Can We Win in Horse Racing Using AI?

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Setting the Expectation!

- Work in Progress
- Sharing of personal experiences
- Discussion on how to build the net to catch fish
- Fish has swam from pond to ocean, more scattered and need a better net to catch
- There are billionaire fishermen out there

Type of Gambler - Conservative

不賭是贏錢!

Type of Gambler - Optimist

小賭可以怡情
大賭可以致富

Start with 1,000, double down 10 times and win in Big/Small and it becomes 1 million

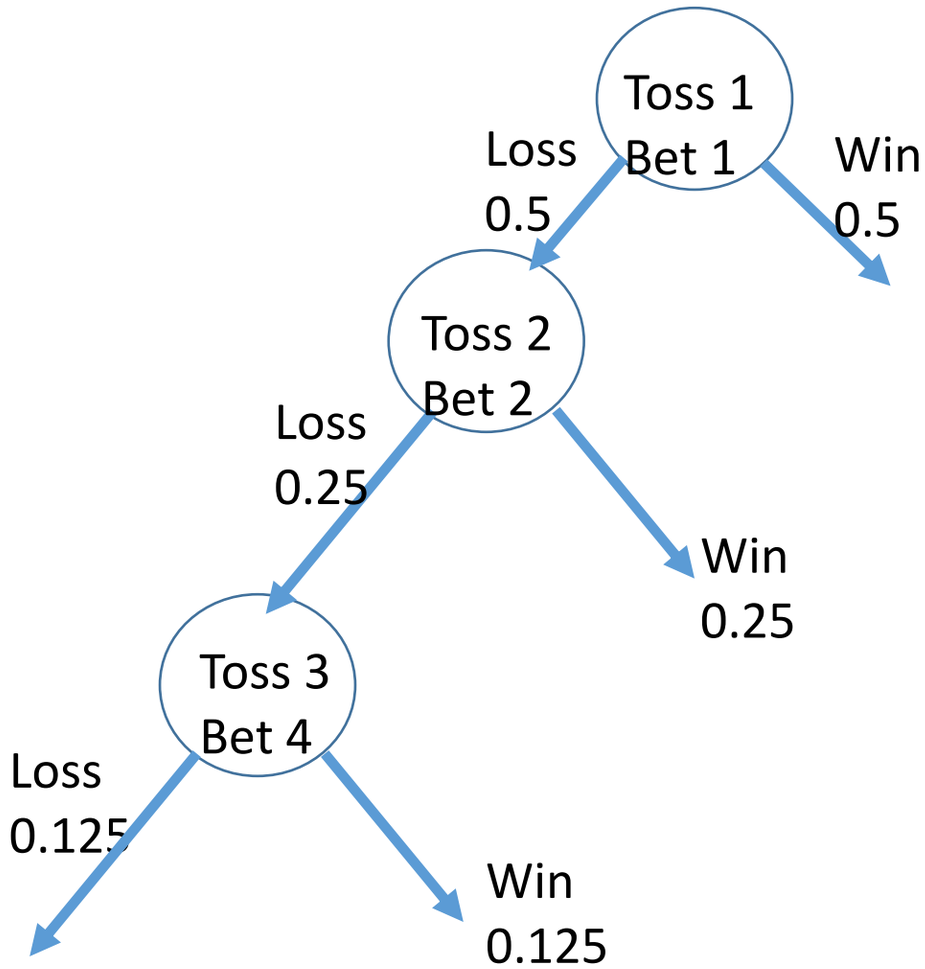
Type of Gambler – Simple and Naive

For an even bet like RED/BLACK in roulette, betting starts from 1, 2, 4, 8, 16, … until a win occurs, then starts from 1 again

A betting method known as Martingale but has proven to be impractical and at the end will loss money if there is a house advantage

Will lose 1 billion if bet wrongly in 30 bets!

Martingale Betting Explained



Total Win = 1 X (0.5 + 0.25 + 0.125)
= 0.875
Total loss = -7 X 0.125 = -0.875
Expected Gain = 0

Two more restrictions is that do you have sufficient capital or is there a house limit

The longest recorded streak of one color in roulette in American casino history happened in 1943 when the red color won 32 consecutive times in a row. For a roulette wheel with 36 numbers + 0, the chance is about 1 in 10 billion

