

“Friend or Foe” Game Show Analysis Using Spotfire

Introduction

In the television game show “Friend or Foe,” three pairs of contestants compete against each other to win money. There are three rounds of competition during which the three pairs of contestants answer trivia questions and are rewarded with money for correct answers. After the first round the team with the lowest amount of money is eliminated and sent to the “Trust Box,” which will be explained shortly. After the second round, the team with the lowest amount of money is also eliminated and sent to the “Trust Box.” The last remaining team answers questions for additional money in the third round. Then, they too enter the “Trust Box.”

A pair of contestants enters the “Trust Box” in order to determine how to split up their winnings. Each contestant privately selects either “Friend” or “Foe.” If both contestants select “Friend” then the money is split evenly between them. If one contestant selects “Friend” while the other selects “Foe,” then the contestant who selected “Foe” wins all of the money and the other contestant wins nothing. If both contestants select “Foe” then they both go home empty handed.

Data for 248 pairs of contestants from 78 shows spanning 2 seasons were collected. The information for each pair of contestants includes: contestant one’s gender, contestant one’s race, contestant one’s age, contestant one’s action (“Friend” or “Foe”), contestant two’s gender, contestant two’s race, contestant two’s age, contestant two’s action, in which season these contestants appeared, what round they were eliminated in, how much cash was at stake, and how much each contestant ended up winning. The data is available online from the Journal of Statistics Education located at the following address: (http://www.amstat.org/publications/jse/jse_data_archive.html).

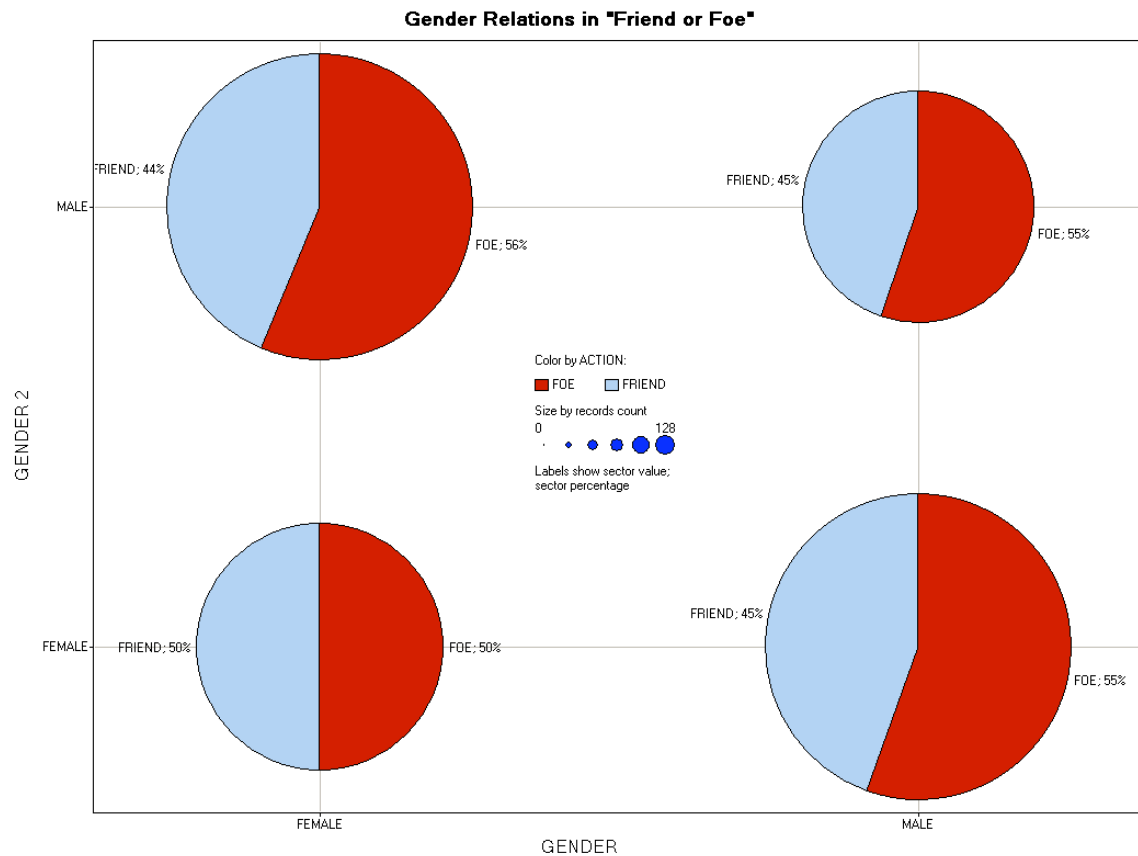
This game is essentially a version of the classic “Prisoners’ Dilemma.” For this reason, analysis of the data would be relevant to many different fields, including economics, sociology, psychology, political science, game theory, and more. The application “Spotfire” was used to analyze the data.

