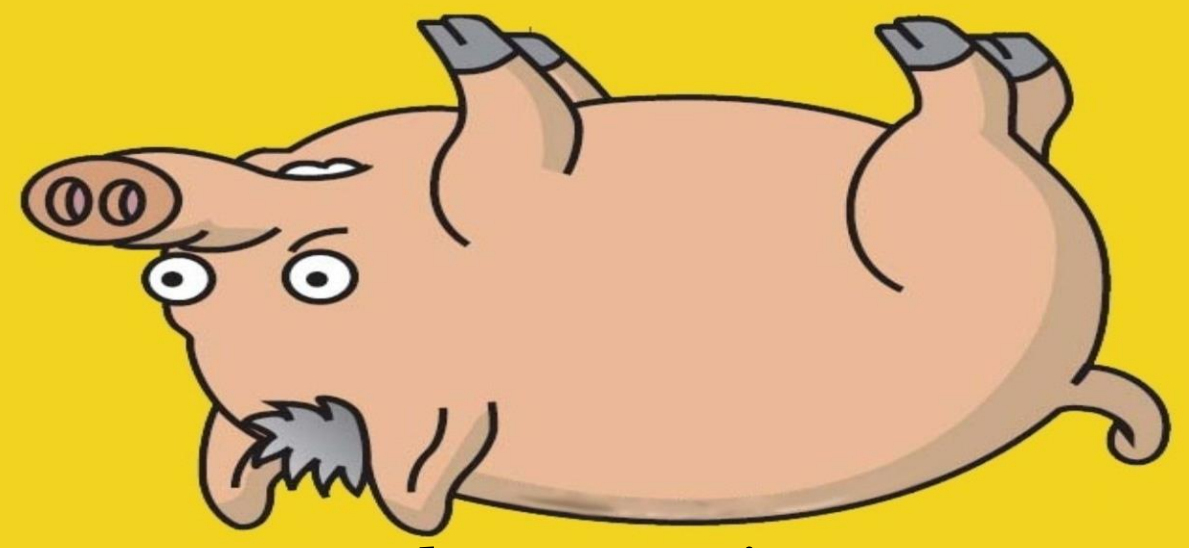
DIPARTIMENTO DI FISICA
SAPIENZA
UNIVERSITÀ DI ROMA

Data mining and pattern classification in online gaming



Andrea Mazzei

Online poker (with a twist)

Two ways of playing online poker

1) “Standard” gaming
   Just like one imagines to play online poker

2) “Grinding” or “massing”
   Playing large amounts of hands (typical 1500/hour)

Online poker (with a twist)