Type of Gambler - Smart

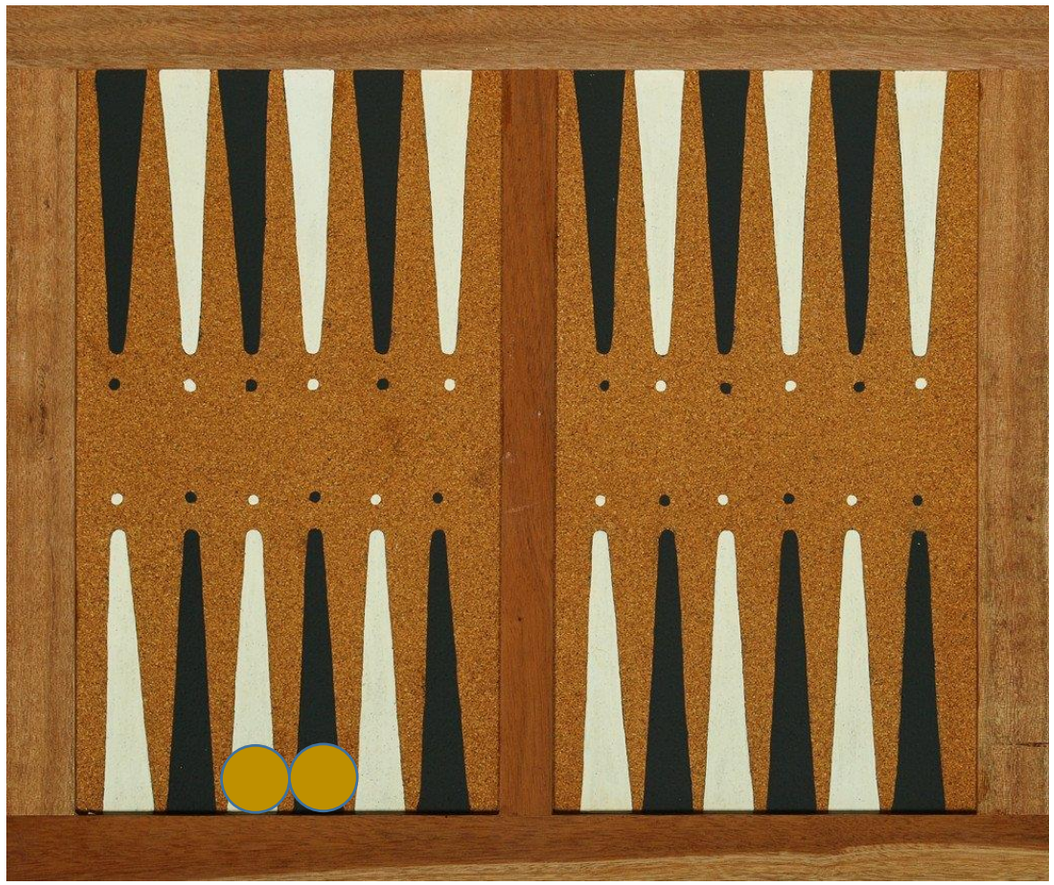
Knows probability and statistics, conducts extensive research and bets wisely

Suggested ready like

The Art of Computer Programming by Knuth

Beat the Dealer by Thorpe

Backgammon Question



If this is your last throw and you have only 2 pieces with one on the 3 and one on the 4 column, do you double?

You win if you throw
2-2
3-3, 3-4, 3-5, 3-6
4-3, 4-4, 4-5,4-6
5-3, 5-4, 5-5, 5-6
6-3, 6-4, 6-5, 6-6
17 combinations but you lose in 19 combinations

But if there is a 10% chance that the opponent will not accept the bet, then your expected gain will become
0.1 * 1 + 0.9 * (17 - 19) / 36 * 2 = 0.0

So, you are better off!

Birthday Question

Probability of 2 people in a room of 40 people having same birthday is
(1 – 364/365*363/365*….*327/365*326/365) = 89.1%

Using Monte Carlo Simulation

```
Nmatch = 0;
for I = 1:10000
  matched = 0;
A = floor ( 365 * rand ( 1 , 40 ) ) ;
for j = 1 : 39
  for k = j + 1 : 40
    if( A ( j ) == A ( k ) )
    if ( matched == 0 )
    matched = 1;
    Nmatch = Nmatch + 1 ;
  endif
  endif
  end
end
end
disp ( Nmatch ) ;
```

Result 1 : 0.9, 0.90, 0.885, 0.8945;
Result 2 : 0.7, 0.89, 0.899, 0.8948

Question:
If someone bet with you with 1 bet of 1 million on even odds, will you take the bet

However, if it is 100 bets of 10,000 each, will you take the bet

Type of Gambler - Professional

- Only wager on bets with expected gain > 1
  - Expected Gain (G) = Odd (O) X Probability (P)
- Probabilities can be Additive
  - e.g. P (place) = P (first) + P (second) + P (third)
- The Law of Large Numbers will mean that if you bet long enough, the actual result will come close to the expected result.

