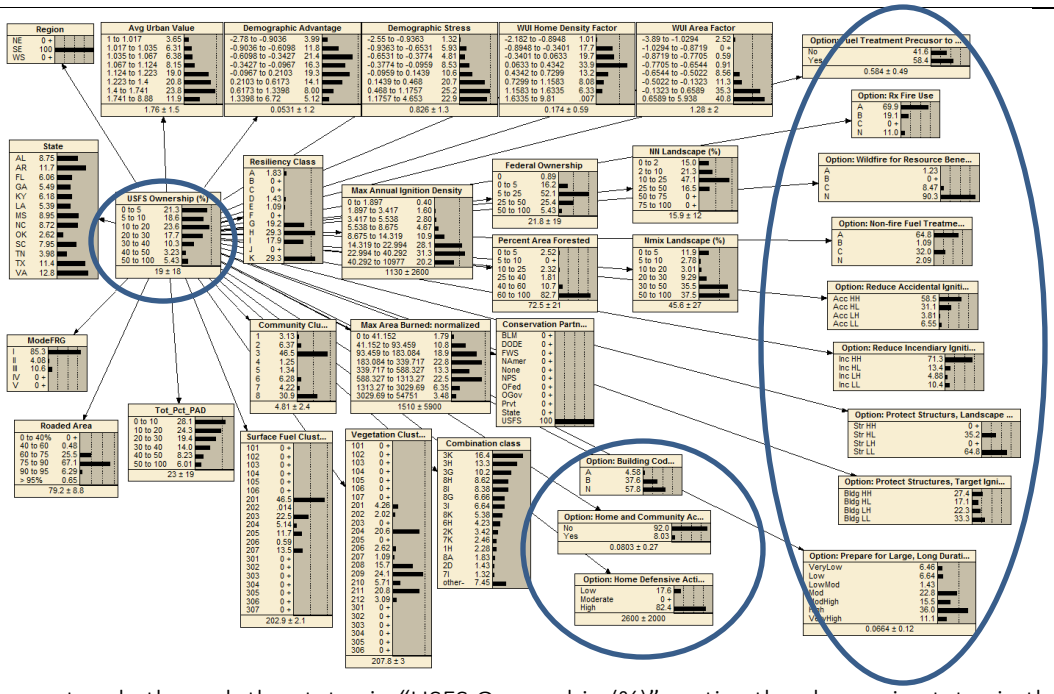

4. As you toggle through the states in "USFS Ownership (%)", notice the change in states in the "State" and "Option: Wildfire for Resource Benefits" nodes.
5. Refer to the Option map handout and the legend for each Option for further information about these Options.
6. Question: Which states have counties with greater than 50% US Forest Service ownership? _____
7. Question: What is the distribution of states (A, B, C, or N) in the node "Option: Wildfire for Resource Benefit" in counties that have greater than 50% US Forest Service ownership?
    - A: ____
    - B: ____
    - C: ____
    - N: ____
8. Question: What Combination Class is associated with counties that have greater than 50% US Forest Service ownership? _____

Activity # 5

1. Open one or two of the following naïve networks for each of the primary conservation partners and explore the data associated with each:
    - DODE_options (Department of Defense and Department of Energy)
    - FWS_options (US Fish and Wildlife Service)
    - Namer_options (Native American and Tribal)
    - Nps_options (National Park Service)
    - OFed_options (Other Federal government, i.e. Bureau of Reclamation, etc.)
    - Private_options (Private ownership)
    - Reg_options (Regional and local government)

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- State_options (State ownership)

THINGS YOU WILL NEED

You will need the following items:

- Personal laptop
- Netica files saved on desktop ("County combos_Southeast", "USFS_options", etc.)

RESOURCES

Norsys Netica "Help" section: http://www.norsys.com/WebHelp/NETICA.htm