THE PUBLIC TESTING OF ARTIFICIAL INTUITION DEVICE USING PICK 3 LOTTERY

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ABSTRACT

This paper presents the results of public testing of the Artificial Intuition Device. Artificial Intuition is commonly viewed as a special algorithm or collection of algorithms capable of replicating some properties of human intuition. Within this approach, Artificial Intuition is a part of the Artificial Intelligence domain. Unfortunately, in spite of Artificial Intelligence research progress, the vast and intriguing area of human intuition (intuitive forecasting of future events, lottery predictions, stock market, etc.) cannot be replicated on software-simulated Artificial Intuition.

The Artificial Intuition Device (AID) employs a hardware solution to the problem of Artificial Intuition and replicates some predictive abilities of human intuition on specially designed scientific equipment. The results of AID tests performed in 2006 were presented at the *51th* Convention of Parapsychological Association in Winchester, UK in August 2008. At that conference I also announced that AID testing was being made *public* because I programmed AID to predict results of daily Canadian Pick 3 lottery and to post the predictions on the Internet *in 3 hours prior* to the lottery draw (web page http://www.intuitiontester.com/summary.html).

The public availability of AID predictions makes experiment 100% clean and free from any possible manipulation. In addition, since Oct.28, 2008 Goldsmiths College at the University of London has developed a daily download process from my website and has been downloading the AID's predictions onto their computer. This happens every day *after* predictions are posted on the Internet, but *before* the lottery draw happens. The public availability of AID predictions provides a great opportunity for everybody to check the ability of AID to predict future and for me to prove that AID works even in such 100% controllable conditions.

Here is a summary of the results produced by the AID public testing prior to Mar.25, 2009:

1. Artificial Intuition Device works and is profitable. Since the start of the public testing, AID has generated a profit of 1,440 with Return On Investment (ROI) = 42.9%. In the null hypothesis, when all AID's predicted numbers are random, the Return On Investment should be negative (-10%) and profit should also be negative and equal (-3336).

2. Significance of accumulated material during the public testing is p<0.036.

3. The graph of profit accumulation is non-linear. There are some periods when accumulated profit grows faster and other periods when it grows slower or even falls. This means that AID's performance is non-constant.

4. The Return On Investment appears to grow when we consider groups with higher AID rank.

5. The Return On Investment is much higher on days with low Geomagnetic Activity. On geomagnetic quiet days (Ap<5) ROI is 63%, as compared to ROI=8.4% for the days with Ap>=5.

6. AID's performance continued to be the almost the same during the public testing as it was before in private lab conditions. What this means is that the presence of independent observers and downloading of predictions to independent computers did not influence the quality of AID predictions.

7. Many psychics state that they lose their abilities when they attempt to get profit from their predictions. In contrary to that, AID allows everybody to use its lottery predictions for profit and continues to work fine, predicts lottery outcomes, and generates a profit of 42.9% in all days and 63% on Geomagnetic-quiet days.

8. All the observations above were confirmed in the independent material accumulated between the start of experiment (May 23, 2006) and the start of public testing (before Aug.13, 2008).

- Between May 23, 2006 and Aug.12, 2008
- a. Estimated profit was \$4,755 and Return On Investment (ROI) was 47.8%. In the null hypothesis, the ROI should be negative (-10%) and profit should also be negative and equal (-\$994).
- b. Significance of accumulated material is p<0.00037.
- c. The graph of profit accumulation is also non-linear.
- d. The Return On Investment also grows when we consider the groups with higher AID's rank.
- e. On geomagnetic quiet days (Ap<5) ROI is 100.9%, as compared to ROI=20.7% for the days with Ap>=5.

The results obtained in this stage of testing indicate that modeling artificial intuition on software and hardware is indeed possible. In addition to that, the testing results suggest that the AID can also be used to improve the quality of forecasting in other areas where people use intuition (planning, investments, stock market, etc).

INTRODUCTION. ARTIFICIAL INTUITION DEVICE

Artificial Intuition is commonly viewed as a special algorithm or collection of algorithms capable of replicating some properties of human intuition. Within this approach, Artificial Intuition is a part of the Artificial Intelligence domain. Unfortunately, in spite of Artificial Intelligence progress, the vast and intriguing area of human intuition (intuitive forecasting of future events, lottery predictions, stock market, etc.) cannot be replicated on software-simulated Artificial Intuition. The *Artificial Intuition Device* (AID) employs a hardware solution and replicates some of human intuition abilities on specially-designed scientific equipment. Design of this device is based on the "hydrodynamic model" of intuition; in which, intuition is the human ability to feel the deviations of micro-event frequencies (for example chemical reactions in our body), preceding the important events.

Details of the "hydrodynamic model" of intuition as well as a description of AID's hardware and software were presented in 2008 at the PA Convention in Winchester, UK and are published in the proceedings of that conference (Zilberman, 2008). Appendices 1, 2 and 3 contain a short description of the "hydrodynamic model" of intuition and Artificial Intuition Device hardware and software design. This device is currently patent pending in the USA and Russia.

ARTIFICIAL INTUITION DEVICE AND LOTTERIES

To test the Artificial Intuition Device, I programmed it to forecast the near future; in particular, to predict the outcomes of public numerical lotteries several hours prior to the lottery draw. Since the PA *51th* Convention in Winchester, UK in August 2008 the AID's predictions have been publicly posted on the Internet (web page <u>http://www.intuitiontester.com/summary.html</u>) several hours *prior* to the lottery draw. This makes experiment 100% clean and free from any manipulation, and allows anyone to preview the predicted numbers, analyze the statistics, and potentially even use the posted predictions to play the Pick 3 lottery online.

In addition to that in October 2008 the Anomalistic Psychology Research Unit (APRU) from the Goldsmiths College, University of London developed a daily download process from our website and since Oct.28, 2008 has been downloading the AID's predictions onto their computer. This happens every day after predictions are posted on Internet, but *before* the lottery draw happens.

The public availability of AID predictions provides great opportunity for:

- a. skeptics to check the validity of AID predictions
- b. me to prove that AID works even in such 100% controllable conditions.

Pick 3 lottery

In experiment, I used the Ontario lottery "Pick 3". It has very simple rules, which are published on the official site of Ontario Lottery and Gaming Corporation <u>www.olg.ca/lotteries/games/howtoplay.do?game=pick-3</u>. In short, 3 digits from 0 to 9 (like 2,3,5 or 2,2,3) are selected every day and winners are the people who submitted those exact 3 digits prior to the lottery draw. The probability to correctly predict a 3-digit number combination is 6/1000 in box play.