Wagering Inefficiency - Pari-mutuel system

- Suppose someone operates a game and fills a bag with 10 balls of different colors red, orange, yellow, green, blue, indigo, violet, black, white and gold
- Each time 2 balls are drawn and people are allowed to bet on the color combination. Because people like the red/gold combination and hate the black/white combination most, the odds are red/gold 30, black/white 50 and others 36.
- What will you bet?

How can there be Betting Opportunities with Expected Gain > 1

- Lottery when there is a large jackpot
- Blackjack when there is a large number of high cards remaining in the deck
- Horse racing when there is jackpot, cross race bets and inefficiency in the racetrack wagering

Horse Racing in Hong Kong

- Pari-mutuel system
- 122.8 billion turn-over in 2017 – 2018 season
- Jockey Club intake is around 18.5%
- Closed system with limited number of
  - Tracks
  - Horses
  - Jockeys
  - Trainers
- Possibility of inefficiency in racetrack wagering when there is jackpot, cross race bets and biased betting

2007 – Year of Change

- Job role change
- Research into Horse Racing to find betting opportunities with expected gain > 1 by comparing the calculated odd of quinella (using the win odd) with the public odd
  - $Q_{i,j} = W_i * W_j / (1 – W_i) + W_i * W_j / (1 – W_j)$

Meeting with William Benter in 2008

- Mensa member
- First generation ‘馬神’,
- Author “Computer Based Horse Race Handicapping and Wagering Systems: A Report (1994)”
- My approach is right but have to consider
  - The true win odd and not the public odd
  - The formula can be wrong as horse racing is not like simple draw need to consider using the log of the odd rather than the simple odd
  - There may be too few betting opportunities using the current method
  - More sophisticated equipment to use the latest odd and bet at last minute

In a match with 10 horses with even probability of wining

Then the theoretical probability of win is 0.1

	Win	Place	Q	QP
No JC intake	10	3.3	45	15
With JC intake	8.1	2.7	36	12

(around 18.5%)

- You can bet on Win, Place, Q, or QP when the public odd is > 10, 3.3, 45 or 15 respectively
- This may occur when there is cross race bets and people betting are significantly biased and in some exotic pools when there is a jackpot
- A bet is made NOT on horse or the odd but on when the pool shows an inefficiency of more than 18.5%

As an example, in a race with 4 horses A, B, C, D with probability of winning 0.4,.0.3, 0.2, 0.1 (adds up to 1), then the probability of A place, AB quinella and AB quinella place is as follows:-

A place = A*(1 + (B/(1-B)+C/(1-C)+D/(1-D)) + (B*C/(1-B-C)*(1/(1-B)+1/(1-C)) + B*D/(1-B-D)*(1/(1-B)+1/(1-D)) + C*D/(1-C-D)*(1/(1-C)+1/(1-D)))) = 0.922 (not quite the same as 0.4)

The formula has to be expanded to work with 14 horses!

AB Q = A*B*(1/(1-A)+1/(1-B)) = 0.371

You can also work out yourself that

AB QP is 0.792

	Win	Act	Pub	2nd	3rd	Pl Act	Pl Act	Q com-	Q	Q Act	Q Pub	QP	QP Act	QP Pub
	Prob	Odd	Odd	Prob	Prob	Prob	Odd	bination	Prob	Odd	Odd	Prob	Odd	Odd
A	0.4	2.5	2.0	0.316	0.206	0.922	1.1	AB	0.371	2.6	2.1	0.792	1.2	1.02
B	0.3	3.3	2.7	0.308	0.262	0.870	1.1	AC	0.233	4.2	3.4	0.681	1.4	1.1
C	0.2	5.0	4.0	0.241	0.317	0.759	1.3	AD	0.111	9.0	7.3	0.371	2.6	2.1
D	0.1	10.0	8.1	0.135	0.214	0.449	2.2	BC	0.161	6.2	5.0	0.629	1.5	1.2
	1.0			1.0	1.0	3.0		BD	0.076	13.1	10.6	0.319	3.1	2.5
								CD	0.047	21.1	17.2	0.208	4.8	3.9
									1.0			3.0		

Analysis – Step 1

- Data Collection and analysis
  - Historical data from newspaper
- Winning versus paid-out
  - Strong correlation between public estimate and actual frequency
  - Return of betting on hot favorite is better than long shot
  - Long shot paid out is more unfavorable towards end of the race day