Analysis

FEMALE-FEMALE TEAMS ARE MORE COOPERATIVE

When we analyzed the actions of participants based on their gender and on the gender of their teammates, we found that females whose teammates were female were the most likely to be cooperative when dividing money. Males teamed with males, males teamed with females, and females teamed with males all chose “Foe” roughly 55% of the time. By contrast, females teamed with females chose “Foe” only 50% of the time.

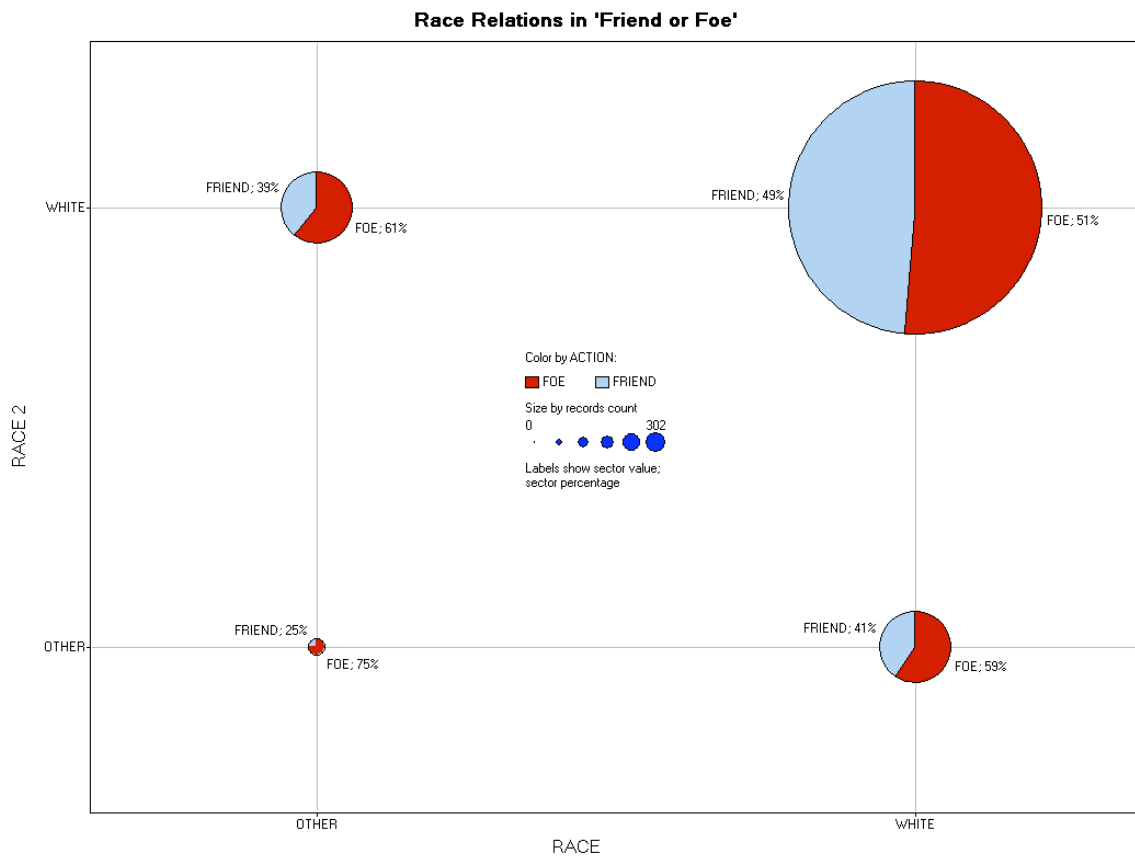
The pie charts below help to visualize this fact. The columns are divided based on the gender of the contestant. The rows are divided based on the gender of the second team member. The pie charts show the percentage of the games in which the contestant chose “Friend” and when contestant chose “Foe.” The size of the pie charts indicates how many instances of each record there are in the dataset.