About box play and calculation of probability. The Pick 3 lottery draw selects one 3-digit number from a possible 1000 numbers between 000 to 999. In 'box play' the sequence of wining digits is irrelevant and therefore one 3-digit number selected in a draw produces six numbers, which all are considered as winning numbers. For example when the lottery draw selects the number 123, combinations 123, 132, 231, 213, 321, 312 all win. Therefore in box play we have 6 winners in a 1000 total possible outcomes, implying the probability of success to be 6/1000.

Ontario "Pick 3" lottery draws happen usually at 9:10 PM (EST) and have a cut-off time of 9:00 PM (EST) sharp for draw entries. At 5:49 PM (EST) of each day, the recorded data is analyzed, and then sorted in accordance to AID algorithms (see (Zilberman, 2008), and also Appendix 3), and sent via e-mail message to my cell phone. Since January 2008 the Artificial Intuition Device has also posted the results of predictions on the Internet (webpage <u>www.intuitiontester.com/summary.html</u>) at 5:52 PM (EST), 3 hours in advance of the lottery draw.

The following screen capture (Fig.1) presents the AID predictions posted on the Internet between Nov.18 and Nov.20 of 2008.

| Nov-18 830 | 0 | 064397 | 046 036 034 634 096 094 694 093 693 493 640 630 430 436 064 | |
|---------------|---|--------|---|----------|
| Nov-19 538 | 1 | 253874 | 235 285 283 583 275 273 573 278 578 378 532 582 382 385 253 | \$300.00 |
| Nov-20 436 | 1 | 096328 | 069 039 036 936 029 026 926 023 923 623 960 930 630 639 096 | |

Fig.1. Screenshot of AID predictions posted on the Internet.

The left column contains the date and the 3-digit number that won in the lottery draw that day.

The second column presents the Ap-index of geomagnetic activity, downloaded from the 'Solar Terrestrial Dispatch' web page <u>http://www.spacew.com/www/hourly.html</u> at 5:30 PM.

The third column contains the top 6 numbers predicted by AID.

The fourth column contains the 15 three-digit combinations derived from the top 5 numbers predicted by AID. The first two lines of each cell in the fourth column contain 10 *unique* combinations derived from the top 5 predicted numbers. The third line of each cell in fourth column contains 4 combinations derived from the top 4 and 1 combination derived from the top 3 predicted numbers. We will discuss later (in the item "Correlation between the Return On Investment and AID's rank") why the algorithm is composed in this way.

STATISTICS OF RESULTS

This paper presents the statistics accumulated since August 13, 2008, when AID's predictions became publicly available on the Internet prior to the draw. All my calculations for this interval can easily be replicated from the data posted on webpage <u>www.intuitiontester.com/summary.html</u>. In several cases I will compare these results with data accumulated before the Aug.13, 2008 to verify results on greater statistics.

| Тор Х | 3 | 4 | 5 | 6 | 3+4+5 |
|--------------|--------|-------|-------|-------|--------|
| Winnings | 3 | 8 | 21 | 30 | 32 |
| Days | 224 | 224 | 224 | 224 | 224 |
| Daily cost | 1 | 4 | 10 | 20 | 15 |
| Income (\$) | 450 | 1,200 | 3,150 | 4,500 | 4,800 |
| Expenses(\$) | 224 | 896 | 2,240 | 4,480 | 3,360 |
| Profit (\$) | 226 | 304 | 910 | 20 | 1,440 |
| р | 0.153 | 0.173 | 0.029 | 0.289 | <0.036 |
| ROI | 100.9% | 33.9% | 40.6% | 0.4% | 42.9% |

Table 1 below presents the statistics for the period from Aug.13, 2008 to Mar.24, 2009.

Here

Top X - the quantity of numbers ranked by AID; for example Top 3 produces 1 unique combination per draw, Top 4 produces 4 unique combinations per draw, Top 5 produces 10 unique combinations per draw etc Winnings - number of winning days for selected Top X algorithm,

Days - quantity of experimental days,

Daily cost - cost to submit all generated combinations once, at cost of \$1 per set. All costs discussed in the paper are in US dollars. For example, to submit 1 combination generated by Top 3 algorithm, a user has to spend \$1, to submit 20 combinations generated by Top 6 algorithm user has to spend \$20,

Income - amount of money user could receive using the Top X algorithm. Income was calculated as

$$[Income] = [Winnings] * $150$$

(where \$150 is the amount that <u>www.Betlips.com</u> pays for one correctly predicted 3-digit combination).

Expenses - amount user spends to submit all combinations for specified Top X algorithm.

[Expenses]=[Daily cost] * [Days],

Profit - difference between income and expenses,

[Profit] = [Income] - [Expenses]

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p – statistical significance of result, p was calculated as
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p=1-BINOMDIST(Winnings-1, Days, [Daily cost] *0.006, TRUE),

Table 1. Return on investment (ROI) and other parameters accumulated from Aug.13, 2008 until Mar.24, 2009.

where 0.006 is the probability to win when submitting one 3-digit combination in box play, the [Daily cost]* 0.006 is probability to win in 1 draw, submitting all 3-digit combinations produced by Top X algorithm in box play; BINOMDIST is the binomial distribution function and TRUE is flag indicating that we use cumulative distribution function,

ROI - is Return On Investment. ROI was calculated as

ROI =[Profit]/ [Expenses].

Column "3+4+5" corresponds to 15 predicted combinations posted on Internet. These 15 numbers are formed as unique 10 three-digit numbers produced by top 5 digits, plus 4 three-digit numbers produced by top 4 digits plus 1 three-digit number produced by top 3 digits. As we see this column produces the maximum profit. However because combinations produced by in this algorithm are repeated, we cannot use the binomial distribution to estimate the probability to get 32 winnings in 224 days. Therefore probability p in then column "3+4+5" was calculated using the Monte Carlo simulation (see the item "Monte Carlo simulation" below). The Monte Carlo simulation estimated significance for "3+4+5" algorithm as p<0.036.

As Table 1 shows, ROI is positive in each individual set (Top 3, Top 4, Top 5, Top 6) and for combined group '3+4+5'. It also appears that ROI grows when we consider the groups with smaller Top X. We will discuss this observation later in more details.