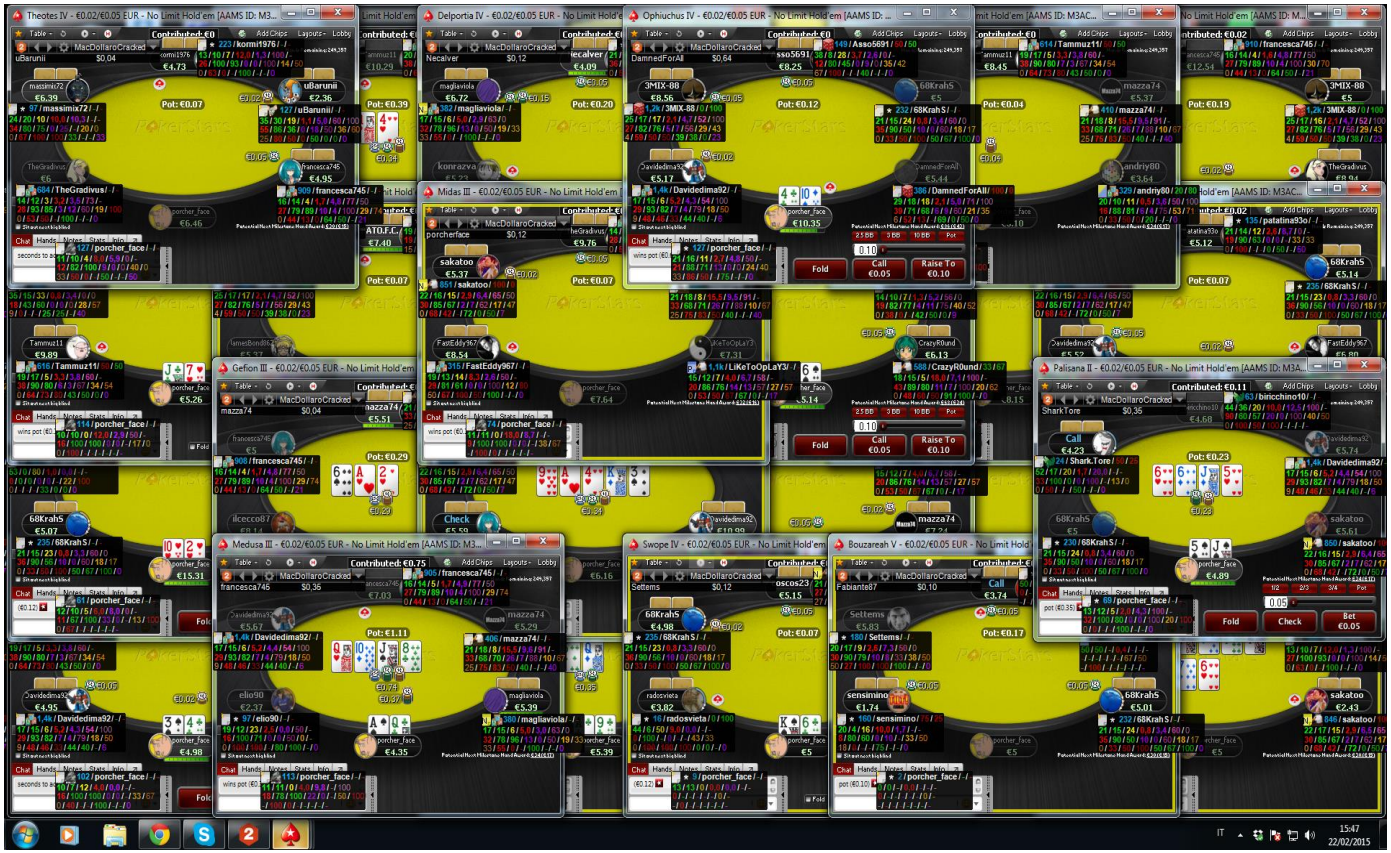
Grinders frequently use additional instruments
Those include:

- Recording of own sessions (to “study”)
- Data mining of opponents
- Montecarlo equity evaluators
- Much more.. (a complete description of tracking softwares for online poker is worthy a university course)

Online poker (with a twist)

Masstabling
12x5€
+12x10€

One can notice a superposed set of numbers on each “villain”. These datas are obtained recording and parsing the hand history using a third party software. Data is stored on a SQL DB.



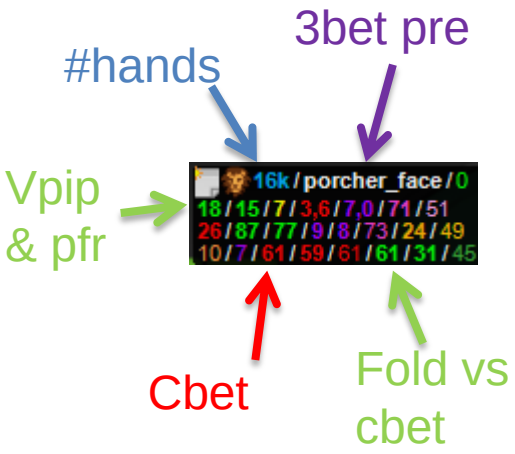
Online poker (with a twist)

Those values indicate the most popular action patterns. The player (called Hero in poker lingo) uses these numbers to know the most popular errors and leaks of the villain, eventually planning a strategy in order to exploit'em.

In this figure we may see hero with shown cards, and five villains.

Online poker (with a twist)

The most common stats are shown in this superposed view (called Head Up Display, HUD)



We can see here that:

Two of them are abitual players (regs).
One is a fish. Two others are still unknown, even though one of them is probably another reg. Can you guess who is the fish?

(Explaining the twist)

Much more elaborate betting patterns are accessible in-game using a pop-up feature. This allows to view every stat. of the opponents, there are lots of available popups, and more than 500 type of pattern recorded by the software. Below, the view of the two main popups for a “reg” villain. The software identifies him as a ABC player, one who plays a standard game, with no significant deviations.
Usually “regs” avoid each others (unless it’s “reg war”).

