

AP Poll System

These instructions describe a system for mimicking a human college football poll such as the Associated Press Poll, useful when doing a replay of a college football. Each week's new rankings are obtained by combining the results of the games of the week with previous week's poll.

My goal in developing this system was to generate rankings that retained the feel of human polls, while remaining simple enough to be done with a hand calculator. The system is based on analysis of the Associated Press Polls from 1950 through 2008.¹

Overview

Each week, each team in the previous week's rankings will receive a "predicted" ranking score, based on the team's previous rank and the results of this week's game. Factors that proved to be important in the real-life AP polls are included, such as the team's record, the amount that they won or lost by this week, and the perceived strength of the opponent.

After all predicted ranking scores have been calculated, the teams are sorted by this predicted ranking score, and this becomes the new rankings. Teams drop out of the rankings when their predicted ranking score is too high. New teams are then chosen to enter the rankings, with the aid of an optional sub-system.

Details

Begin with the previous week's rankings. If beginning a new season, use the preseason rankings from real-life, or make up your own preseason rankings.

Calculate predicted ranking score

Calculate the predicted ranking score $Rank_{pred}$ individually for each team in the rankings, based on their performance in this week.

If the team won their game this week

$$Rank_{pred} = 1.98 + \frac{5}{6} Rank_{prev} - \frac{(Score - Score_{opp})}{47} - \frac{Wins}{25} + 0.37 * Losses$$

Where the variables are:

$Rank_{prev}$ is the team's ranking in the previous poll,

$Score - Score_{opp}$ is the team's score minus their opponent's score (i.e., how much they won by),

$Wins$ is the number of wins the team has in the season, including this week's win, and

$Losses$ is the number of losses the team has in the season.

Add $\frac{1}{2}$ to both $Wins$ and $Losses$ for every tie that the team has.

(Variables described in this section have the same meanings throughout the instructions. Note that $Wins$ and $Losses$ always include the current week's result, and both also include the $\frac{1}{2}$ per tie.)

¹ Associated Press Poll data obtained from the AP Poll Archive: <http://www.appollarchive.com/index.cfm>
Other scores and conference data obtained from James Howell's Historical Scores:
<http://www.jhowell.net/cf/scores/scoresindex.htm>

If their opponent was also ranked in the previous poll, adjust $Rank_{pred}$ by

$$-2.23 - \frac{3}{2}(Opp\ ranked\ higher?) - \frac{3}{40}(Rank - Rank_{Opp})$$

$Opp\ ranked\ higher?$ is 1 if the opponent was ranked higher in the previous poll, and 0 otherwise,

$Rank$ is the team's previous ranking, and

$Rank_{Opp}$ is the opponent's previous ranking.

Otherwise, if the opponent was not ranked in the previous poll, adjust $Rank_{pred}$ based on the opponent's conference²:

| | |
|---|-------|
| Strong Independents | -1.31 |
| Big Ten / Pac 10 / SEC | -1.12 |
| Big 8 / SWC | -1.02 |
| ACC / Big 12 / Big East / Average Independents | -0.94 |
| Big West / CUSA / MAC / MVC / MWC / Southern / Sun Belt / WAC / Weak Independents | -0.33 |
| Border / Ivy / Skyline / Lower division | None |

If the team lost their game this week

$$Rank_{pred} = 10.94 + 0.781(Rank_{prev}) - \frac{(Score - Score_{Opp})}{12} - 0.52(Wins) + \frac{3}{4}(Losses)$$

Note that $Losses$ includes this week's loss.

If their opponent was also ranked in the previous poll, adjust $Rank_{pred}$ by

$$-2.52 - \frac{7}{11}(Opp\ ranked\ higher?) - \frac{(Rank - Rank_{Opp})}{13}$$

Otherwise, if the opponent was not ranked in the previous poll, adjust $Rank_{pred}$ based on the opponent's conference:

| | |
|--|-------|
| Strong Independents | -1.82 |
| Big 8 / Big Ten / Pac 10 / SEC / SWC | -1.30 |
| ACC / Big 12 / Big East / Average Independents | -0.92 |
| All Others | None |

² For explanations of conference designations, see the "Conferences" section.