SAME-RACE TEAMS MORE LIKELY TO COOPERATE

Members of interracial teams selected “Foe” nearly 60% of the time, while members of all-white teams selected “Foe” only 50% of the time, a full 10% less. The data indicates that teams comprised of all-non-white members selected “Foe” 75% of the time, however, there were only 4 instances of such teams in the data, so little can be drawn from this information.

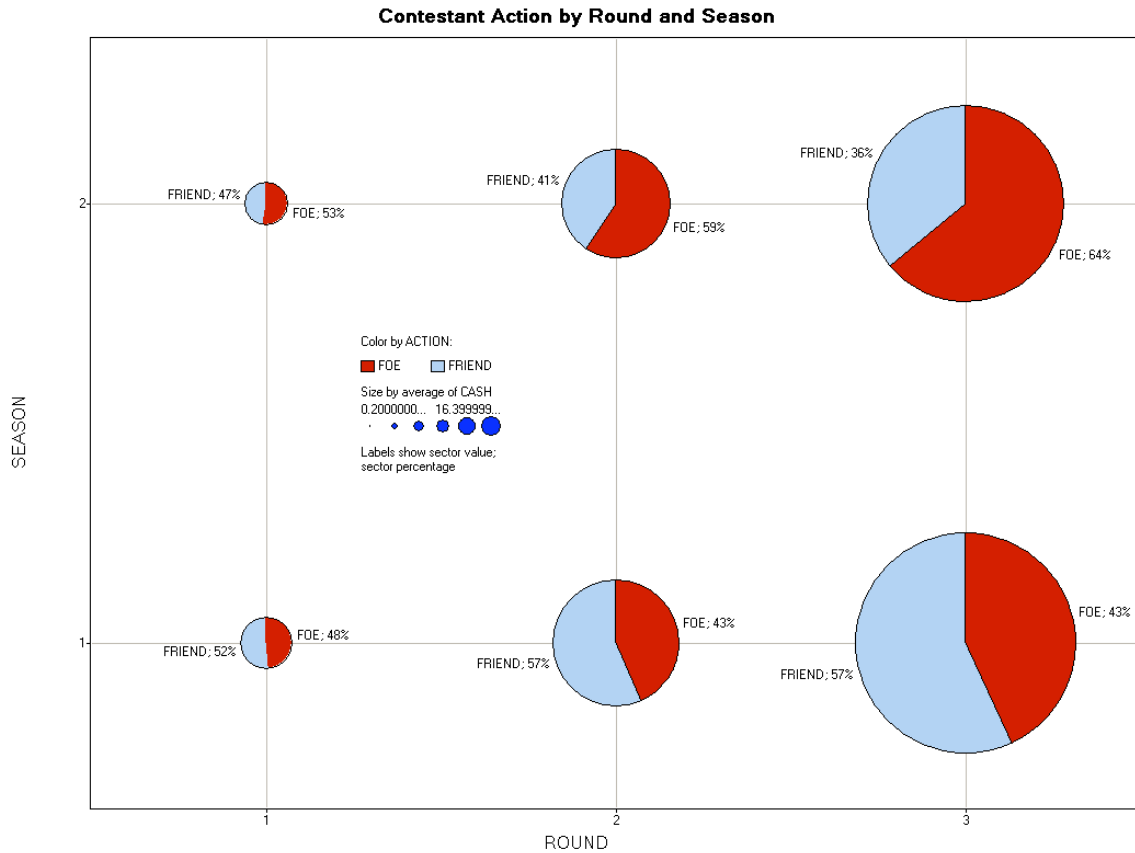
In the visualization below, columns are separated based on the race of contestant one and rows are separated based on the race of contestant two. The size of the pie charts indicates how many records there were of each type. The pie charts show the percent of the time that contestant one selected “Friend” or that contestant one selected “Foe.”