ROI in the null hypothesis

According to the null hypothesis, when all selected numbers are random, the difference between profit produced by different algorithms and even profit itself should not exist since on average people spend more money on lottery than gain from it.

The mathematical expectation of ROI in null hypothesis can easily be calculated. Because <u>www.Betslips.com</u> pays \$150 for correctly predicted number with 3 different digits in the box play and because probability of correct guess in that case is 0.006, the mathematical expectation of income (on each spent dollar) is

E(Income)=\$150*0.006=\$0.9,

mathematical expectation of profit is

E(Profit) =\$0.9-\$1=(-\$0.1),

and mathematical expectation of ROI is

E(ROI) = (-\$0.1)/\$1*100% = -10%

(i.e. negative).

During the public testing, however, ROI is a *positive double-digit* value for Top 4, Top 5 and '3+4+5' and positive triple-digit value for Top 3.

Comparison with data accumulated before the Aug. 13, 2008

Because of the importance of this observation, it was verified on independent data sets accumulated from the beginning of the experiment on May 23, 2006 until Aug.12, 2008. This information is presented in Table 2 below. The profit in Table 2 was calculated in accordance with the number of correct predictions as [number of correct predictions]*\$150, where \$150 is the amount which the <u>www.Betslips.com</u> lottery web site pays out for 1 correct prediction. Please note however, in reality I started submitting predictions online not from beginning of experiment but rather after Jan.1, 2008.

| Тор Х | 3 | 4 | 5 | 6 | 3+4+5 |
|---------------|-------|-------|---------|----------|---------|
| Qty | 8 | 26 | 64 | 113 | 98 |
| Total | 663 | 663 | 663 | 663 | 663 |
| Cost 1 | 1 | 4 | 10 | 20 | 15 |
| Income (\$) | 1,200 | 3,900 | 9,600 | 16,950 | 14,700 |
| Expenses (\$) | 663 | 2,652 | 6,630 | 13,260 | 9,945 |
| Profit (\$) | 537 | 1,248 | 2,970 | 3,690 | 4,755 |
| р | 0.049 | 0.011 | 0.00015 | 0.000088 | <0.0004 |
| ROI | 81.0% | 47.1% | 44.8% | 27.8% | 47.8% |

Table 2. Return on investment (ROI) and other parameters accumulated from May.23, 2006 until Aug. 12, 2008.

As we see from Table 2, the independent data set from May 23, 2006 to Aug.12, 2008 also produces a positive double-digit ROI instead of -10% expected in null hypothesis. And similarly to the Table 1, ROI from the Table 2 also grows when we consider the groups with smaller Top X. Significance of results (p) in the Table 2 are much higher because of greater statistics. Similarly to the Table 1 probability p in then column "3+4+5" was calculated using the Monte Carlo simulation. It estimated significance for "3+4+5" algorithm as p=0.000368.

GRAPHS OF ACCUMULATED PROFIT

From Aug.13, 2008 to Mar.24, 2009

Table 1 contains value for the profit accumulated between Aug.13, 2008 and Mar.24, 2009 equal to \$1,440 in '3+4+5' algorithm. (This is algorithm, which AID uses to post predictions on the Internet in 3 hours in advance). This is the final value as of Mar.24, 2009. However it is also interesting to check how this \$1,440 were accumulated. If the quality of AID predictions is approximately constant, we can expect an approximately linear graph of accumulation. If quality of AID predictions is variable over time, the graph can have a more complex trend.

Because in '3+4+5' algorithm user spends \$15 a day, and because all the correctly predicted combinations and winnings are published on the Internet, it is not difficult to build such graph.

Fig.2 below presents the graph of accumulated profit between Aug.13, 2008 and Mar.24, 2009.

- The yellow line represents the values of accumulated profit for each day between Aug.13, 2008 and Mar.24, 2009.
- The blue line is the trend of 20-days average.
- The green line represents the graph of accumulated profit in a null hypothesis. The math estimation of ROI, E(ROI) is -10% in null hypothesis (see the item '*ROI in the null hypothesis*' above). Therefore when user spends \$15 a day (what takes place in '3+4+5' algorithm), then the math estimation of daily profit is E(Daily profit) =-\$1.5 (negative) and for day 'i' the accumulated profit is (-\$1.5)*i.

Mark Zilberman



Fig. 2. The graph of accumulated profit between Aug.13, 2008 and Mar. 24, 2009.

As we see from the graph Fig.2 the graph of accumulated profit is non-linear. There are some periods when accumulated profit grows faster and other periods when it grows slower or even falls. This means that AID performance is non-constant.

From May 23, 2006 to Mar.24, 2009

Graph Fig.2 based on the data publicly available on <u>www.intuitiontester.com/summary.html</u> since Aug.13, 2008. It could also be interesting to compare this result with the graph of accumulated profit before the Aug.13, 2008.

Graph Fig.3 below presents the graph of profit accumulation for all available dates starting from May 23, 2006. Similarly to graph Fig.2,

- The yellow line represents the values of accumulated profit for each day.
- The blue line is the trend of 20-days average.
- The green line represents the graph of accumulated profit in the null hypothesis.

Horizontal line between Oct.19, 2006 and Feb.23, 2007 belongs to the interval without measurements related to this experiment.



The Public Testing of Artificial Intuition Device Using Pick 3 Lottery

Fig. 3. The graph of accumulated profit between May 23, 2006 and Mar. 24, 2009

As we see, the full time interval of the experiment also shows existence of the intervals when accumulated profit grows faster and other periods when it grows slower or even falls. In the same time the profit accumulation is obvious and is very far from the null hypothesis graph.

Part of the line on the graph Fig.3, after Aug.13, 2008 was presented on the graph Fig.2 above.

CORRELATION BETWEEN THE RETURN ON INVESTMENT AND AID'S RANK

As we may note from Table 1 and Table 2, the ROI appears to grow when we consider the groups with smaller Top X.

Indeed, if all 10 numbers from 0 to 9 are used, we have 1,000 combinations (from 000 to 999) and ROI is negative, as these are regular conditions of the lottery without the use of AID. When only Top 5 digits are used, we have 10 combinations per a draw and ROI above 40% (see Table 1).

It could be interesting to check if there is correlation between the return on investment and AID's rank. To check this, I added one more column 'Top 7' into the Tables 1 and 2. This 'Top 7' column is not posted on <u>http://www.intuitiontester.com/summary.html</u>, but I have it in my database and can extend the tables to one more column.

