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Project Milestone 5: Proposal of Future Work

Based on our initial model findings, we see that shooting streak is not typically predictive for an increased shooting performance, and when significant actually predicts a decrease in likelihood of next shot. This holds true even when confounding variables were included beyond streak. Thus, our initial findings suggest that the Hot Hand is indeed a fallacy, but moving forward we would like to test this even further. Though our confounding variables included metrics indicative of shot difficulty (defender and shot distance, shot clock, dribbles, touch time, shooting percentage, and final score), we still fail to capture some other variables that may affect the shot. For instance, if players believe the Hot Hand theory is true, then opposing teams likely adjust their defensive strategies so better defenders guard 'hot' players. Our initial models do not account for specific defenders, and this is where we'd like to improve our model. Our next step will be to create a metric for how strong a given defender is (some 'Defender Score') that allows us to see how the quality of defense may affect shooting percentage. This approach will give us a more holistic grasp of shot difficulty than we currently are employing. With this metric, we'll be utilizing all available information to make a final determination on our view of the Hot Hand theory.

Beyond our conclusions on the Hot Hand theory, there are further applications of our dataset we would like to extend our analysis to. As Gilovich et al. (1985)[1] examines, there is a noticeable belief among players and coaches that the Hot Hand exists. Though we may not find any significance for individual players, we'd like to examine if this theory may work on a team level. In other words, if a team believes they have a hot player or they as a team are hot (i.e. on a team scoring streak), is the play of the team as a whole elevated? This could result in higher team shooting percentage, the team going on more scoring streaks, or the team winning more games where they have more 'hot' streaks. With this analysis, we can study the Hot Hand theory on a macroscopic level, which may yield some interesting results.

We'd also like to pursue another theory in basketball: the Clutch Factor. There is a perception that certain players elevate their performance in important moments, such as when the score is close or the game is in its final minutes. We would like to use similar methodology to our Hot Hand analysis to briefly explore if the Clutch Factor is may indeed hold merit or is just another fallacy.

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[1] Gilovich, T., Vallone, R., & Tversky, A. (1985). The hot hand in basketball: On the misperception of random sequences. *Cognitive psychology*, *17*(3), 295-314.