Analysis – Step 2

- Winning odd calculation
  - Identify the variables related to track, horse, jockey, trainer etc….
  - Conduct regression analysis to assign coefficients to their relative significance
- Retrofit to model and test again (20 – 200 variables)

William Benter – Computer Based Horse Race Handicapping and Wagering Systems: A Report

Randall Chapman – Still Searching for Positive Returns at the Track: Empirical Results from 2,000 Hong Kong Races

Betting using Kelly Criterion

For simple bets with two outcomes, one involving losing the entire amount bet, and the other involving winning the bet amount multiplied by the payoff odds, the Kelly bet is:

$$f = (p * b – 1)/(b – 1)$$

where f is the fraction of the current bankroll to wager

b is the odds received on the wager

p is the probability of winning

As an example, if a horse has a wining probability of 0.4 and the odd is 3, then the amount to bet is

$$(0.4 * 3 – 1) / (3 – 1) = 0.1$$ or 10% of your bankroll

Trading Shares Using Kelly Criterion

As another illustration, in stock market, if a share rises from $1 to $1.1 in day one and drops from S1.1 to $1 the other day or drops from $1 to $0.9 in day one and then rises back to $1 the next day, (有波幅,冇升幅), is there an investment strategy that allows you to make money. Using Kelly criterion, you even your investment in cash and share every day and you find yourself making money irrespective of where the shares are heading.

			No. of	Share	Share						No. of	Share	Share		
			Shares	Price	Value	Cash	Total				Shares	Price	Value	Cash	Total
			5,000	1.0	5,000	5,000	10,000				5,000	1.0	5,000	5,000	10,000
Rise to 1.1			5,000	1.1	5,500	5,000	10,500	Drops to 0.9			5,000	0.9	4,500	5,000	9,500
Sell 227 shares		227	4,773	1.1	5,250	5,250	10,500	Buy 228 shares		278	5,278	0.9	4,750	4,750	9,500
Drops to 1.0			4,773	1.0	4,773	5,250	10,023	Rises to 1.0			5,278	1.0	5,278	4,750	10,028
Buys 239 shares		239	5,011	1.0	5,011	5,011	10,023	Sells 264 shares		264	5,014	1.0	5,014	5,014	10,028