Table 3 below is in fact Table 1 with a new 'Top 7' column.

Mark Zilberman

| Тор Х | 3 | 4 | 5 | 6 | 7 | 3+4+5 |
|--------------|--------|-------|-------|-------|--------|--------|
| Winnings | 3 | 8 | 21 | 30 | 44 | 32 |
| Days | 224 | 224 | 224 | 224 | 224 | 224 |
| Daily cost | 1 | 4 | 10 | 20 | 35 | 15 |
| Income (\$) | 450 | 1,200 | 3,150 | 4,500 | 6,600 | 4,800 |
| Expenses(\$) | 224 | 896 | 2,240 | 4,480 | 7,840 | 3,360 |
| Profit (\$) | 226 | 304 | 910 | 20 | -1,240 | 1,440 |
| р | 0.153 | 0.173 | 0.029 | 0.289 | 0.716 | <0.036 |
| ROI | 100.9% | 33.9% | 40.6% | 0.4% | -15.8% | 42.9% |

Table 3. Return on investment (ROI) and other parameters accumulated from Aug.13, 2008 until Mar.24, 2009.

Significance p in the Table 3 for '3+4+5' algorithm was calculated using the Monte Carlo simulation, which we will discuss below.

Table 4 below is in fact Table 2, which was built for independent data sets accumulated from the beginning of the experiment on May 23, 2006 until the Aug.12, 2008 with a new 'Top 7' column.

| Тор Х | 3 | 4 | 5 | 6 | 7 | 3+4+5 |
|---------------|-------|-------|---------|----------|---------|----------|
| Qty | 8 | 26 | 64 | 113 | 175 | 98 |
| Total | 663 | 663 | 663 | 663 | 663 | 663 |
| Cost 1 | 1 | 4 | 10 | 20 | 35 | 15 |
| Income (\$) | 1,200 | 3,900 | 9,600 | 16,950 | 26,250 | 14,700 |
| Expenses (\$) | 663 | 2,652 | 6,630 | 13,260 | 23,205 | 9,945 |
| Profit (\$) | 537 | 1,248 | 2,970 | 3,690 | 3,045 | 4,755 |
| р | 0.049 | 0.011 | 0.00015 | 0.000088 | 0.00052 | < 0.0004 |
| ROI | 81.0% | 47.1% | 44.8% | 27.8% | 13.1% | 47.8% |

Table 4. Return on investment (ROI) and other parameters accumulated from May.23, 2006 until Aug. 12, 2008.

The graphs in Fig.4 below are based on Table 3 and Table 4 and present the correlation between ROI and AID rank for 2 independent intervals [May 23, 2006 - Aug. 12, 2008] and [Aug 13, 2008 - Mar.24, 2009].

As we see in both intervals ROI grows when we consider the groups with smaller Top X (i.e. with higher AID's rank). In other words, the top ranked numbers perform better than other numbers and the closer the numbers are to the top - the better their performance is.

Because of this, the web-page <u>http://www.intuitiontester.com/summary.html</u> where AID posts the daily predictions, presents in the column "Predictions for top 5" the 15 three-digit numbers, derived from the selected top 5 digits, ranged by AID. These 15 numbers are formed as 10 unique three-digit numbers produced by top 5 digits, plus 4 three-digit numbers produced by top 4 digits plus 1 three-digit number produced by top 3 digits.



Fig.4. Correlation between Return On Investment (ROI) and AID rank in [May 23, 2006 - Aug. 12, 2008] and [Aug.13, 2008 - Mar.24, 2009] intervals. Yellow triangles present the ROI produced by 10,000,000 random trials in Monte Carflo simulation..

To verify this result I performed the Monte Carlo simulation of 10,000,000 random trials with calculation of the ROI for individual Top X column. Results are presented in the Table 5 below. As expected simulation produced the ROI is very close to -10%, as it should be in the null hypothesis. The graph with yellow triangles on the Fig.4 presents the ROI from the Table 5 visually. I put the executable file and source code of simulation program on the Web page <u>http://www.intuitiontester.com/DownloadSimulationFile.html</u> for references.

| Тор Х | 3 | 4 | 5 | 6 | 7 |
|---------------|------------|------------|-------------|-------------|-------------|
| Qty | 60,073 | 239,887 | 600,173 | 1,200,717 | 2,099,961 |
| Income (\$) | 9,010,950 | 35,983,050 | 90,025,950 | 180,107,550 | 314,994,150 |
| Cost 1 (\$) | 1 | 4 | 10 | 20 | 35 |
| Expenses (\$) | 10,000,000 | 40,000,000 | 100,000,000 | 200,000,000 | 350,000,000 |
| ROI | -9.891% | -10.042% | -9.974% | -9.946% | -10.002% |

Table 5. Return on investment (ROI) in Monte Carlo simulation of 10,000,000 random trials.

GEOMAGNETIC ACTIVITY INFLUENCE

The independent research (Persinger & Schaut, 1988), (Zilberman, 1995), (Radin & Rebman, 1996) show that intuition (and more generally the paranormal abilities) correlates with geomagnetic activity (GA). Correlation is usually negative: the weaker is the geomagnetic activity - the stronger is intuition.

To analyze the geomagnetic activity influence on Artificial Intuition Device I built tables similar to table 3 above, for days with Ap<5 and Ap>=5, where Ap is the average planetary index of geomagnetic activity. I used Ap-indices from the "Solar Influences Data analysis Center - RWC Belgium". The "Solar Influences Data analysis Center" (SIDC) - is the solar physics research department of the Royal Observatory of Belgium. Their Web page, <u>http://sidc.oma.be/registration/registration_main.php</u>, provides a free subscription to daily e-mails from SIDC with various Solar-Earth data.

