

Automation and Human Interaction in Trading in Sports Betting: A Sport by Sport Analysis

A Case Study of Huddle
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INTRODUCTION

Automation is an on-going trend in the sports betting industry, but it is important to remember it is a means to an end and not a goal in itself. A fully-automated system may or may not be the optimal solution, it depends on the nature of the problem, and this is particularly true of trading systems.

Predicting the future requires a detailed understanding of previous events, which data analytics excels at, but also the ability to extrapolate beyond limited datasets or deal with changes to the context of events, and humans are often better able to handle those particular challenges.

The nature of automation across various sports has plenty of commonalities but the nuances and characteristics of each sport also play a part in determining the extent of that automation. Even in the case of the highest level of automation, there will still be scope for human experts to add information and data that is highly subjective or difficult to capture.

OVERVIEW OF AUTOMATION IN SPORTS BETTING

Technology in Betting

Data science has rich applications for sportsbetting - the very nature of data science is to analyze data to determine underlying patterns and use those to make predictions, which is exactly what bookmakers have been doing since our earliest history. The fourth industrial revolution has transformed sportsbetting just as it has done with most other sectors. Gone are the clunky models in Excel files and frantic copying and pasting by traders, now hundreds of markets can be priced at the touch of a button and hand-free trading systems are the norm rather than the exception.

This has led to an explosion in the volume, velocity, value, variety and veracity of data. Traders used to check the weather forecast for golf tournaments to try and predict if it would be windy or not, now models are fed real-time data about not just the strength of the wind, but its direction, air pressure, humidity, temperature and much more. The truth of it is that building a good sports model is only part of the challenge, creating and maintaining the data architecture you need to deploy the models in production is the real differentiator and source of competitive advantage.

THE ROLE OF HUMAN INTERACTION

Human experts still have value in the age of data science and a useful analogy is to think about autonomous driving systems in cars. When cruising along the interstate in traffic, the on-board system will be doing all the work and the driver is just keeping an eye on things. But once on a side street, with parked cars on both sides and drivers having to take it in turns to have right-of-way, the automation will struggle. That is because in those situations drivers use subtle cues to indicate they are letting each other go ahead. That could be a smile, a wave or a flash of the headlights. The automation simply isn't receiving that data so it fails and even if it could, the data is ambiguous and subjective - a smile could be a grimace, and the intention behind a wave changes a lot depending on the number of fingers used.

Human traders adjust the output of automated systems based on their interpretation of events that are either not captured or inherently unquantifiable but still relevant. This will vary according to the nature of each sport and, at times, can be tremendously important. Humans are able to access data the model lacks on an ad-hoc basis as it becomes relevant to the occasion and can adjust model output to reflect their interpretation of that data

SPORT-BY-SPORT ANALYSIS

Major League Baseball (MLB)

A baseball game consists largely of repeated, discrete events—specifically, players' plate appearances. Few sports offer the extensive range and depth of data and statistics that baseball does, capturing nearly every possible outcome of these appearances. This wealth of information makes it relatively straightforward to identify the key parameters necessary for forecasting those events.

At Huddle, we distill each player into a set of parameters that are generated from their playing history and model each game as a **Monte Carlo simulation** of full sets of plate appearances. We have made baseball a sport with a very high degree of automation once configured.

However, even here, line-ups need to be predicted and certain anomalous events, such as injuries, stolen bases and intentional walks, accounted for to give accurate predictions - so setting up baseball games requires care and attention from our traders. Traders are also able to anticipate and react to potential pitcher changes by monitoring bull-pen activity during games, which will significantly affect the game.

NFL

Football is another data rich sport and we simulate each set of down in our modeling process. The range of possible outcomes for the plays that make up the game is far more varied than in a baseball plate appearance, with a wider array of strategies and tactics employed to achieve them. Throughout a game, teams often drastically alter their style and pace of play as they manage the clock. While these adjustments can be somewhat predictable, there are critical inflection points where the outcomes can have a disproportionately large impact on the game. Predicting the likelihood of the outcomes of these moments very accurately depends on the specific context of that specific situation.

Will the coach go for it on 4th down? How much will they run the ball when leading by a single score? How many yards do they need to make a field goal attempt? Analytics may say one thing based on the field position, score etc. but that decision is made by a human coach, with their own biases and incentives. Is the coach under pressure, what happened the last time he made this decision, does he trust his offensive line, is he generally conservative and orthodox or does he rely more on analytics? Our expert traders understand this context and are able to adjust forecasts based on their insight throughout games, adjusting parameters for each team and refining the model output as the game is played out.