CONTESTANTS ARE GETTING MORE AGGRESSIVE

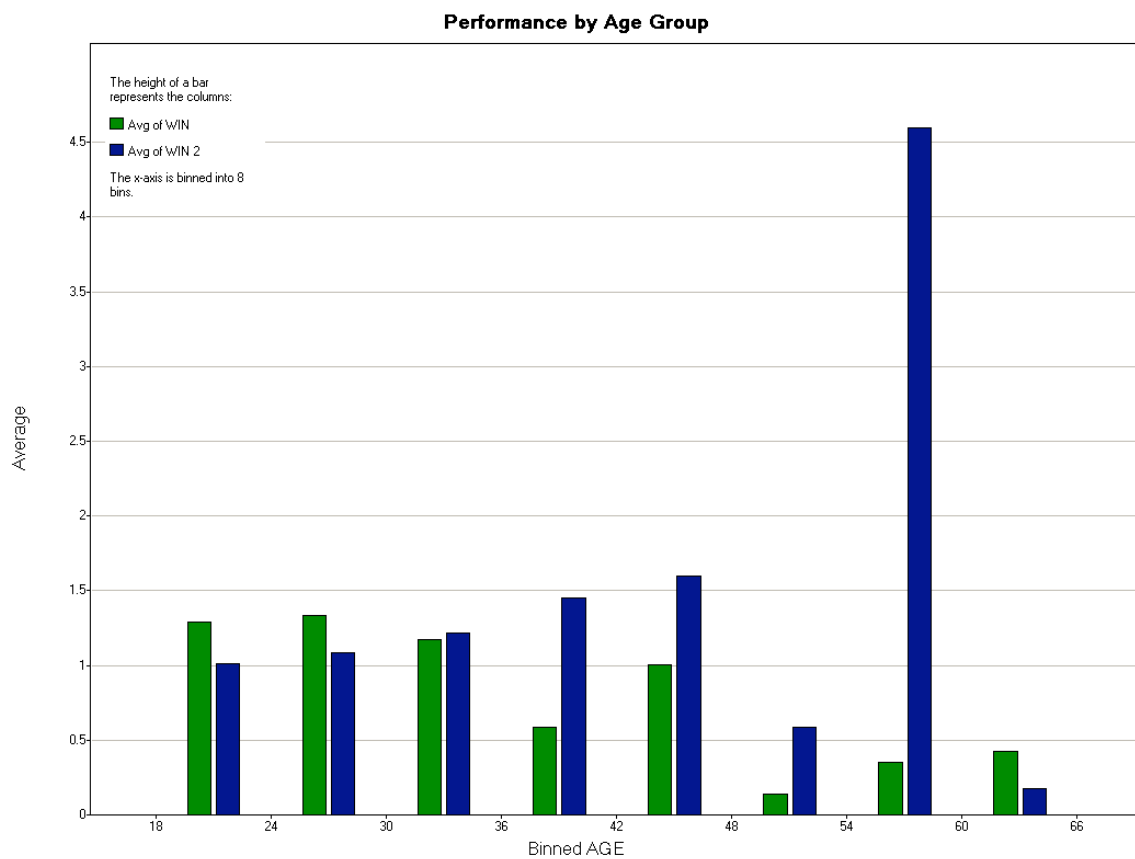
The visualization below reveals some very interesting facts about the contestants on “Friend or Foe.” The contestant data is separated into columns based on the round in which the contestant was eliminated. The sizes of the pie charts indicate the average amount of money at stake in each record. The pie charts themselves show the percentage of the time that contestants selected “Friend or Foe.” The top row is for data from season two, while the bottom row is for data from season one.

Striking differences between the actions of contestants in season one and in season two are apparent from the visualization. It is clear that contestants in season two selected “Foe” far more frequently than contestants from season one. However, that is not the only striking aspect of the data. In season one, as the amount of money at stake increased, contestants picked “Foe” less frequently. The exact opposite is true of contestants in season two, where when more money was at stake, more contestants selected “Foe.”