As tables 5 and 6 below show, separation of data by the Ap-index of geomagnetic activity drastically changes the picture. ROI in geomagnetic quiet days (Ap<5) becomes much greater that in days with Ap>=5.

| Тор Х | 3 | 4 | 5 | 6 | 7 | 3+4+5 |
|--------------|--------|-------|-------|-------|-------|--------|
| Winnings | 2 | 6 | 15 | 23 | 30 | 23 |
| Days | 141 | 141 | 141 | 141 | 141 | 141 |
| Daily cost | 1 | 4 | 10 | 20 | 35 | 15 |
| Income (\$) | 300 | 900 | 2,250 | 3,450 | 4,500 | 3,450 |
| Expenses(\$) | 141 | 564 | 1,410 | 2,820 | 4,935 | 2,115 |
| Profit (\$) | 159 | 336 | 840 | 630 | -435 | 1,335 |
| р | 0.208 | 0.125 | 0.023 | 0.078 | 0.501 | <0.028 |
| ROI | 112.8% | 59.6% | 59.6% | 22.3% | -8.8% | 63.1% |

Ap<5

Table 5. Return on investment (ROI) and other parameters accumulated from Aug.13, 2008 until Mar.24, 2009 for days with Ap<5.

5

6

83

10

900

830

70

0.380

8.4%

6

7

83

20

1,050

1.660

-610

0.883

-36.7%

7

14

83

35

2,100

2,905

-805

0.856

-27.7%

3+4+5

9

83

15

1,350

1,245

105

8.4%

| Тор Х | 3 | 4 | |
|------------|----|----|--|
| Winnings | 1 | 2 | |
| Days | 83 | 83 | |
| Daily cost | 1 | 4 | |

150

83

67

0.393

80.7%

300

332

-32

0.595

-9.6%

Ap>=5

Income (\$)

Profit (\$)

ROI

Expenses(\$)

Table 6. Return on investment (ROI) and other parameters accumulated from Aug.13, 2008 until Mar.24, 2009 for days with Ap>=5.

As above, the significance p in the Table 5 for '3+4+5' algorithm was calculated using the Monte Carlo simulation of 10,000,000 random draws, which we will discuss later. Picture Fig.5 below presents the distribution of ROI by AID ranks visually for Ap<5 and Ap>=5.



Fig.5. Correlation between Return On Investment (ROI) and AID rank for days with Ap<5 and Ap>=5. Analyzed period from Aug.13, 2008 until Mar.24, 2009.

As we see, ROI for days with Ap<5 significantly outperforms the ROI for the days with Ap>=5 in any rank.

This important result was received during the AID public testing, i.e. since Aug.13, 2008 and can easily be repeated using the data available on <u>http://www.intuitiontester.com/summary.html</u>.

This result was also verified on an independent data set accumulated before the Aug.13, 2008, i.e. from May 23, 2006 until Aug.12, 2008. Tables 7 and 8 and picture Fig.6 present the Return On Investment (ROI) and other parameters accumulated between May 23, 2006 to Aug.12, 2008 for days with Ap<5 and Ap>=5.

| Тор Х | 3 | 4 | 5 | 6 | 7 | 3+4+5 |
|----------|--------|--------|---------|---------|-------|----------|
| Qty | 4 | 14 | 27 | 46 | 64 | 45 |
| Total | 224 | 224 | 224 | 224 | 224 | 224 |
| Cost 1 | 1 | 4 | 10 | 20 | 35 | 15 |
| Income | 600 | 2,100 | 4,050 | 6,900 | 9,600 | 6,750 |
| Expenses | 224 | 896 | 2,240 | 4,480 | 7,840 | 3,360 |
| Profit | 376 | 1,204 | 1,810 | 2,420 | 1,760 | 3,390 |
| р | 0.047 | 0.0012 | 0.00047 | 0.00019 | 0.004 | <0.00021 |
| ROI | 167.9% | 134.4% | 80.8% | 54.0% | 22.4% | 100.9% |

| Ap<5 |
|------|
|------|

Table 7. Return on investment (ROI) and other parameters accumulated from May 23, 2006 to Aug.12, 2008 for days with Ap<5.

As above, the significance p in the Table 7 for '3+4+5' algorithm was calculated using the Monte Carlo simulation of 10,000,000 random draws, which we will discuss later.

| Тор Х | 3 | 4 | 5 | 6 | 7 | 3+4+5 |
|----------|-------|-------|-------|--------|--------|--------|
| Qty | 4 | 12 | 37 | 67 | 111 | 53 |
| Total | 439 | 439 | 439 | 439 | 439 | 439 |
| Cost 1 | 1 | 4 | 10 | 20 | 35 | 15 |
| Income | 600 | 1,800 | 5,550 | 10,050 | 16,650 | 7,950 |
| Expenses | 439 | 1,756 | 4,390 | 8,780 | 15,365 | 6,585 |
| Profit | 161 | 44 | 1,160 | 1,270 | 1,285 | 1,365 |
| р | 0.271 | 0.365 | 0.025 | 0.024 | 0.017 | <0.064 |
| ROI | 36.7% | 2.5% | 26.4% | 14.5% | 8.4% | 20.7% |

Ap>=5

Table 8. Return on investment (ROI) and other parameters accumulated from May 23, 2006 to Aug.12, 2008 for days with Ap>=5.



Fig.7. Correlation between Return On Investment (ROI) and AID rank for days with Ap<5 and Ap>=5. Analyzed period from May 23, 2006 to Aug.12, 2008.

As we see, ROI in the days with Ap<5 over-performs the ROI in the days with Ap>=5 before Aug.13, 2008 in very similarly manner to what was observed during the public testing (i.e. after the Aug.13, 2008).

•

MONTE CARLO SIMULATION AND CALCULATIONS OF SIGNIFICANCE FOR "3+4+5" ALGORITHM

Fifteen numbers, which AID posts on the Internet into the "Predictions for top 5" column are produced by the '3+4+5' algorithm. This algorithm creates 10 unique combinations derived from top 5 digits ranked by AID,

+

4 combinations derived from top 4 digits ranked by AID,

+

1 combination derived from top 3 digits ranked by AID.

Fig.6 below illustrates the '3+4+5' algorithm. From the top 6 digits '253874' selected by AID, the top 5 digits (25387) produce 10 combinations (235, 285, 283, 583, 275, 273, 573, 278, 578, 378), the top 4 digits (2538) produce 4 combinations (532, 582, 382, 385) and top 3 digits (253) produce 1 combination (253).

| 830 | | | 094 694 093 693 493 640 630 430 436 064 | Top 5 | 1 |
|---------------|---|--------|---|----------|-------|
| Nov-19 538 | 1 | 253874 | 235 285 283 583 275 273 573 278 578 378 532 582 382 385 253 | \$300.00 | (4.0) |
| Nov-20 436 | 1 | 096328 | 069 039 036 936 029 026 926 023 923 623 | Top 3 | 0.8 |

Fig. 6. Illustration of '3+4+5' algorithm.