(ABC Player) [redacted]

[redacted]
43 bb/100

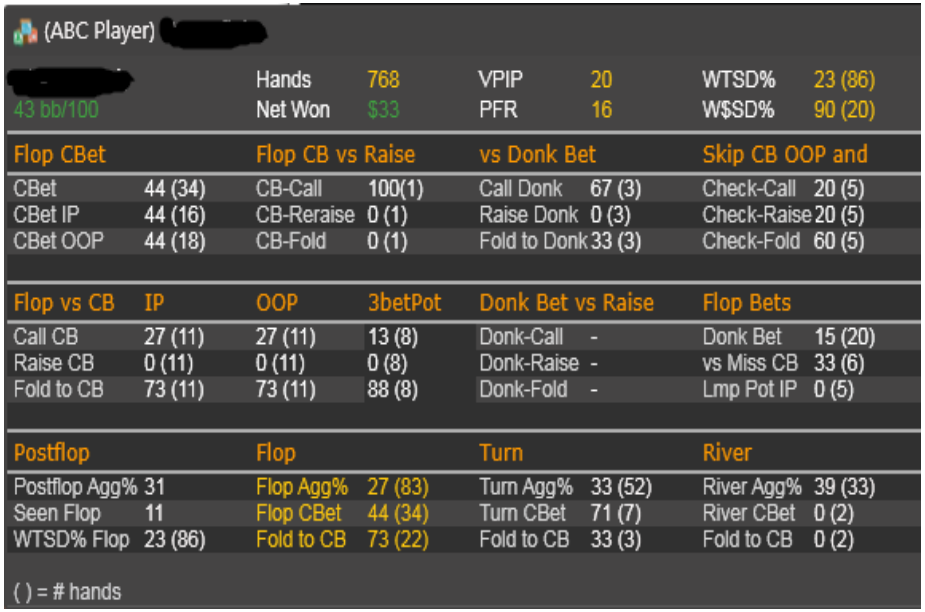
Hands	768	VPIP	20
Net Won	$33	PFR	16
WTSD%	23 (86)		
W$SD%	90 (20)		

Preflop	Total	EP	MP	CO	BTN	SB	BB
VPIP	20	14	15	23	28	21	22 (95)
PFR	16	14	13	22	22	17	4 (95)
Cold Call	11	-	11 (27)	6 (36)	9 (65)	6 (88)	21 (57)

3-Bet	Total	EP	MP	CO	BTN	SB	BB
3-Bet	5,0	-	0,0 (27)	7,9 (38)	6,6 (61)	5,0 (80)	4,0 (75)
Call 3B	50 (18)	60 (5)	75 (4)	50 (4)	33 (3)	0 (2)	-
Fold to 3B	44 (18)	40 (5)	0 (4)	50 (4)	67 (3)	100(2)	-

vs 3-Bet		vsHero 3-Bet		Misc Preflop		4-Bet+	
Call 3B	50 (18)	Call 3B	33 (3)	Squeeze	3 (40)	4B Range	1 (17)
Fold to 3B	44 (18)	Fold to 3B	33 (3)	Limp	0	5B Range	5 (1)
Raise 3B (4B)	6 (17)	Raise (4B)	33 (3)	Minraise	0	Cold 4B+	0 (27)

( ) = # hands



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Flop CBet		Flop CB vs Raise		vs Donk Bet		Skip CB OOP and	
CBet	44 (34)	CB-Call	100(1)	Call Donk	67 (3)	Check-Call	20 (5)
CBet IP	44 (16)	CB-Reraise	0 (1)	Raise Donk	0 (3)	Check-Raise	20 (5)
CBet OOP	44 (18)	CB-Fold	0 (1)	Fold to Donk	33 (3)	Check-Fold	60 (5)

Flop vs CB	IP	OOP	3betPot	Donk Bet vs Raise		Flop Bets	
Call CB	27 (11)	27 (11)	13 (8)	Donk-Call	-	Donk Bet	15 (20)
Raise CB	0 (11)	0 (11)	0 (8)	Donk-Raise	-	vs Miss CB	33 (6)
Fold to CB	73 (11)	73 (11)	88 (8)	Donk-Fold	-	Lmp Pot IP	0 (5)

Postflop		Flop		Turn		River	
Postflop Agg%	31	Flop Agg%	27 (83)	Turn Agg%	33 (52)	River Agg%	39 (33)
Seen Flop	11	Flop CBet	44 (34)	Turn CBet	71 (7)	River CBet	0 (2)
WTSD% Flop	23 (86)	Fold to CB	73 (22)	Fold to CB	33 (3)	Fold to CB	0 (2)