If the team tied their game this week

$$Rank_{pred} = 8.45 + 0.74(Rank_{prev}) - \frac{6}{11}(Wins) + \frac{5}{4}(Losses)$$

If their opponent was also ranked in the previous poll, adjust $Rank_{pred}$ by

$$-4.32 - \frac{3}{16}(Rank - Rank_{Opp})$$

Otherwise, if the opponent was not ranked in the previous poll, adjust $Rank_{pred}$ based on the opponent's conference:

| | |
|--|-------|
| ACC, Big 8, Big 12, Big Ten, Pac 10, SEC, SWC, Strong Independents | -0.94 |
| All Others | None |

If the team did not play this week

$$Rank_{pred} = 0.26 + 0.955(Rank_{prev}) - \frac{Wins}{23} + 0.14(Losses)$$

Sort by predicted ranking score

Now that you have calculated all predicted ranking scores for each team in the rankings, sort the teams by this predicted ranking score. The order of the teams becomes the rankings for current week.

Teams who receive a predicted ranking score of anything greater than the number of ranked teams (25 in recent years) fall out of the rankings. You may also, at your discretion, drop a team out of the rankings if their predicted ranking score is within 1 of the number of ranked teams. For current years with 25 ranked teams, this would mean any team with a predicted ranking score of 24 or greater. You would do this if you found teams that are more deserving of being ranked, in the steps described below for finding new teams to enter the rankings.

Examples

This section will walk through an example for the top six teams from the results preceding the December 6th, 2009 Associated Press poll.

#1 Florida lost to #2 Alabama, 13-32. Florida's record after the loss was 12-1. Florida's base predicted ranking score is $10.94 + 0.781(1) - \frac{(13-32)}{12} - 0.52(12) + \frac{3}{4}(1) = 7.81$. Since their opponent was ranked, this is adjusted by $-2.52 - \frac{7}{11}(0) - \frac{(1-2)}{13} = -2.44$, so Florida's final predicted ranking score is **5.37**.

#2 Alabama beat #1 Florida, 32-13. Alabama's record after the win was 13-0. Alabama's base predicted ranking score is $1.98 + \frac{5}{6}(2) - \frac{(32-13)}{47} - \frac{13}{25} + 0.37*0 = 2.72$. Since their opponent

was ranked, this is adjusted by $-2.23 - \frac{3}{2}(1) - \frac{3}{40}(2-1) = -3.80$, so Alabama's final predicted ranking score is **-1.08**.

#3 Texas beat #21 Nebraska, 13-12. Texas's record after the win was 13-0. Texas's base predicted ranking score is $1.98 + \frac{5}{6}(3) - \frac{(13-12)}{47} - \frac{13}{25} + 0.37(0) = 3.94$. Since their opponent was ranked, this is adjusted by $-2.23 - \frac{3}{2}(0) - \frac{3}{40}(3-21) = -0.88$, so Texas's final predicted ranking score is **3.06**.

#4 TCU had a record of 12-0 and did not play, so their predicted ranking score is $0.26 + 0.955(4) - \frac{12}{23} + 0.14(0) = 3.56$.

#5 Cincinnati beat #14 Pittsburgh, 45-44, to improve their record to 12-0. Following the same steps as #2 Alabama and #3 Texas, their final predicted ranking score is **4.10**.

#6 Boise State beat New Mexico State, 42-7, to improve their record to 13-0. Boise State's base predicted ranking score is $1.98 + \frac{5}{6}(6) - \frac{(42-7)}{47} - \frac{13}{25} + 0.37(0) = 5.72$. Since New Mexico State was not ranked, this is adjusted by -0.33 because New Mexico State is in the WAC. So Boise State's final predicted ranking score is **5.39**.

Now that the predicted ranking scores have been calculated, we can sort the top six teams:

| New Ranking | Team | Predicted Ranking Score |
|-------------|-------------|-------------------------|
| 1 | Alabama | -1.08 |
| 2 | Texas | 3.06 |
| 3 | TCU | 3.56 |
| 4 | Cincinnati | 4.10 |
| 5 | Florida | 5.37 |
| 6 | Boise State | 5.39 |

Finding teams to enter the rankings

The final step in each week's rankings is finding any new teams that will enter the rankings, to replace the teams that have fallen out. This step requires some judgment and some subjective decisions. Still, this system includes some guidelines for making reasonable choices.

In the first two or three weeks of a replay, it is best to look at the real-life rankings. Simply select the teams that entered the rankings in real-life, provided they also won their games in the replay. Be especially eager to rank teams that finished the season highly ranked in real-life, so that they can begin the long climb up the rankings as the season progresses.