This algorithm produces the highest profit (see tables 1 and 2). However, since the combinations in the '3+4+5' algorithm are not independent (top 3 is repeated 3 times and top 4 are repeated 2 times) the binomial distribution is not applicable for calculation of the probabilities.

To calculate the significance of the "3+4+5" algorithm I used a Monte Carlo simulation. I created a simple program, which simulates the N draws run in accordance with Pick 3 rules and builds a distribution of the winnings quantity after X trials.

The zipped file with the source code written in MS Visual Basic 6.0 and executable of mentioned simulation program can be downloaded from <u>http://www.intuitiontester.com/DownloadSimulationFile.html</u>.

This simulation allowed me to build the distribution of the number of winnings in the '3+4+5' algorithm after 224 draws. The graph Fig.7 below was built based on 10,000,000 trials. The white diamond marks the point with 32 winnings, which AID produced between Aug.13, 2008 and Mar.24, 2009.

Mark Zilberman



Fig. 7. Distribution of the number of winnings in the '3+4+5' algorithm for 224 draws.

Calculations show that the probability to accumulate randomly 32 or more winnings in 224 draws using the '3+4+5' algorithm is equal to p=0.0356. This value was put into the cell correspondent to significance p in the '3+4+5' column of Table 1.

Similar calculations for the independent data sets accumulated from the beginning of the experiment on May 23, 2006 until the Aug.12, 2008 (see Table 2) show that the probability to accumulate randomly 98 or more winnings in 663 draws using '3+4+5' algorithm is equal to p=0.000368. Therefore p<0.0004 was put into the cell corresponding to significance p in the '3+4+5' column of Table 2.



Fig. 8. Distribution of the number of winnings in the '3+4+5' algorithm for 663 draws.

The graph Fig.8 above was built based on 10,000,000 trials. The white diamond marks the point with 98 winnings, which AID produced between May 23, 2006 until the Aug.12, 2008.

SUMMARY OF RESULTS

Data is current as of Mar.24, 2009.

1. Artificial Intuition Device works and is profitable.

Since the start of the public testing (Aug.13, 2008) AID's profit is \$1,440 and Return On Investment is 42.9%. In the null hypothesis the ROI should be negative (-10%) and profit should also be negative and equal (-\$336).

2. Significance of accumulated material during the public testing is p=0.029 for Top 5 and p<0.036 for the '3+4+5' algorithm (which AID uses when it posts predictions on the Internet in 3 hours in advance of the lottery draw).

3. The graph of profit accumulation is non-linear. There are some periods when accumulated profit grows faster and other periods when it grows slower or even falls. This means that AID performance is non-constant. See graphs Fig.2 and Fig.3.

4. The Return On Investment appears to grow when we consider the groups with higher AID's rank. See Tables 3 and 4 and graph Fig.4.

5. The Return On Investment is much higher on days with low Geomagnetic Activity. On geomagnetic quiet days (Ap<5) Return On Investment is 63%, as compared to ROI=8.4% for the days with Ap>=5. See Tables 5 and 6 and graph Fig.5.

6. This public AID testing also answered 2 important questions.

a. ESP tests in private and in public conditions often go very differently. Presence of an independent observer and especially of a "skeptic" often makes observed ESP effects negligible. Did AID's performance change since I made the experiment public?

The answer to this question is 'NO'. AID continues to work and continues to predict the future when independent observers are allowed to follow the results over the Internet and even to download the predictions.

b. Many psychics state that they lose their abilities when they attempt to get profit from their predictions. AID predicts lottery outcomes and allows everybody use predictions for profit (using Betslips.com for example). Does it influence the performance of AID?

The answer to this question is also 'NO'. During the public testing the AID continues to work, predicts lottery outcomes, and generated a profit of 42.9% in all days and 63% on Geomagnetic-quiet days.

7. All the observations above were confirmed in the independent material accumulated between the start of experiment (May 23, 2006) and the start of public testing (before the Aug.13, 2008).

Between May 23, 2006 and Aug.12, 2008

- a. Estimated profit was \$4,755 and Return On Investment (ROI) was 47.8%. In the null hypothesis the ROI should be negative (-10%) and profit should also be negative and equal (-\$994).
- b. Significance of accumulated material is p<0.00037.
- c. The graph of profit accumulation is also non-linear (Fig. 3).
- d. The Return On Investment also grows when we consider the groups with higher AID's rank (Table 4, Fig.4).
- e. On geomagnetic quiet days (Ap<5) ROI is 100.9%, as compared to ROI=20.7% for the days with Ap>=5.

CONCLUSION

The results obtained in this stage of testing indicate that modeling artificial intuition on software and hardware is indeed possible. In addition to that, the testing results suggest that the AID can also be used to improve the quality of forecasting in other areas where people use intuition (planning, investments, stock market, etc).

APPENDIX 1. HYDRODYNAMIC MODEL OF INTUITION

Here is quick reminder about the "Hydrodynamic model" of intuition. This model uses physical parameter "entropic potential of event". This parameter and corresponding formulas were first time introduced by the author in 1989 (Zilberman, 1989). It describes the influence of the current event on the change of entropy of the system in the future.

As it is well known, entropy of a system measures the organization of the system, its distance from chaos. It operates with the current state of the system as it is on the moment of measurement. However, what happens when we want to estimate the influence of the event which happened in the system *now*, in relation to development or degradation of the system in the *future*? Or, in other words, what if we want to estimate the potential of the current event to change the entropy of the system in the future?

Of course, in accordance with second law of thermodynamics, entropy in a closed system grows permanently. But it can grow with different speed. There can be some processes, which speed-up entropy growth and some which slow-down entropy growth. Is it possible to distinguish these processes by some parameter? This is purpose of "entropic potential of the event" (Z-potential below).

Fig.A1-1 below illustrates the "entropic potential of the event" visually.

1 - is the "river" of events, which happen in the system R while the time is passing,

2 - the analyzed event, which happens in the system at some specific moment

3 - are events, which happened in the system because the event 2 happened. Events, which could not have happened without event 2, or at least, which had lesser probability of occurrence.



Fig.A1-1 Illustration of the "Hydrodynamic model" of intuition

The horizontal axis is time, the vertical axis is the entropy of the system.

On this picture - the further we are going along the river from the event 2 to the right - the less is number of events, which happened exclusively because of the event 2. And therefore influence of event 2 on the entropy level of the system becomes weaker and weaker with time passing.

