Statistics 222 Research Proposal
NFL - Punt or Go For It?

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The Data:

Data sets have been collected from three sources. Depending upon the development of further research questions more data may need to be collected. The three sources are the following:

1. NFL play-by-play data for the 2002 season through the 2012 season is taken from http://www.advancednflstats.com/2010/04/play-by-play-data.html. This data contains descriptions and scoring information of each play of each game for each season.

2. NFL offensive and defensive rankings data is taken from http://www.nfl.com/stats/. This data gives game statisitcs for each team per season (2002 - 2012) and team rankings, which are based on these statistics.

3. NFL game information, such as location, weather, duration, etc. are taken from http://aragorn.org/data/sports/NFL/seasons/met adata_since_1980/uncleaned_nfl_game_metadata_since_1980.csv.

The Proposal:

The following are the research questions for this project although more questions may arise in moving forward, in which case they will be addressed if found worthy:

Does the decision to punt or go for it on a fourth down have a relationship with the outcome of the game? If it does, then should an NFL team, in the 4th down of their possession, go for a first down or punt the ball to the opposing team? Which action will give them better odds of winning the game? Is their a trend of a certain philosophy for a given team? Does this trend correlate with who is coaching? Does weather conditions or game location correlate with one philosophy over the other?

Inspiration for these research questions has come due to recent questioning of the traditional philosophy to punt on the fourth down rather than going for a first down. If there is a higher likelihood of winning by going for the first down, then using this philosophy could dramatically change football strategy.

Figures and Table Titles:

1. Title: Point Spread and The decision to punt of go for it
   This will be a 2 - dimensional graph with the y-axis to be the point spread win, and the x-axis to be the fraction of times a punt was kicked compared to going for the first down.

2. Title: Point spread per pair of Ranked Teams
   This will be a 3 - dimensional graph with x-axis: Offensive Rank, y-axis: Defensive Rank, z-axis: Average Point Spread

3. Title: Go for it Success Probabilities
   This will be a 3 - dimensional plot with x-axis: Offensive ranking, y-axis: Defensive ranking, z-axis: probability of success.