



NHL Game Prediction Model

Mark Shumka
November 24, 2023



Problem Statement

Can we use data science to analyze past results of National Hockey League games and make accurate predictions of future game outcomes?

NHL announces North American partnership with FanDuel, BetMGM



OFFICIAL PARTNER OF THE NHL®



Dataset and Preprocessing

- Combination of Basic and Advanced Statistics
- Built comparative variables
- Converted in-game statistics into aggregated historical statistics
 - From rolling 10-game average to weighted linear decay



Model Building

- Reviewed correlations with target variable and dropped some features due to similarity and multicollinearity
- Consolidated all features in a single row for each game
 - Now predicting whether the home team won
- Established baseline model
 - Predict home team wins
 - Accuracy = 54.3%
 - Log loss = 0.6894



Results


Model	Test Accuracy	Log Loss
Logistic Regression	59.7%	0.6702
SVM	58.0%	0.6719
Neural Network	58.2%	0.6731
Random Forest	58.4%	0.6738
xGBoost	58.6%	0.6739



Model	Games	Log Loss
rajer	278	0.6624
DoNotTail	278	0.6636
Implied Odds	292	0.6680
DRatings	292	0.6727
MoneyPuck	278	0.6734
HockeySkytte	292	0.6775



That's all well and good, but can you actually make money with your model?

Calculating Odds



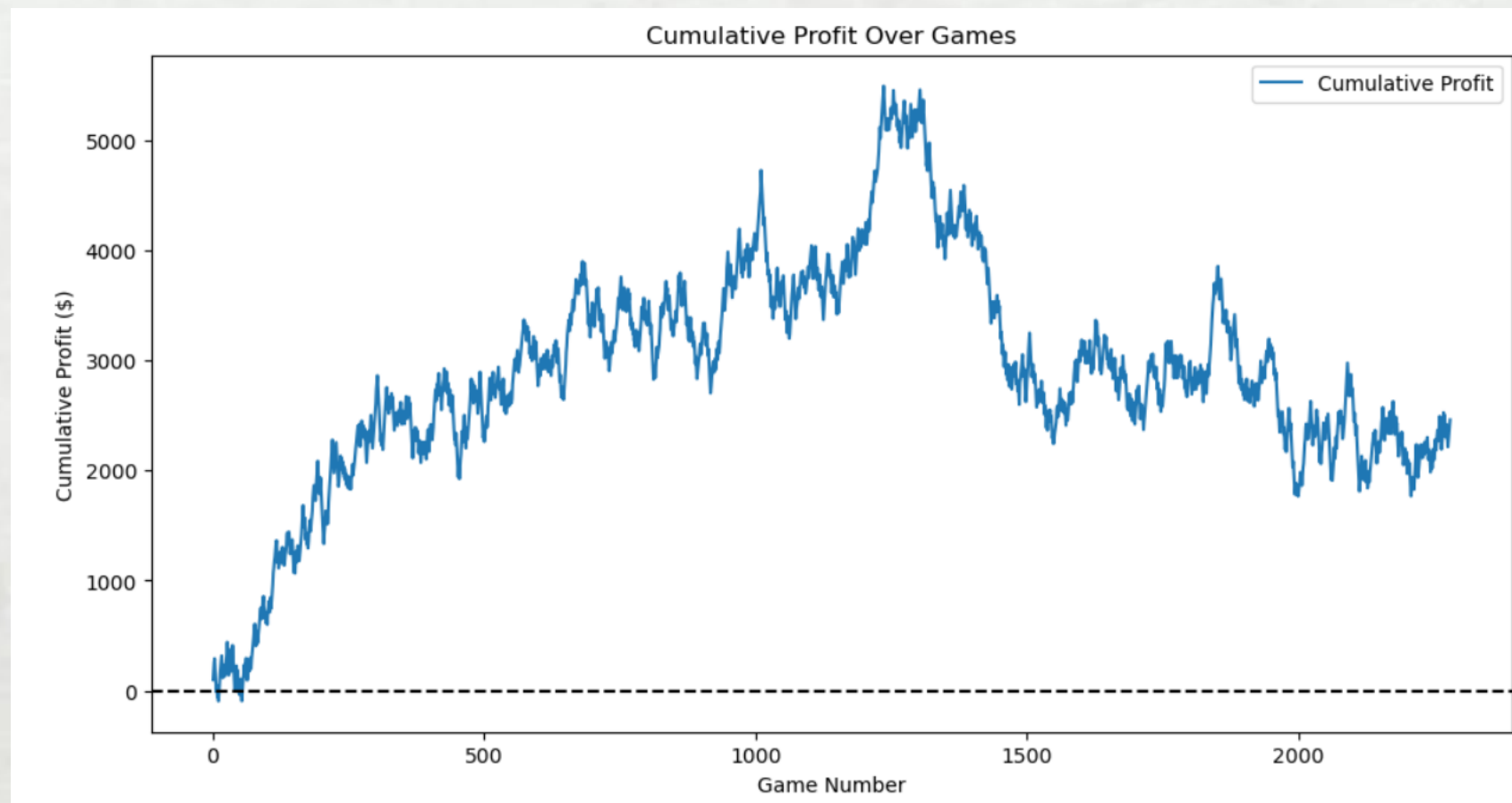
TOMORROW		PUCK LINE FT (INCL OT)		TOTAL FT (INCL OT)		MONEYLINE FT (INCL OT)	
SGP	4:08PM						
	NJ Devils	-1.5	+160	O 6.5	-135		-162
	DET Red Wings	+1.5	-192	U 6.5	+114		+136