Sino Land using Kelly

		Lot Size	Holding	No. of Lots				
Date	Close	2000	2,792,000	100				
2018								
		Holding	Share Value	Cash Value	Total Kelly	Total	Sell Price	Buy Price
1/2	13.96	100	2,792,000	2,792,000	5,584,000	5,584,000	13.68	14.25
1/5	14.42	99	2,855,160	2,820,840	5,676,000	5,676,000	14.04	14.63
1/8	14.68	98	2,877,280	2,850,200	5,727,480	5,728,000	14.31	14.92
2/5	14.10	99	2,791,800	2,822,000	5,613,800	5,612,000	13.89	14.47
2/6	13.80	100	2,760,000	2,794,400	5,554,400	5,552,000	13.61	14.17
2/7	13.58	101	2,743,160	2,767,240	5,510,400	5,508,000	13.37	13.92
2/15	14.00	100	2,800,000	2,795,240	5,595,240	5,592,000	13.71	14.28
2/20	13.60	101	2,747,200	2,768,040	5,515,240	5,512,000	13.38	13.93
2/26	14.12	100	2,824,000	2,796,280	5,620,280	5,616,000	13.77	14.34
3/1	14.40	99	2,851,200	2,825,080	5,676,280	5,672,000	14.05	14.63
3/5	13.84	100	2,768,000	2,797,400	5,565,400	5,560,000	13.64	14.20
3/6	14.22	99	2,815,560	2,825,840	5,641,400	5,636,000	13.96	14.54
3/9	14.60	98	2,861,600	2,855,040	5,716,640	5,712,000	14.29	14.89
3/13	14.18	99	2,807,640	2,826,680	5,634,320	5,628,000	13.94	14.53
3/16	13.88	100	2,776,000	2,798,920	5,574,920	5,568,000	13.66	14.23
3/19	13.58	101	2,743,160	2,771,760	5,514,920	5,508,000	13.38	13.93
3/22	13.36	102	2,725,440	2,745,040	5,470,480	5,464,000	13.15	13.68
3/23	13.00	103	2,678,000	2,719,040	5,397,040	5,470,000	12.85	13.36
3/28	12.84	104	2,670,720	2,693,360	5,364,080	5,360,000	12.65	13.15
4/9	13.20	103	2,719,200	2,719,760	5,438,960	5,432,000	12.94	13.47
4/26	12.94	104	2,691,520	2,693,880	5,385,400	5,380,000	12.70	13.20
4/30	13.58	103	2,797,480	2,721,040	5,518,520	5,508,000	13.13	13.66
5/4	13.00	104	2,704,000	2,695,040	5,399,040	5,392,000	12.73	13.24
5/8	13.32	103	2,743,920	2,721,680	5,465,600	5,456,000	13.01	13.53
5/14	13.64	102	2,782,560	2,748,960	5,531,520	5,520,000	13.29	13.83
5/30	13.06	103	2,690,360	2,722,840	5,413,200	5,404,000	12.88	13.40
5/31	13.58	102	2,770,320	2,750,000	5,520,320	5,508,000	13.27	13.81
6/4	13.96	101	2,819,920	2,777,920	5,597,840	5,584,000	13.58	14.14
6/5	14.14	100	2,828,000	2,806,200	5,634,200	5,620,000	13.80	14.38
6/13	13.66	101	2,759,320	2,778,880	5,538,200	5,524,000	13.44	13.99
6/14	13.36	102	2,725,440	2,752,160	5,477,600	5,464,000	13.16	13.70
6/19	13.00	103	2,678,000	2,726,160	5,404,160	5,392,000	12.86	13.38
6/25	12.76	104	2,654,080	2,700,640	5,354,720	5,344,000	12.62	13.13
7/3	12.62	105	2,650,200	2,675,400	5,325,600	5,316,000	12.44	12.93
7/4	12.40	106	2,628,800	2,650,600	5,279,400	5,272,000	12.22	12.70
7/9	12.70	105	2,667,000	2,676,000	5,343,000	5,332,000	12.48	12.97
7/19	12.42	106	2,633,040	2,651,160	5,284,200	5,276,000	12.23	12.71
7/24	12.84	105	2,696,400	2,676,840	5,373,240	5,360,000	12.55	13.05
7/25	13.14	104	2,733,120	2,703,120	5,436,240	5,420,000	12.82	13.33
7/30	13.44	103	2,768,640	2,730,000	5,498,640	5,480,000	13.09	13.62
8/2	12.82	104	2,666,560	2,704,360	5,370,920	5,356,000	12.66	13.17
8/13	12.64	105	2,654,400	2,679,080	5,333,480	5,320,000	12.46	12.95
8/27	13.12	104	2,728,960	2,705,320	5,434,280	5,416,000	12.81	13.32
8/30	13.40	103	2,760,400	2,732,120	5,492,520	5,472,000	13.07	13.60
9/5	13.02	104	2,708,160	2,706,080	5,414,240	5,396,000	12.76	13.28
9/14	13.34	103	2,748,040	2,732,760	5,480,800	5,460,000	13.04	13.57
9/20	13.66	102	2,786,640	2,760,080	5,546,720	5,524,000	13.33	13.87
10/2	12.98	103	2,673,880	2,734,120	5,408,000	5,388,000	12.87	13.39
10/4	12.78	104	2,658,240	2,708,560	5,366,800	5,348,000	12.65	13.16
10/11	12.20	106	2,586,400	2,659,760	5,246,160	5,232,000	12.14	12.62
10/22	12.66	105	2,658,600	2,685,080	5,343,680	5,324,000	12.48	12.98
10/23	12.40	106	2,628,800	2,660,280	5,289,080	5,272,000	12.24	12.72
10/29	12.24	107	2,619,360	2,635,800	5,255,160	5,240,000	12.05	12.52
10/30	12.00	108	2,592,000	2,611,800	5,203,800	5,192,000	11.82	12.28
10/31	12.30	107	2,632,200	2,636,400	5,268,600	5,252,000	12.08	12.55
11/2	12.76	106	2,705,120	2,661,920	5,367,040	5,344,000	12.42	12.91
11/7	13.00	105	2,730,000	2,687,920	5,417,920	5,392,000	12.65	13.16
11/9	12.40	106	2,628,800	2,663,120	5,291,920	5,272,000	12.24	12.73
11/15	12.82	105	2,692,200	2,688,760	5,380,960	5,356,000	12.57	13.07
11/26	13.20	104	2,745,600	2,715,160	5,460,760	5,432,000	12.87	13.39
11/28	13.40	103	2,760,400	2,741,960	5,502,360	5,472,000	13.10	13.62
12/3	13.92	102	2,839,680	2,769,800	5,609,480	5,576,000	13.48	14.03
12/11	13.40	103	2,760,400	2,743,000	5,503,400	5,472,000	13.10	13.63
12/12	13.82	102	2,819,280	2,770,640	5,589,920	5,556,000	13.43	13.98
12/13	14.08	101	2,844,160	2,798,800	5,642,960	5,608,000	13.69	14.25
12/14	13.78	101	2,783,560	2,798,800	5,582,360	5,548,000	13.69	14.25
12/17	14.00	101	2,828,000	2,798,800	5,626,800	5,592,000	13.69	14.25
12/18	13.74	101	2,775,480	2,798,800	5,574,280	5,540,000	13.69	14.25
12/19	13.96	101	2,819,920	2,798,800	5,618,720	5,584,000	13.69	14.25
12/20	13.84	101	2,795,680	2,798,800	5,594,480	5,560,000	13.69	14.25
12/21	13.48	102	2,749,920	2,771,840	5,521,760	5,488,000	13.27	13.81
12/31	13.42	102	2,737,680	2,771,840	5,509,520	5,476,000	13.27	13.81