With the entropic potential definition in mind, the entropy of the system in area 3 becomes different in comparison to the neighboring areas of the river. This happens because of the event 2. If event 2 did not happen, the entropy level in the area 3 could be the same as in neighboring places. It became different because event 2 happened. This way the depth and width of area 3 can be a visual illustration to the entropic potential definition.

So far everything mentioned above was only the visual illustration of Z-potential. We introduced a new mathematical term, which is convenient to describe the potentials of events for entropy change of the system. But, did it put us closer to understanding what intuition is?

Let's return to the "hydrodynamic model" described above. On the left side of the "event" 2 we can note small rise 4. In a real river this rise happens because the flow of water meets an obstacle, which slightly pushes the water level up. The greater the obstacle the bigger, higher, and longer (to the left) is the water rise 4.

Imagine that you go along the river in small boat during the night. In the absolutely darkness (or 100% fog) you can not see if there is any obstacles in the front of your boat (in our model in the future). However even in darkness you will be able to detect the presence of the water rise, which you may feel at the moment when you pass it (in our model in the "now"). And as soon as you detected the water rise you know that there is an obstacle in the front of your boat!

Can it be that our intuition does the same? If intuition is simply our ability to feel the "rise" preceding the event with significant entropic potential? For example by detecting the change in the speed of chemical reactions in our body or some other processes. Of course the "hydrodynamic model" is only an analogy. There is nothing in current physics that supports the existence of such kind of "rise", which precedes a process with significant Z-potential. And it is highly speculative to think that such a "rise" can be detected. Only experimentation can prove or reject its validity.

APPENDIX 2. AID HARDWARE DESIGN

Micro-event

The micro-event is a single, simple, low-energy, potentially noticeable by appropriate scientific equipment event, which discretely changes the entropy of the system on a step-by-step basis. Depending on the nature of a physical micro-event such micro-events may be:

radiation of one particle - in the radioactive decay,

separation of one molecule from the liquid - in the evaporation,

radiation of the quantum of energy - in the heat/cool dissipation,

migration of one molecule from the substance into liquid - in the dissolution of some material into the liquid etc.

Macro-event

The macro-events are events of our normal regular life. In accordance with the definition of entropic potential of event (below Z-potential), a macro-event has a non-zero Z-potential if:

it is not forced, i.e. if the probability of it's realization is not equal to 1 (else mathematical expectations of entropy change before and after the event will be equal and potential will be 0),

and

it changes entropy of the system where it happened.

Here are some examples of macro-events with positive Z-potential: random selection of wrong road, lightning randomly targeted the house or human, wrong investment, lost money, wrong medicine taken by mistake etc. In another words - events where the entropy increase was greater that random.

Here are some examples of macro-events with negative Z-potential: random selection of a correct road, a successful investment decision, found money or a lottery win, miraculous safety in the a danger situation, etc. In another words - events where the entropy increase was less that random.

I build my experiment to check if there is deviation in the frequencies of micro-events near the macro event with significant entropic potentials and if I can use these deviations as detector of future macro event.

Source of micro-events

In my experiment I used radioactive decay as the source of micro-events with predefined entropy change.

The radioactive decay has several advantages as a generator of micro-events with positive entropy potentials.

Radioactive decay is a truly irreversible process with small but consistent entropy growth.

The radiation of one particle is independent from radiation of another.

Temperature does not influence radioactive decay. (It may influence the measurement equipment however).

Detector

Please note, descriptions of hardware and software provided here are now patent pending in patent applications filed in USA and Russia.

- a. A small piece of a radioactive isotope was securely attached to a Geiger counter. This radioactive isotope piece was distributed under the CNSC License No.12783-2. I used Geiger counter "DRSB-88", manufactured in Russia by "OAO Kyshtymskii radiozavod". In the article below I will use the word "detector" instead of "radioactive isotope / Geiger counter couple". The detector was surrounded by small mirrors from 5 sides.
- b. The detector was placed into a hermetically sealed glass jar with wall thickness of approximately 2 mm. This was done to protect the Geiger counter from the radon gas, which could penetrate into the

jar and give extra impulses to Geiger counter. The five walls inside the jar were covered with larger mirrors.

- c. The five walls inside the glass jar were also covered with 3-mm lead sheets, to protect the detector from background radiation. Control measurements without the radiation source attached and without lead sheets gave 3-4 impulses a minute coming from the background radiation.
- d. This glass jar was wrapped with aluminum sheets from 5 sides.
- e. Signals from the detector were recorded on a computer and inserted into a SQL database for future analysis.
- f. The frequency of impulses from the detector was approximately 40-50 impulses a minute.



Fig.A2-1 Details of physical elements of the detector and the protective box.

Fig.A2-1 provides details of the physical elements of the "radioactive source / radioactive particles counter" couple (detector) and it's protective box. The radioactive particles counter (4) detects the particles radiated by the radioactive source (6). Cable 8 connects the radioactive particles counter (4) with the power supply. Cable 7 connects the radioactive particles counter (4) with the input of computer. The walls (1,2,3,5) form the container, which covers the detector for protection. In preferred embodiment, these walls are made of a mirror with a reflective side facing inside the container. Wall 5 is optional and in the described experiment was not present.



Fig.A2-2 Details of the shield layers that protect detector from various influences.

Fig.A2-2 provides details of the shield layers that protect the detector from various influences. The detector described in the Fig.A2-1, was placed into a hermetically sealed jar (15) with a lid (11). The jar (15) is shielded with additional protective layers of lead and aluminum (9, 12). Cable 14 connects the radioactive particles counter (located inside the container (15)) to a power supply. Cable 13 connects the radioactive particles counter to the input of the computer. Cable 10 grounds the entire container. Walls 9 are optional and in the described experiment were not present.

APPENDIX 3. SOFTWARE TO RECORD, PROCESS AND ANALYZE THE RECORDED IMPULSES

Recording application

| 🕕 Wheel Control | | | |
|----------------------|---------|-------------|---|
| B1: | | | |
| | I. | 9 | |
| Exposure (s) 300 | | | |
| Next Exposure 3/17/2 | 2007 10 |):26:00 / | M |
| Current time 10:22:1 | 9 AM | | |
| <u>Start</u> St | pp . | <u>E</u> nd | |

Fig. A3-1 Example of the controlling application screen

Fig. A3-1 presents an example of the recording application screen. Application was written on the Microsoft Visual Basic 6.0.

