

Monte Carlo Simulation of the 2008 presidential election

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Abstract

This report takes the latest poll data from each state and simulates possible outcomes of the national presidential election. The simulation takes into account the polling uncertainty and is repeated 10000 times to calculate an approximate probability of any particular outcome for the electoral college. This methodology is referred to as Monte Carlo simulation and is a well established methodology for analysing complex probabilistic problems. Below is the definition of Monte Carlo simulation from wikipedia.com.

”Monte Carlo methods are a class of computational algorithms that rely on repeated random sampling to compute their results. Monte Carlo methods are often used when simulating physical and mathematical systems. Because of their reliance on repeated computation and random or pseudo-random numbers, Monte Carlo methods are most suited to calculation by a computer. Monte Carlo methods tend to be used when it is infeasible or impossible to compute an exact result with a deterministic algorithm.”

This report will be updated on a regular basis to keep up to date with the latest available polling data. If you want a customized report based on another set of polling data, please contact DataWise Consulting LLC at email: info@datawise-consulting.com for a quote.

1 Introduction

The state by state polling data is collected from: <http://www.usaelectionpolls.com/2008/state-polls.html>. For simplicity it is assumed that all the polls have a standard sampling error of +/- 4% which is fairly typical for presidential polls. The data used for the analysis is shown in Appendix A, and was downloaded from [usaelectionpolls.com](http://www.usaelectionpolls.com) on Oct 25, 2008.

2 Results

Running a Monte Carlo simulation based on the poll data available on Oct 25, 2008 (Appendix A) results in the following probabilities:

- The probability for an Obama win is 100%.
- The probability for a McCain win is 0%.
- The probability for a tie is 0%.

Figure 1 shows a histogram of the probability for any particular electoral college outcome. The mode (the most likely result) is for Obama to get 378 electoral votes and for McCain to get 160 electoral votes. The probability for this particular outcome is 6.4%.

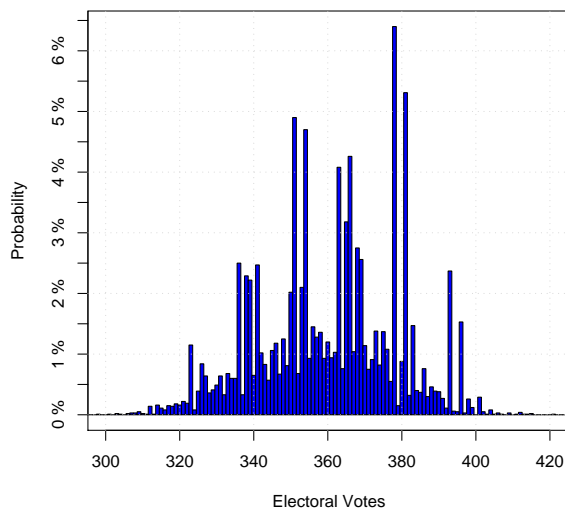


Figure 1: Probability distribution of electoral votes for Obama, fewer than 269 electoral votes would mean a McCain victory (indicated by red), exactly 269 electoral votes would result in a tie (indicated by the green bar).

2.1 Trend

Figure 2 shows how the results of the Monte Carlo Simulation have changed over time as new poll results have become available.

2.2 What if Scenarios

The tables below shows how the probability for an Obama or McCain victory changes if certain states are assumed to have a specific outcome. The 7 states that currently are the closest according to the polling data are included in the analysis as well as any pair of states among the 7.

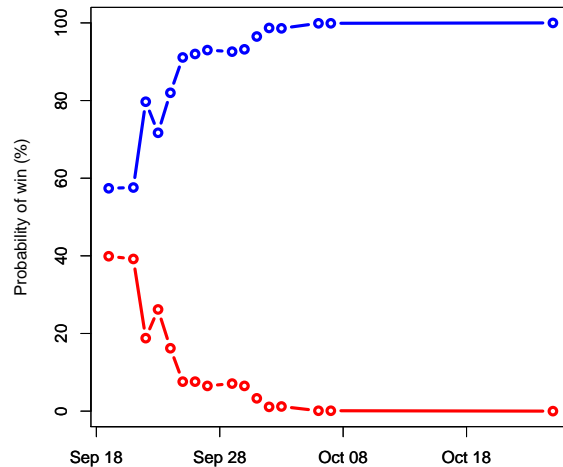


Figure 2: Trend for probability of victory (Blue - Obama, Red - McCain).

