The Statistical Analysis of Acquiring Poker Hands

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ABSTRACT

Probability is a fundamental tool for the world and can be used in various professions including health-care providers, sports analysts, and weather forecasters. Probability is often implemented to predict the outcomes of events where uncertainty lies. These predictions can then be reported and utilized for the benefit of the people who are impacted by the study or research conducted. Our project focused on a more basic form of probability in which we analyzed the likelihood of acquiring different poker hands. In our study, we conducted a series of poker games played by the members of the group to collect data and then compare results with a computer simulated poker game. Our goal was to compare the results from the simulation and our own data and conclude if computer generated probability results were accurate to their real-world depictions.

INTRODUCTION/OBJECTIVES

Our project sought out to compare the statistical probability of different poker hands via computer software and real-world games. The objectives are to collect a broad series of data and compare it to simulated data and show the similarities/differences within their results. Firstly, we will obtain hands from a multitude of poker games and analyze the probable chance of receiving a certain hand. Next, we will run code via computer software to further analyze the specific odds of a hand. Finally, we will look to compare the obtained data across the two methods and conclude on the ability to accurately simulate statistics. With a growing age of technological advancement, viewing the similarities of real-life probability with technological statistics will help display the future of computer/code simulation. The usage of analyzing poker hands will provide a gateway to future statistical analysis across various scenarios in the fields of medicine, sports, computer science, and game theory.

METHODS

- Use of computer software to simulate poker hands
- Conducted trial hands with real games
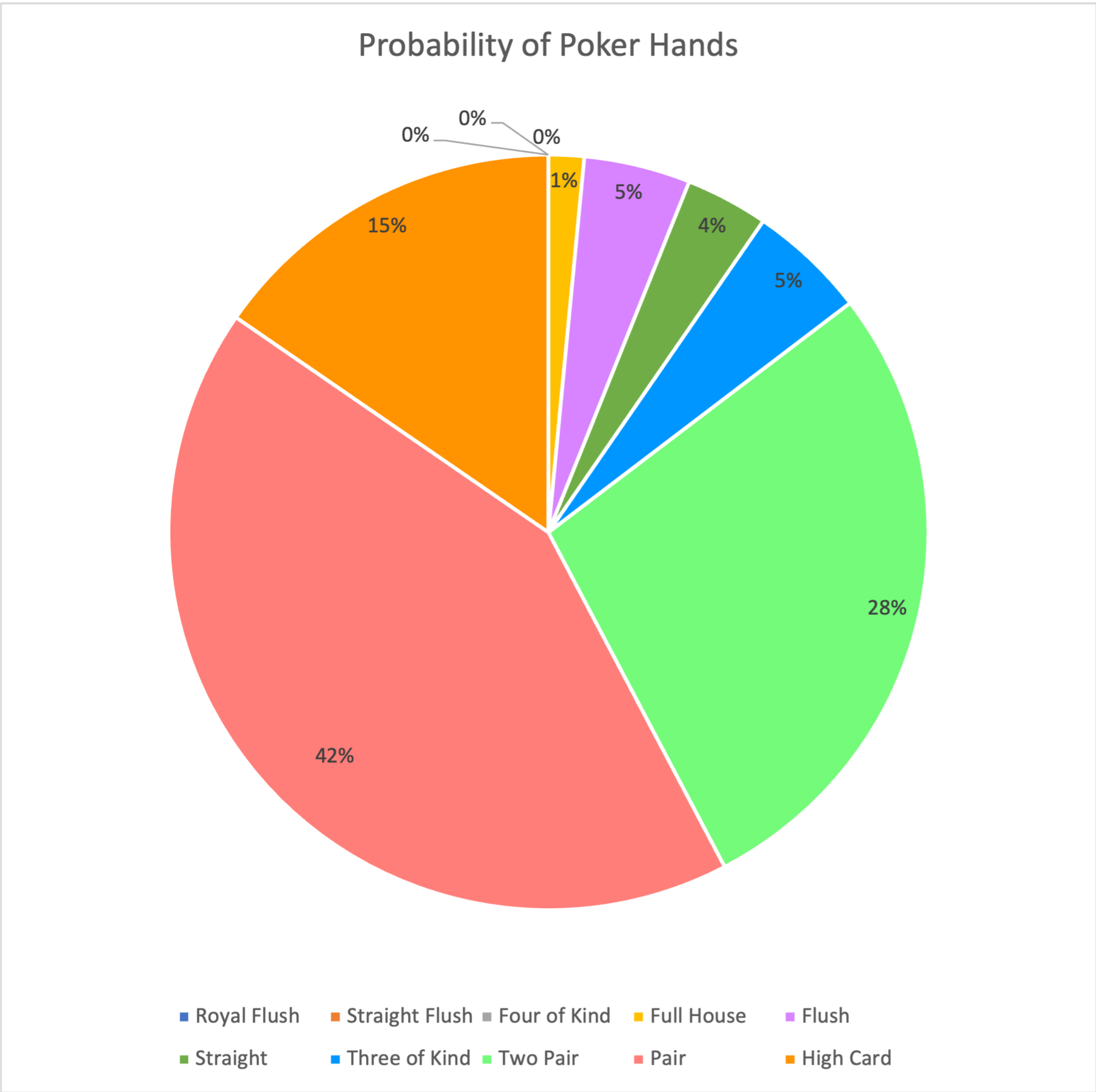- Data and graphs tabulated in Excel