- The Devils are favoured because their moneyline is negative
 - The -162 means you would have to risk \$162 to win \$100 profit
- For the underdog Red Wings, the +136 means you need to risk \$100 to profit \$136
- Implied probabilities:

Favourite	$162 / (100 + 162) = 61.8\%$
Underdog	$100 / (136 + 100) = 42.4\%$

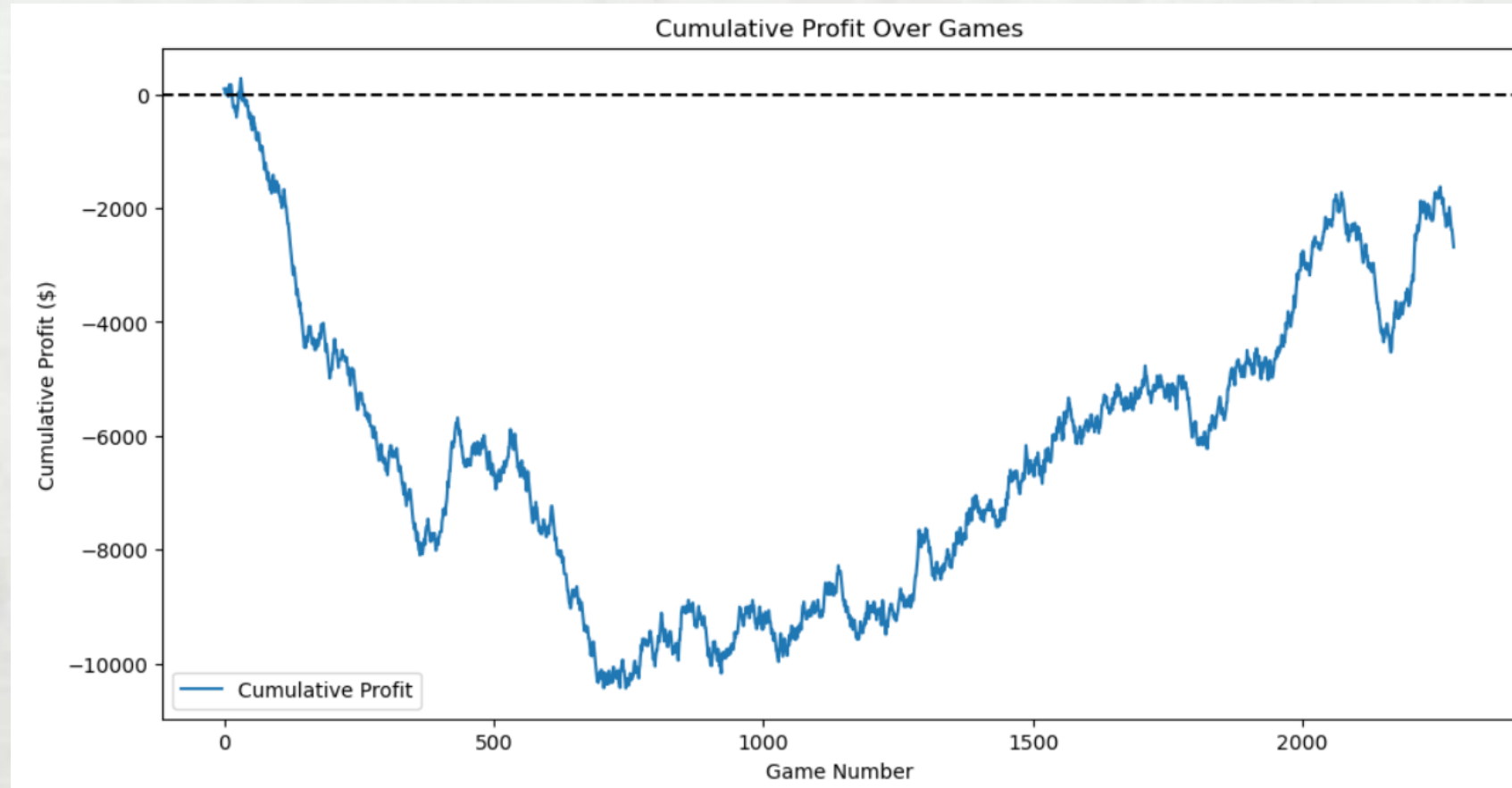


“Dumb” Betting Strategy



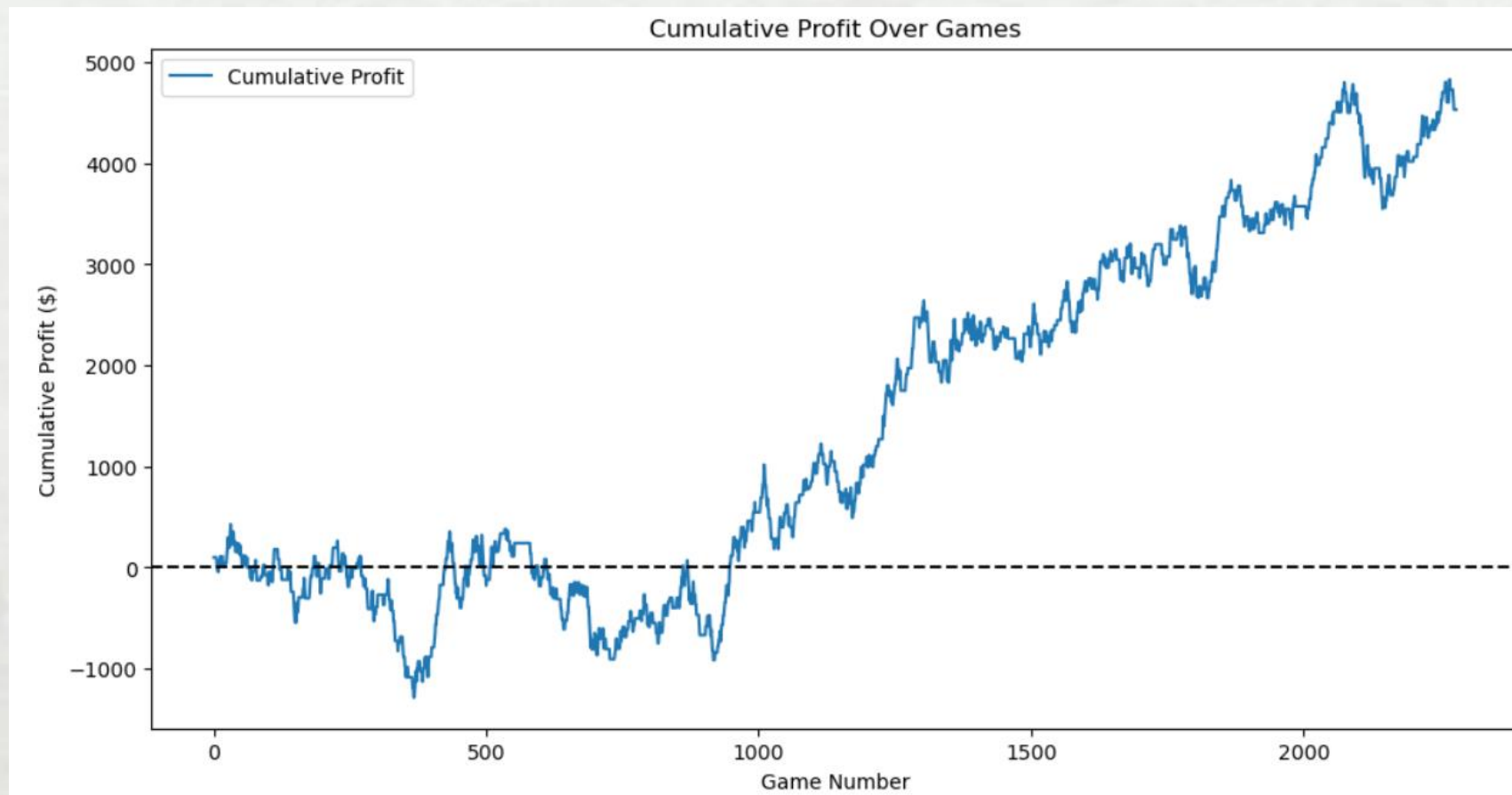
- Profit = \$2,461
- ROI = 1.1%

“Too Smart For My Own Good” Betting Strategy



- Profit = -\$2,683
- ROI = -1.5%

“Smarter” Betting Strategy








































- Profit = \$4,531
- ROI = 5.1%



Now what?

Standard Sports Betting Site

	BETTING LINE		BETTING LINE	
	-104 51.0%	New York  @  Ottawa	-115 53.5%	