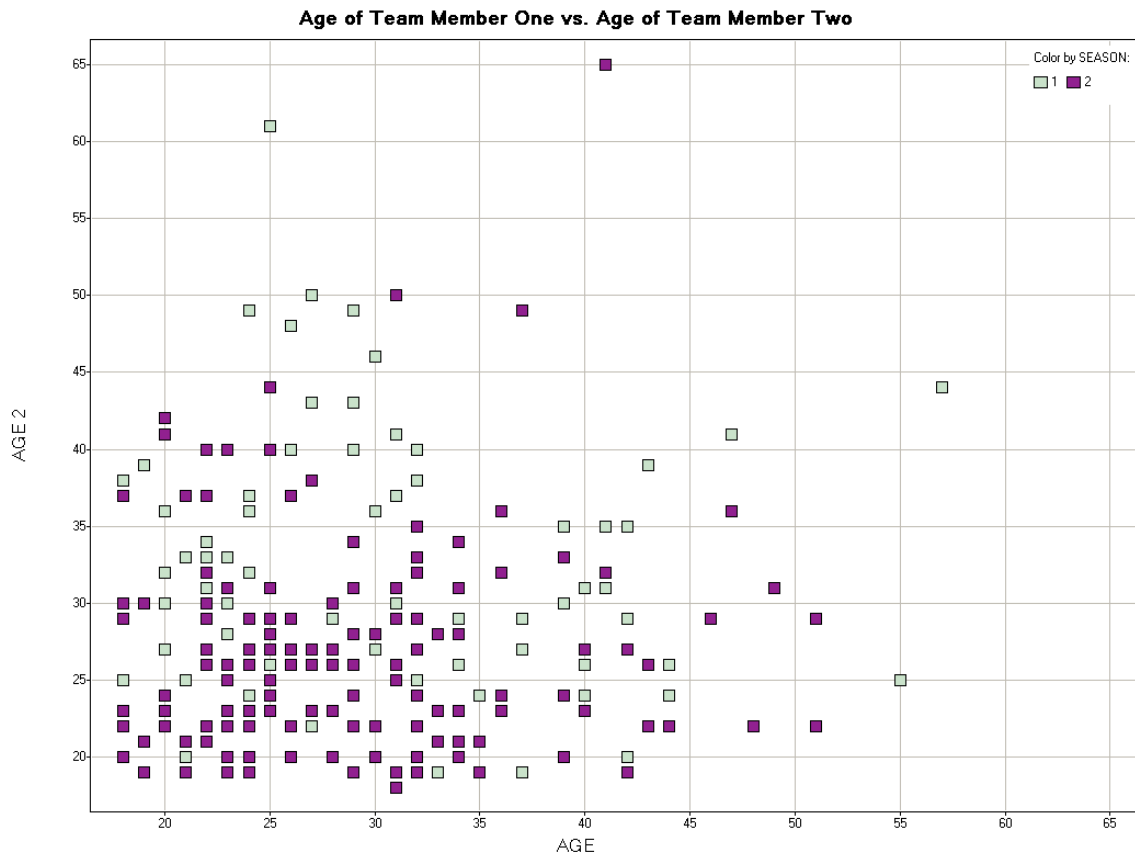
YOUNGER AND MORE RUTHLESS

This visualization shows that younger contestants fared better in the “Trust Box” than did older contestants. The bars in the graph are broken up into a number of age ranges. The blue bar in each age range indicates the average amount of money that was won by each contestant in that age range, while the blue bar indicates the average amount of money won by such a contestant’s teammate (monetary amounts in the y-axis are in the thousands). From this graph you can see that the younger contestants (18-30) won more than their teammates. Contestants between the ages of 30 and 36 won about the same amount of money as their teammates. Contestants who were older than 36 won less money than their opponents won. On closer examination the age groups of 54-60 and 60-66 should be ignored because there is very little data meeting these restrictions.



SHOW SELECTS YOUNG CONTESTANTS

The scatter plot below shows the distribution of teams' ages. A data point's location on the x-axis indicates the age of contestant one, and its location on the y-axis indicates the age of contestant two. The one thing that is made very obvious by looking at this graph is the fact that most contestants on the show fall in the younger side of the age range. It is not clear from this visualization if there is a difference between the ages of contestants on season one and on season two. However, when using the tool we can toggle on and off the season one and season two data points. When doing this it becomes clearer that the season two contestants are more tightly clustered towards the bottom left corner of the graph, that is, they are younger.



Using Spotfire

I was very impressed by Spotfire. In particular, the pie chart capabilities were incredibly useful. Between the x-axis, y-axis, size of the charts, and the charts themselves I was able to visualize 4 dimensions of data at one time. Also, the tools ability to handle categorical data was very nice.

When creating bar charts with real number data, the bars of the graph are binned. I wish that this binning capability were applied to the pie charts as well. For example, it would have been nice to be able to put the age of the contestant on the x-axis of a pie chart and bin the ages into a manageable number of columns.

The tool made exploration of the data very easy. Exporting the visualizations for this write-up proved to be a little frustrating. I could not get the legend to export with the visualizations, so I had to export the legends separately and paste them in to the visualizations manually using a photo editor. However, it is possible that I simply am ignorant of Spotfire's capabilities in this area.