Figure 1. Data Captured from Real-Life Gameplay – 50 games

RESULTS

	High Card	Pair	Two Pair	Full House	Flush	Straight	Four of a Kind
Real-Life	15%	42%	28%	1%	5%	4%	0%
Code	20%	48%	22%	2.6%	2.7%	0.08%	0.13%

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Player: Ryan
Probability of Royal Flush: 0.0000
Probability of Straight Flush: 0.0000
Probability of Four of a Kind: 0.0013
Probability of Full House: 0.0261
Probability of Flush: 0.0270
Probability of Straight: 0.0008
Probability of Three of a Kind: 0.0485
Probability of Two Pair: 0.2212
Probability of One Pair: 0.4776
Probability of High Card: 0.1975

Player: Graham
Probability of Royal Flush: 0.0000
Probability of Straight Flush: 0.0000
Probability of Four of a Kind: 0.0017
Probability of Full House: 0.0238
Probability of Flush: 0.0278
Probability of Straight: 0.0006
Probability of Three of a Kind: 0.0492
Probability of Two Pair: 0.2178
Probability of One Pair: 0.4748
Probability of High Card: 0.2043

Player: Gloria
Probability of Royal Flush: 0.0000
Probability of Straight Flush: 0.0000
Probability of Four of a Kind: 0.0010
Probability of Full House: 0.0265
Probability of Flush: 0.0305
Probability of Straight: 0.0006
Probability of Three of a Kind: 0.0497
Probability of Two Pair: 0.2137
Probability of One Pair: 0.4789
Probability of High Card: 0.1991

Player: Ababacar
Probability of Royal Flush: 0.0000
Probability of Straight Flush: 0.0000
Probability of Four of a Kind: 0.0019
Probability of Full House: 0.0250
Probability of Flush: 0.0299
Probability of Straight: 0.0006
Probability of Three of a Kind: 0.0502
Probability of Two Pair: 0.2228
Probability of One Pair: 0.4692
Probability of High Card: 0.2004
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Figure 2. Data Captured from the code analysis

DISCUSSION/FUTURE WORK

This project was a small comparison between computer simulated and real-life probability analysis. Although our project did not make any groundbreaking discoveries, it did show that computer generated, and real probabilities can have similarities. In the future, we would like to look into comparing different aspects of computer-generated results and how they could compare to more than just probabilities.

Figure 3. Group Members Conducting Real-life Games

CONCLUSIONS

We have concluded from our results that the most probable hand happens to be a pair while the least probable hand is the royal flush. The results across both data sets were similar in most hands while still varying in few hands by approximately 3-5%. Overall, this shows that computer simulation is a good representation of real events occurring in game theory.

Acknowledgments