States assumed won by Obama	Probability of win
North Dakota	100%
North Dakota, Florida	100%
North Dakota, Georgia	100%
North Dakota, Virginia	100%
North Dakota, North Carolina	100%
North Dakota, Montana	100%
North Dakota, Colorado	100%
Florida	100%
Florida, Georgia	100%
Florida, Virginia	100%
Florida, North Carolina	100%
Florida, Montana	100%
Florida, Colorado	100%
Georgia	100%
Georgia, Virginia	100%
Georgia, North Carolina	100%
Georgia, Montana	100%
Georgia, Colorado	100%
Virginia	100%
Virginia, North Carolina	100%
Virginia, Montana	100%
Virginia, Colorado	100%
North Carolina	100%
North Carolina, Montana	100%
North Carolina, Colorado	100%
Montana	100%
Montana, Colorado	100%
Colorado	100%

Table 1: Probability of an Obama victory assuming an Obama victory in the listed states

States assumed won by McCain	Probability of win
North Dakota	0%
North Dakota, Florida	0%
North Dakota, Georgia	0%
North Dakota, Virginia	0%
North Dakota, North Carolina	0%
North Dakota, Montana	0%
North Dakota, Colorado	0%
Florida	0%
Florida, Georgia	0%
Florida, Virginia	0%
Florida, North Carolina	0%
Florida, Montana	0%
Florida, Colorado	0%
Georgia	0%
Georgia, Virginia	0%
Georgia, North Carolina	0%
Georgia, Montana	0%
Georgia, Colorado	0%
Virginia	0%
Virginia, North Carolina	0%
Virginia, Montana	0%
Virginia, Colorado	0%
North Carolina	0%
North Carolina, Montana	0%
North Carolina, Colorado	0%
Montana	0%
Montana, Colorado	0%
Colorado	0%

Table 2: Probability of a McCain victory assuming a McCain victory in the listed states

A Data used for analysis

	Obama	McCain	Other/Undesided	Electoral votes	Mid Date
Alabama	36.0	51.0	13.0	9	6/26/020
Alaska	42.0	53.0	5.0	3	10/18/08
Arizona	38.0	59.0	3.0	10	9/29/08
Arkansas	41.0	53.0	6.0	6	9/21/08
California	56.0	33.0	11.0	55	10/16/08
Colorado	51.0	46.0	3.0	9	10/20/08
Connecticut	56.0	39.0	5.0	7	10/14/08
Delaware	56.0	41.0	3.0	3	10/10/08
District of Columbia	82.0	13.0	5.0	3	9/12/08
Florida	48.0	47.0	5.0	27	10/22/08
Georgia	48.0	47.0	5.0	15	10/23/08
Hawaii	63.0	32.0	5.0	4	9/10/08
Idaho	29.0	68.0	3.0	4	9/9/08
Illinois	61.0	32.0	7.0	21	10/21/08
Indiana	51.0	41.0	8.0	11	10/21/08
Iowa	52.0	39.0	9.0	7	10/21/08
Kansas	41.0	53.0	6.0	6	10/22/08
Kentucky	44.0	52.0	4.0	8	10/21/08
Louisiana	41.0	57.0	2.0	9	10/21/08
Maine	54.0	39.0	7.0	4	10/20/08
Maryland	54.0	39.0	7.0	10	9/18/08
Massachusetts	59.0	35.0	6.0	12	10/14/08
Michigan	58.0	36.0	6.0	17	10/21/08
Minnesota	56.0	41.0	3.0	10	10/22/08
Mississippi	40.0	50.0	10.0	6	10/15/08
Missouri	49.0	44.0	7.0	11	10/19/08
Montana	44.0	40.0	16.0	3	10/18/08
Nebraska	37.0	56.0	7.0	5	9/30/08
Nevada	51.0	46.0	3.0	5	10/20/08
New Hampshire	50.0	43.0	7.0	4	10/18/08
New Jersey	59.0	36.0	5.0	15	10/18/08
New Mexico	52.0	45.0	3.0	5	10/13/08
New York	57.0	37.0	6.0	31	10/14/08
North Carolina	48.0	50.0	2.0	15	10/23/08
North Dakota	45.0	45.0	10.0	3	10/15/08
Ohio	52.0	42.0	6.0	20	10/22/08
Oklahoma	35.0	59.0	6.0	7	10/19/08
Oregon	48.0	34.0	18.0	7	10/15/08
Pennsylvania	53.0	41.0	6.0	21	10/22/08
Rhode Island	58.0	39.0	3.0	4	9/13/08
South Carolina	43.0	54.0	3.0	8	10/20/08
South Dakota	39.0	55.0	6.0	3	9/20/08
Tennessee	42.0	54.0	4.0	11	10/16/08
Texas	44.0	54.0	2.0	34	10/21/08
Utah	29.0	65.0	6.0	5	9/12/08
Vermont	56.0	38.0	6.0	3	9/20/08
Virginia	47.0	45.0	8.0	13	10/21/08
Washington	54.0	43.0	3.0	11	10/22/08
West Virginia	44.0	49.0	7.0	5	10/21/08
Wisconsin	52.0	41.0	7.0	10	10/21/08
Wyoming	37.0	58.0	5.0	3	10/19/08

Table 3: Data collected on Oct 25, 2008 from <http://www.usaelectionpolls.com/2008/general-election/electoral-college-results.html>