Using Kelly is 0.6% better

CEC using Kelly

Share		759	Lot Size	2,000					
	Open	Holding	Share Value	Cash Value	Total	Original	Buy Price	Sell Price	
8/17	09:00	0.455	100	93,000	93,000	186,000	186,000		
8/20	09:30	0.590	89	105,020	105,980	211,000	211,000	0.580	0.610
	09:40	0.610	88	107,360	107,200	214,560	215,000	0.595	0.625
	10:00	0.730	81	118,260	117,420	235,680	239,000	0.710	0.745
	10:05	0.850	75	127,500	127,620	255,120	263,000	0.830	0.875
	10:15	0.770	79	121,660	121,460	243,120	247,000	0.750	0.790
	10:25	0.800	78	124,800	123,060	247,860	253,000	0.775	0.815
	10:30	0.840	76	127,680	126,420	254,100	261,000	0.815	0.855
	10:40	0.800	78	124,800	123,220	248,020	253,000	0.775	0.815
	11:00	0.820	77	126,280	124,860	251,140	257,000	0.795	0.835
	11:15	0.830	76	126,160	126,520	252,680	259,000	0.810	0.855
	11:20	0.860	75	129,000	128,240	257,240	265,000	0.835	0.880
	11:25	0.900	73	131,400	131,840	263,240	273,000	0.880	0.925
	11:35	0.970	71	137,740	135,720	273,460	287,000	0.935	0.990
	11:50	0.930	72	133,920	133,860	267,780	279,000	0.905	0.955
	13:15	0.960	71	136,320	135,780	272,100	285,000	0.930	0.985
	13:25	0.920	72	132,480	133,940	266,420	277,000	0.900	0.950
	13:35	0.870	74	128,760	130,460	259,220	267,000	0.855	0.900
	13:50	0.900	73	131,400	132,260	263,660	273,000	0.875	0.930
	14:30	0.840	75	126,000	128,900	254,900	261,000	0.830	0.875
	14:35	0.800	77	123,200	125,700	248,900	253,000	0.790	0.830
	14:50	0.840	75	126,000	129,060	255,060	261,000	0.825	0.875
	15:00	0.810	76	123,120	127,440	250,560	255,000	0.805	0.845
	15:45	0.890	73	129,940	132,780	262,720	271,000	0.875	0.925
	16:00	1.400	60	168,000	169,180	337,180	373,000	1.400	1.450
8/21	09:30	0.830	80	132,800	135,980	268,780	259,000	0.820	0.860
	09:35	0.750	84	126,000	129,980	255,980	243,000	0.745	0.780
	09:40	0.740	85	125,800	128,500	254,300	241,000	0.730	0.765
	09:55	0.780	83	129,480	131,620	261,100	249,000	0.770	0.805
	10:00	0.810	82	132,840	133,240	266,080	255,000	0.790	0.830
	10:15	0.830	81	134,460	134,900	269,360	259,000	0.810	0.850
	10:20	0.800	82	131,200	133,300	264,500	253,000	0.785	0.825
	10:35	0.780	83	129,480	131,740	261,220	249,000	0.770	0.810
	11:05	0.770	84	129,360	130,200	259,560	247,000	0.755	0.790
	11:50	0.800	82	131,200	133,400	264,600	253,000	0.785	0.825
	11:55	0.770	84	129,360	130,320	259,680	247,000	0.755	0.790
	13:00	0.750	85	127,500	128,820	256,320	243,000	0.735	0.775
	13:25	0.730	86	125,560	127,360	252,920	239,000	0.720	0.755
	13:45	0.720	87	125,280	125,920	251,200	237,000	0.705	0.740
	15:00	0.700	88	123,200	124,520	247,720	233,000	0.685	0.720
	15:55	0.680	89	121,040	123,160	244,200	229,000	0.670	0.700