Every 5 minutes, recording software displays the next number from the sequence [0,1,...9] in the application text box. Each impulse coming from the detector was recorded into an SQL database with the number displayed at the moment when the impulse was detected and timestamped.

Each daily series started on 11:00 PM of preceding day and finished on 10 PM of draw day. Ontario "Pick 3" lottery draws happen usually at 9:10 PM (EST) and have a cut-off time of 9:00 PM (EST) sharp for draw entries. At 5:49 PM (EST) of each day, the recorded data is analyzed, and then sorted in accordance to AID algorithms.

Analyzing routine

This routine was written in T-SQL language for SQL Server.

1. This routine accepts 2 input parameters: FromDate and ToDate. These parameters allow the user to select the interval where analysis of impulses frequencies will be performed.

2. During the initialization this routine creates 3 temporary tables

| #Numbers | (num int, r real, Qty int) |
|-------------|----------------------------------|
| #AllNumbers | (num int, r real, Qty int) |
| #t | (dat datetime, qty int, num int) |

3. The routine defines the hourly intervals between FromDate and ToDate. For example, if FromDate ='Mar 13, 2007 10:00:00' and ToDate='Mar 13, 2007 18:00:00' - it divides all impulses recorded between FromDate and ToDate into 8 intervals:

from 'Mar 13, 2007 10:00:00' to 'Mar 13, 2007 11:00:00', from 'Mar 13, 2007 11:00:00' to 'Mar 13, 2007 12:00:00', ... from 'Mar 13, 2007 17:00:00' to 'Mar 13, 2007 18:00:00'

4. For each hourly interval it:

- a. Cleans the temporary tables #t and #Numbers
- b. Inserts into the table #t the total number of impulses arrived in each minute of analyzed hour and number, which was exposed on computer monitor during that interval.
- c. Using the data loaded into the table #t, the described routine calculates the average frequency of detected impulses grouping them by exposured number and combining them by all minutes of analyzed hour. The average frequency is calculated as:

total # of impulses combined by all minutes of the analyzed hour when the analyzed number was exposed total # of minutes in the analyzed hour when the analyzed number was exposed

- d. The described routine may optionally limit the number of detected impulses per minute to be above some predefined threshold. For example, it can be programmed to consider only the minutes when there are at least 10 impulses recorded. This allows the routine to ignore the minutes when no impulses or only background impulses were recorded (for example, due to technical problems).
- e. After completion of the calculations described in item 4-c above, the routine inserts the exposed number, calculated frequencies and the total quantity of impulses for each exposured number into temporary table #Numbers, which was created in step 2 and cleaned in step 4-a.
- f. Using the data in the table #Numbers, the described routine sorts the records by frequency and selects the numbers with the highest frequencies and correspondent hour from the table #Numbers into the table #SelectedNumbers. In the preferred embodiment, the routine inserts 50% of records with the highest frequencies into the #SelectedNumbers table. Obviously this number can vary if necessary.

5. After processing of all hourly intervals is finished, the routine calculates how many times each analyzed number appears in the #SelectedNumbers table, sorts the analyzed numbers by quantity and notifies the user. The simplest way to notify the user is to display the result on the computer monitor. However, other methods of notification, like sound alert, printing of output, SMS messaging, or e-mail / cell phone notification are also possible.

6. Example in Fig. A3-2 presents the analyzed numbers (from 0 to 9) and how many times each analyzed number was inserted in the #SelectedNumbers table on the step 4f.

| R1 | | |
|---------------|--------|------------|
| | 3 | 5 |
| | 9 | 6 |
| | 1 | 7 |
| | - 5 | 7 |
| | 0 | 8 |
| | 8 | 9 |
| | - 4 | 11 |
| | 6 | 11 |
| | 2 7 | 13 |
| | - 7 | 13 |
| | | |
| ∖01- 1 | 11 🔏 | 01-10 / 01 |

Fig. A3-2. Example of the #SelectedNumbers table on Jan.11, 2009.

For example, number "7" was inserted into the #SelectedNumbers table 13 times, number "6" was inserted into #SelectedNumbers table 11 times etc. As it was described in the item 4f, the routine inserts into #SelectedNumbers table the 50% of records from the table #Numbers with the *highest* frequencies for each hour. In result the bottom part of the table in Fig.A3-2 contains the analyzed numbers corresponding to higher speed of radioactive decay (because more times this number was included into top 50% of records with highest frequencies). Correspondingly the top part of the table in Fig.A3-2 contains the numbers corresponding to lower speed of radioactive decay.

7. Acceleration vs. deceleration criteria. Having the Fig.A3-2 table, user makes the key decision - which numbers to fill in the lottery ticket. In the "hydrodynamic model" of intuition, the speed of physical processes is changing near the event with significant entropic potential. In our case the "physical process" is the radioactive decay and the "event" is the process of testing the number, which can be entered for the coming lottery draw. A priori we do not know if the radioactive decay will speed-up, slow-down or do something else near the correct number (number with non-zero entropic potential). However, if we accept the model in picture A1-1 "as-is", we can expect the *acceleration* of the radioactive decay near correct prediction (rise 4 on the picture means acceleration of the entropy growth, and corresponds to the acceleration of radioactive decay in described experiment).

8. Conversion of the selected numbers into lottery combinations. Let's return to the picture in Fig.A3-2. Detector selected top 5 numbers as (7,2,6,4,8). If the "hydrodynamic model" is correct, these 5 numbers had more chances to win in the coming lottery draw. I filled only combinations with different digits (like 123 and never like 112). Therefore the selected 5 numbers (7,2,6,4,8) produced ten 3-digit combinations: 762, 742, 746, 246, 782, 786, 286, 784, 284, 684, because there are only 10 different ways to extract the unique 3-digit combination from the given five digits. In addition to these 10 unique combinations AID also adds 4 combinations produced by top 4 digits (7,2,6,4): 267, 247, 647, 642. And it also adds one combination produced by the top 3 digits: 726. The reasons why algorithm is doing this are described in the item "Correlation between the Return On Investment and AID's rank"

Having these 15 combinations I entered them for the coming draw into the "Pick 3" web-page on the <u>www.Betslips.com</u> lottery web-site, which pays \$150 for each correctly predicted Pick3 number in the box play (<u>http://www.betslips.com/orderp3.aspx?cmd=on</u>).

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