

Experimental Design

After completion of the simulator, we thought about how we could validate and test the outputs. From the very beginning, we had two experiments in mind:

Experiment 1 : Prediction Accuracy

We want our simulator to be an accurate representation of a soccer match. Obviously, we have taken many assumptions and simplifications, so it was important for us to test this claim. We had 2 sources of test data - the actual match result and the expected results from the Poisson model created previously (see Data Analysis).

The structure of the experiment is to run 100 iterations of the match between Man City and Aston Villa, and record the scores and results (home win, away win or draw). We then compare these values with the actual score and the result from the Poisson model and see if there is a significant difference in expected value.

Experiment 2 : Tactic Selection

The second experiment we designed was to test the effect of changing tactics on the outcomes of matches. Using the sliders in the simulator, we intend to test if a change in tactics can significantly increase the probability of winning a match. For this experiment, we consider the 'real life' dilemma of the Aston Villa - the opponent is clearly stronger than my team, so how can I increase my chance of winning?

We reason that by increasing the Pass Length and Chance Creation Passing attributes, Villa will become more direct and play longer passes. This would theoretically give Villa more shots per game, although it also increases the risk of losing possession to City.

The experiment is done by running an extra 100 iterations of the same match, again recording the scores and results. We also compute the expected value of number of home and away goals, as well as the probability of each result occurring. After that, we perform a t-test at 90% confidence to check if there is a significant difference in the results between Experiment 1 and 2.