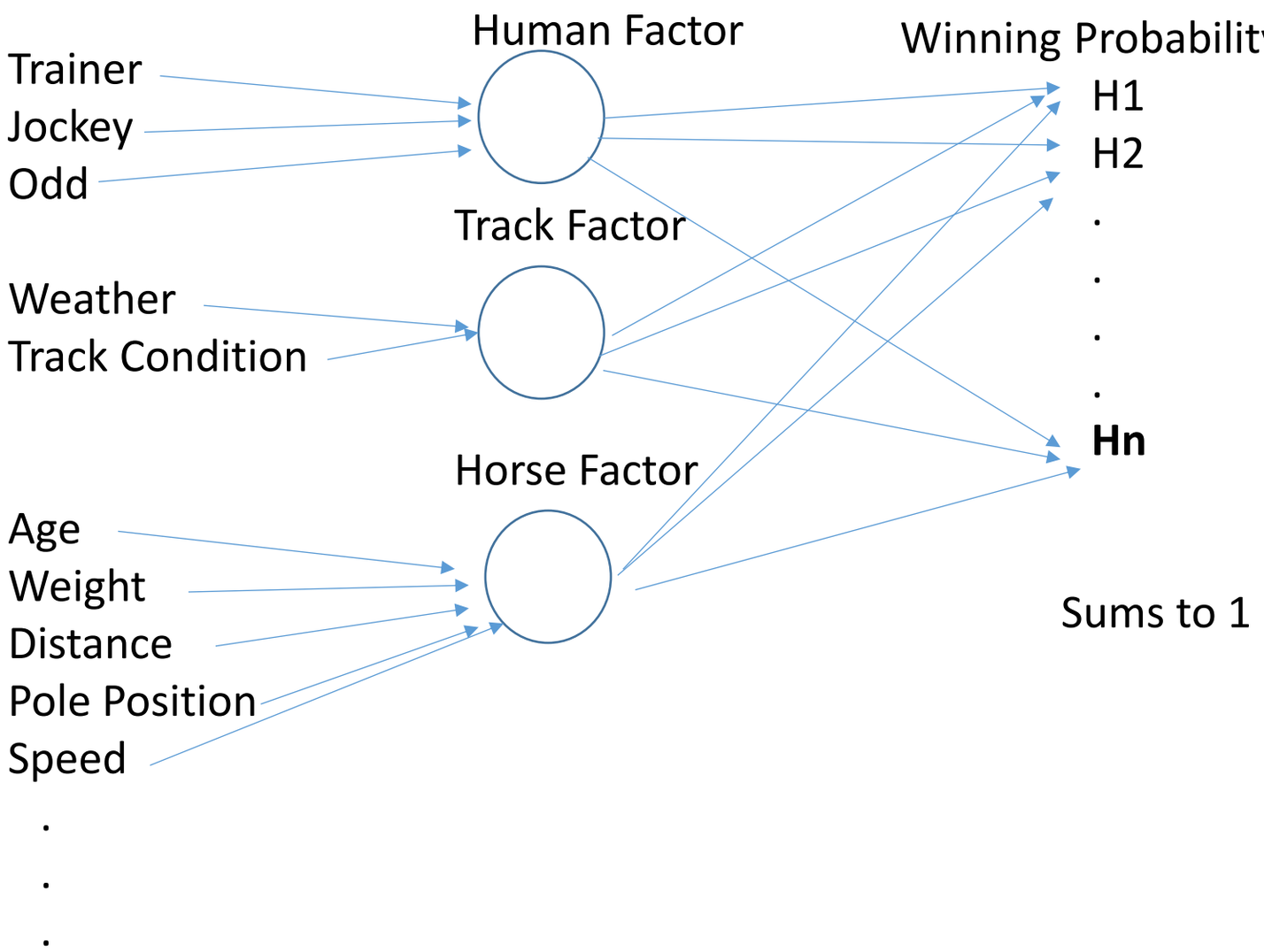
Using Kelly is 6.6% better off

2014 – 2017 Years of Chance

- Practicing origami
- Study machine learning
  - Machine learning is an application of artificial intelligence that automates analytical model building by using algorithms that iteratively learn from data without being explicitly programmed where to look.

- Research wager inefficiency in Place betting

In horse racing, we want to determine the true odd in order to improve the accuracy of the model and enhance the probability of winning. The probability of a horse winning a race is a function of
F (horse characteristics 1- i, jockey characteristics 1 – j, trainer characteristics 1 – k, field characteristics 1 – l, public odd ……)
“Still Searching for Positive Returns at the Track: Empirical Results from 2,000 Hong Kong Races”, Randall G. Chapman has listed down 20 parameters as significant parameters and William Benter even suggested over 200 to be considered. Using logistic regression, one can find out the relative significance of factors like the horse ranking and 排檔but still we need to understand their interaction with one another.
Using a neural network, one can set up a model using the parameters in F as the input parameters, the hidden middle layer as the interaction between related influencing parameters and the output being the ranking of the wining probability of the horses.