	+138 42.0%	Tampa Bay  @  Carolina	-167 62.5%	
	+120 45.5%	Winnipeg  @  Florida	-148 59.7%	
	+148 40.3%	Calgary  @  Dallas	-179 64.2%	
	-135 57.4%	Colorado  @  Minnesota	+112 47.2%	
	-106 51.5%	Vancouver  @  Seattle	-115 53.5%	

			<div><div></div><div><div>PUCKPREDICTOR</div><div>INTELLIGENCE FOR HOCKEY BETTING</div></div></div>							
	PREDICTION	BETTING LINE				BETTING LINE	PREDICTION			
<div><div>BET NOW</div><div>CLICK HERE</div></div>	45.8%	-104 51.0%	New York		@		Ottawa	-115 53.5%	54.2%	<div><div>BET NOW</div><div>CLICK HERE</div></div>
<div><div>BET NOW</div><div>CLICK HERE</div></div>	44.9%	+138 42.0%	Tampa Bay		@		Carolina	-167 62.5%	55.1%	<div><div>BET NOW</div><div>CLICK HERE</div></div>
<div><div>BET NOW</div><div>CLICK HERE</div></div>	46.7%	+120 45.5%	Winnipeg		@		Florida	-148 59.7%	53.3%	<div><div>BET NOW</div><div>CLICK HERE</div></div>
<div><div>BET NOW</div><div>CLICK HERE</div></div>	33.4%	+148 40.3%	Calgary		@		Dallas	-179 64.2%	66.6%	<div><div>BET NOW</div><div>CLICK HERE</div></div>
<div><div>BET NOW</div><div>CLICK HERE</div></div>	56.2%	-135 57.4%	Colorado		@		Minnesota	+112 47.2%	43.8%	<div><div>BET NOW</div><div>CLICK HERE</div></div>
<div><div>BET NOW</div><div>CLICK HERE</div></div>	99.9%	-106 51.5%	Vancouver		@		Seattle	-115 53.5%	0.1%	<div><div>BET NOW</div><div>CLICK HERE</div></div>

Potential Improvements / Next Steps

- Model enhancements
 - Special teams vs. even strength
 - Score/venue adjusted stats
 - Goalie stats
 - Individual players
- Start my business





PUCKPREDICTOR

INTELLIGENCE FOR HOCKEY BETTING

Thank you