Furthermore, the NFL is such an important league that any downtime must be minimized. There are times when the outcome of referee decisions or reviews can be clear to observers but not yet fully confirmed. Our traders watch every game on low latency TV feeds and can anticipate what is going to happen at these times and get lines back up even before the scout at the games is ready to provide that confirmation.

Football is perhaps the best example of the power of expert traders working with a powerful and accurate model. We are able to price games with little or no trader input, relying only on data feeds, but also have the tools so that traders are able to add value for the most important games, where books will take the most handle and demand the best possible user experience.

NBA

As with baseball, basketball can be broken down into discrete, homogeneous events and we simulate each possession to generate our prices. An added complexity with basketball is that players come on and off court much more frequently than pitchers and batters are changed. This makes forecasting how many minutes each player will play particularly important and is something our traders focus on before and during games.

Basketball is another sport where the pace of scoring for teams can vary over a game as they manage the clock, but this is relatively straightforward to model in general, although traders will adjust team parameters during a game if this rate is outside expected boundaries.

At Huddle, we try to incorporate **pricing strategies into our models** wherever possible rather than requiring traders to manually adjust in a robotic and predictable way. A good example of this is how we factor in the performance of key players when games are tight versus when it's a blowout. In these situations we model not just the performance of the team, but also how that performance is distributed across the players within that team, which can vary greatly depending on the score. This concept, originated from our traders, was proven to be statistically relevant and so we adapted our model, demonstrating the excellent cooperation we have between our trading and quant teams and the domain knowledge of both.

NHL

Hockey is similar to soccer in many aspects, a fluid game that is not easily broken down into chunks of play. Soccer modeling is well documented and understood and our hockey model uses a similar method to the **most advanced soccer models but accounts for specific hockey phenomenon**, such as power players and empty net situations.

These situations drastically change the scoring rates and teams are changing strategy regarding empty net situations, becoming more aggressive when they pull their goalie. This is not happening uniformly though, some teams are much more aggressive than others. This is another example of how previous data may become less relevant and human insight needs to adjust parameters based on recent trends and outside context. Our traders study the strategies used by teams and anticipate not only what the optimal strategy is but when teams will adopt it, and adapt to situations as they arise during games.

CHALLENGES AND CONSIDERATIONS

The concept of a chain-link strategy is particularly relevant to trading systems - **you really are only as strong as your weakest link** and the pace of progress is determined by the pace of the slowest component. This is why innovation is so hard to achieve in big organizations - once the company reaches a certain number of employees, silos are inevitable and coordinating multiple functions at once is like herding cats.

Clear, frank, and frequent communication is vital between traders, quants, data scientists, data engineers and many other stakeholders. There needs to be a common language used and clear visibility of decisions. Managing this when people are often located across different time zones requires a dedicated effort from all parties involved. Culture plays a key role here, obsessing about job descriptions and purviews only gets in the way, but people must feel engaged and accountable regardless of their seniority or domain expertise.

Again, data capture and analysis is key. Understanding how each element, human and machine, adds value is an ongoing process that should be done without bias so that the overall product can be as efficient and accurate as possible.

CONCLUSION

Modern trading systems balance automation and human expertise. This is not just a case of a trader jumping in when a model goes haywire, rather they continually add and adjust model inputs to refine and improve the accuracy of the predictions. The nature of this interaction varies by sport and must be considered at the very start of the creation process of the models, and also continually refined as the way each sport is played evolves over time.

At the very heart of the process is analysis to have a clear picture of where traders can and do add value and accuracy, how this can be maximized while also increasing efficiency, uptime and other key metrics.

At Huddle, we are fortunate to have exceptional traders who possess in-depth knowledge of their respective sports and have played a pivotal role in developing our cutting-edge models. Their expertise allows them to swiftly and accurately adjust game parameters, ensuring seamless trading without waiting for market adjustments. Even during typical football games, our traders continuously fine-tune the models in real-time, adapting to the evolving play to more accurately reflect the unique circumstances of each specific game. This proactive approach ensures that our trading remains responsive and precise, maintaining a competitive edge in the dynamic world of sports betting.

CONCLUSION AND FUTURE OUTLOOK

The integration of advanced automation in sports betting represents a pivotal evolution in the industry, addressing the complexities of modern betting products and ensuring accurate and efficient trading operations. By leveraging sophisticated algorithms, AI, ML, and high-quality data feeds, automated trading systems enhance the precision of odds setting and enable real-time adjustments to dynamic game conditions. However, the synergy of automation with expert human oversight remains crucial, as it balances technological efficiency with the intuitive insights of experienced traders. As the industry continues to evolve, the future of sports betting will be defined by further advancements in automation, ensuring scalability, adaptability, and a competitive edge. This ongoing evolution promises a landscape where innovative technologies and human expertise work hand-in-hand to deliver unparalleled accuracy and reliability in sports betting.