Implementation Consideration

- Web Crawler (about 300K records)
- True odd calculation
- Model development (about 5 man-year)
- Train, Test, Validate model

Proof of Concept

- Use the public win odd as the win probability
  - Strong correlation between public odd and win estimates
  - Benter shows significant improvement in his model
  - Chapman estimates 21% significance
  - Unanimous A.I. using Artificial Swarm Intelligence correctly predicts the first, second, third and fourth ranking of the 2016 Kentucky Derby
- Calculate the Place odd
- Bet when the wager inefficiency is > 18.5%

Moment of Truth (2017 Season)

Date	Race	馬號	馬名	騎師	最後	位置賠率	名次	Net	P Cal Odd	Dividend	Rebate	
9/3	2	4	馬飛龍	潘頓	2.6	1.4	11	-10.0	1.37	0.0	1	-9.0
	3	3	發盈喜	潘明輝	4.4	1.9	3	9.0	1.79	19.0	0	9.0
	4	6	家品皇者	莫雷拉	2.2	1.3	1	3.0	1.24	13.0	0	3.0
	5	8	銘記心中	莫雷拉	2.5	1.5	1	5.0	1.37	15.0	0	5.0
	7	5	夢幻仙子	莫雷拉	2.6	1.4	8	-10.0	1.31	0.0	1	-9.0
	9	14	旅遊皇者	莫雷拉	2.7	1.4	6	-10.0	1.36	0.0	1	-9.0
	10	1	估惑	莫雷拉	2.3	1.4	12	-10.0	1.26	0.0	1	-9.0
9/6	1	10	好富有	潘明輝	5.9	2.6	1	16.5	2.38	26.5	0	16.5
	2	1	玩得喜	潘頓	3.5	1.6	4	-10.0	1.56	0.0	1	-9.0
	5	8	獵狐者	莫雷拉	1.8	1.2	1	2.0	1.16	12.0	0	2.0
	6	5	理想回報	潘頓	3.6	1.8	3	8.5	1.69	18.5	0	8.5
	8	3	一道	田泰安	2.7	1.4	1	4.0	1.39	14.0	0	4.0
7/11	3	2	威先生	郭能	3.2	1.5	2	5	1.47	15	0	5.0
	4	2	川河領駒	莫雷拉	2.9	1.5	11	-10	1.48	0	1	-9.0
	6	3	樂滿家	潘頓	4	1.8	1	8	1.74	18	0	8.0
7/15	1	2	有衝勁	潘頓	3.3	1.6	8	-10	1.58	0	1	-9.0
	3	8	好腳頭	莫雷拉	8.1	3.3	13	-10	3.26	0	1	-9.0
	4	1	快利	潘頓	6.5	2.7	3	17	2.69	27	0	17.0
	7	13	福威勝	何澤堯	10	4.2	12	-10	4.02	0	1	-9.0
	8	3	旌暉	潘明輝	8.9	2.6	3	16.5	2.58	26.5	0	16.5
	8	7	幸福分享	莫雷拉	2.9	1.3	4	-10	1.27	0	1	-9.0
	9	7	活影	田泰安	7.5	3.1	4	-10	2.97	0	1	-9.0
	11	9	志同道合	莫雷拉	3.4	1.5	2	5.5	1.48	15.5	0	5.5
							Total	-158.5			199	40.5
							Total Bet	3,830.0				3,830.0
								-4.14%				1.06%

Conclusion

- Not Bet on Sure Win, Bet on Bets with Positive Return
- Not Bet on Horse, Bet on wager inefficiency

Closing Remark

For the time being, I suggest the following:-

1. Keep of a bankroll of say 10,000
2. On racing day, find favorable odds that you can bet
3. Bet (for fun) using the recommendation from the system and apply Kelly criterion on the amount to wager
4. Watch for abnormal fluctuation of the odds as this may be the last minute betting from the professional teams and you can ride on their analytic results
5. Good luck and have fun

References:
“Beat the Dealer” 1966, Edward Thorpe
“Bring down the house” 2002
“Computer Based Horse Race Handicapping and Wagering Systems: A Report (1994)” William Benter
“Still Searching for Positive Returns at the Track: Empirical Results from 2,000 Hong Kong Races”, Randall G. Chapman
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Thank You!