After a few weeks, you can start to use the following system to sort out the teams that would likely be ranked. The system can theoretically be applied to all available teams, but in reality you will pick several teams that merit consideration because of their record or a win over a ranked opponent. Then you can use the system to pick as many teams as you need to enter the rankings out of those considered.

First, sort the teams by Wins - Losses. This is called the “win difference” in the instructions to follow.

Adjust this win difference based on the team's conference:

| | |
|---|-----------|
| Strong Independents | +2.7 wins |
| Big 8, Big Ten, Pac 10, SEC, SWC | +2.4 wins |
| ACC, Big 12, Southern, Average Independents | +1.7 wins |
| Big East, MWC, WAC | +1.2 wins |
| All Others | None |

Teams that won this week get a bonus to their win difference of $\frac{(Score - Score_{Opp})}{59}$.

If the opponent was ranked, award an additional bonus of $0.9 - \frac{Rank_{Opp}}{22}$.

The teams with the highest adjusted win difference enter the rankings. For each team that will enter the rankings, their predicted ranking score begins at 18.55 if there are 20 ranked teams, or 23.72 if there are 25 ranked teams. This number is adjusted by $0.42(Losses) - \frac{(Score - Score_{Opp})}{108}$. (If the team did not play this week, ignore the $(Score - Score_{Opp})$ term.)

If the team beat a ranked opponent, adjust the predicted ranking score by $-3.76 + \frac{Rank_{Opp}}{9}$.

Otherwise, if the team beat a non-ranked opponent from a Major Conference, adjust the predicted ranking score by -0.79.

Once predicted ranking scores have been calculated for all of the newly-ranked teams, simply sort them into the new rankings along with the other ranked teams.

Example

Again the example is from the results preceding the December 6th, 2009 Associated Press poll.

Unranked Arizona beat #20 USC, 21-17, improving their record to 8-4. First we calculate their adjusted win difference. They begin with $8 - 4 = 4$, which is adjusted by +2.4 because they are in the Pac-10. They get a further adjustment of $\frac{(21 - 17)}{59} = 0.1$ for the score of the game, and

$0.9 - \frac{20}{22} = 0.0$ for beating a ranked team. So their final win difference is $4 + 2.4 + 0.1 + 0.0 = 6.5$.

If we decide based on this or on our own judgment that Arizona is worthy of entering the rankings, we calculate their predicted ranking score as $23.72 + 0.42(4) - \frac{(21-17)}{108} = 25.32$. This is adjusted by $-3.76 + \frac{20}{9} = -1.54$ because they beat a ranked opponent, for a final predicted ranking score of $25.32 - 1.54 = 23.78$.

Conferences

Throughout these instructions there are references to the various conferences in college football, as well as “Strong Independents,” “Average Independents,” and “Weak Independents.” This section discusses these various classifications.

All historical conferences have been combined into the name that is currently in use. Specifically:

| Current Conference | Also Includes |
|---------------------------|----------------------|
| Pac-10 | AAWU, Pac-8, PCC |
| Big 8 | Big 7 |
| Big Ten | Western |
| Big West | PCAA |

For Independent teams, it was necessary to split them up into general categories to get a sensible system. “Strong Independents” are the schools that are perceived as the strongest and most prestigious programs. Opponents of these teams receive a boost to their rankings, and these strong independents are also more likely to be ranked, which is reflected in their win difference bonus. “Weak Independents” teams are generally seen as equal to a school from a weak conference. They will need an exceptional record before they are ranked.

These classifications are not set in stone, and you can use your judgment based on the specific year. Over the course of the 50 years considered for this system, the data led to these classifications:

| | |
|----------------------|--|
| Strong Independents | Air Force, Houston, Miami (FL), Notre Dame, Penn State, Pittsburgh |
| Average Independents | Army, Boston College, Boston University, Cornell, Florida State, Georgia Tech, Navy, Oklahoma State, Oregon, Oregon State, Pennsylvania, Rutgers, South Carolina, Syracuse, Texas Tech, Tulane, Virginia, Virginia Tech, Washington State, West Virginia, Yale |
| Weak Independents | All Others |

A few schools that could have been considered Strong Independents are Boston College, Georgia Tech, Navy, and South Carolina. Remember that these classifications only matter when the Independent is not ranked, and represents the perception at the time, not necessarily how strong the team actually is in any given year.