( ) = # hands

Typical examples

VPIP: The number of times a player pays to enter in the hand
PFR: The number of times a player raises to enter in the hand
CC: (Cold call) The number of times a player calls a PFR
3BET: The number of times a player raises the PFR (then we have 4bets, 5bet..
F3BET: (fold to 3bet) The number of times the PFR folds against a 3bet

STEAL: The number of times the player PFRs from the latest position
RSTL: (resteal) The number of times the player 3bets against a steal

CBET: (either flop, turn, river) The number of times the player bets flop when he was PFR preflop
FCBET: (fold vs cbet, either flop, turn, river) The number of times the player folds against a cbet.

Typical examples

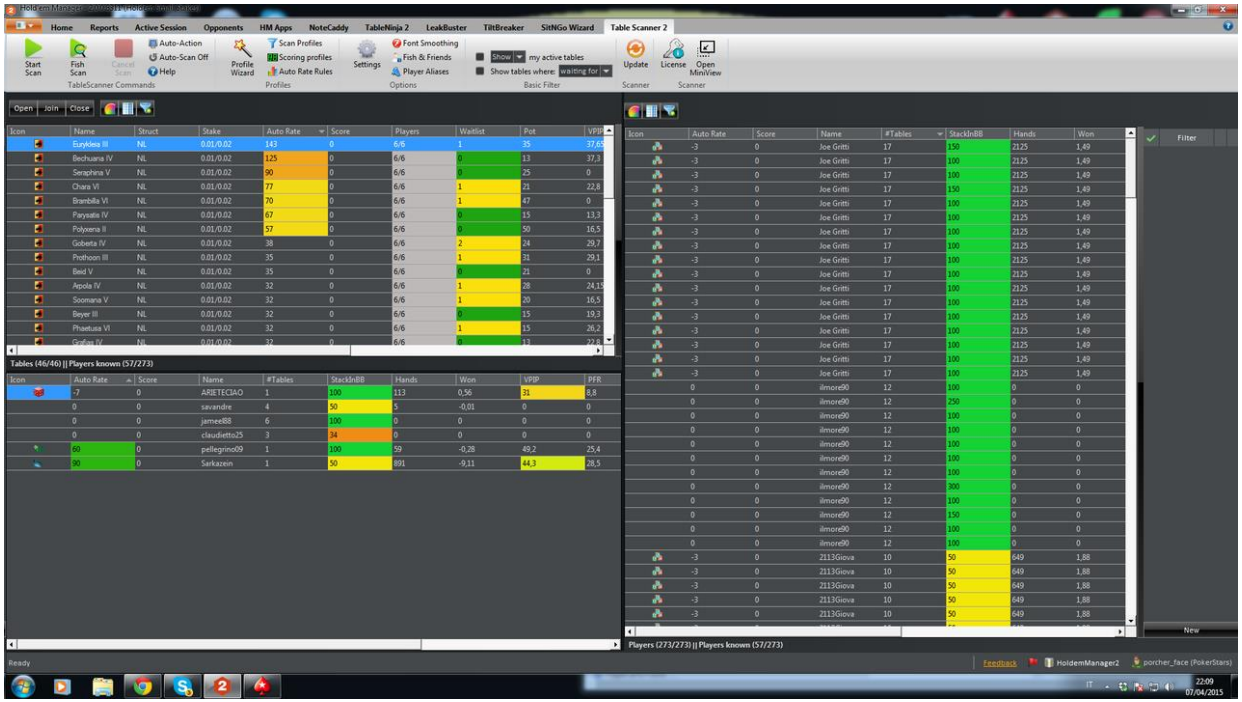
In order to have a solid game, regs have to line their stats up to a certain range of values for each stats. These are IMPROPERLY called GTO (game theory optimal). These ranges are typically adapted to the villain we are facing.

EX1: vpip=15-25 %); pfr ~ vpip; CC < 5%; cbet= 60-80%; foldcbet= 50-70% are typical ranges for a ABC player. (but we must still see how this reg behaves on other stats, like steal, donk bet, and so on..

EX2: vpip < 10%; steal < 20%; foldcbet >70%; 3bet<5% are the typical values o of a “rock” player, bluff this player frequently and be very aggressive on him!

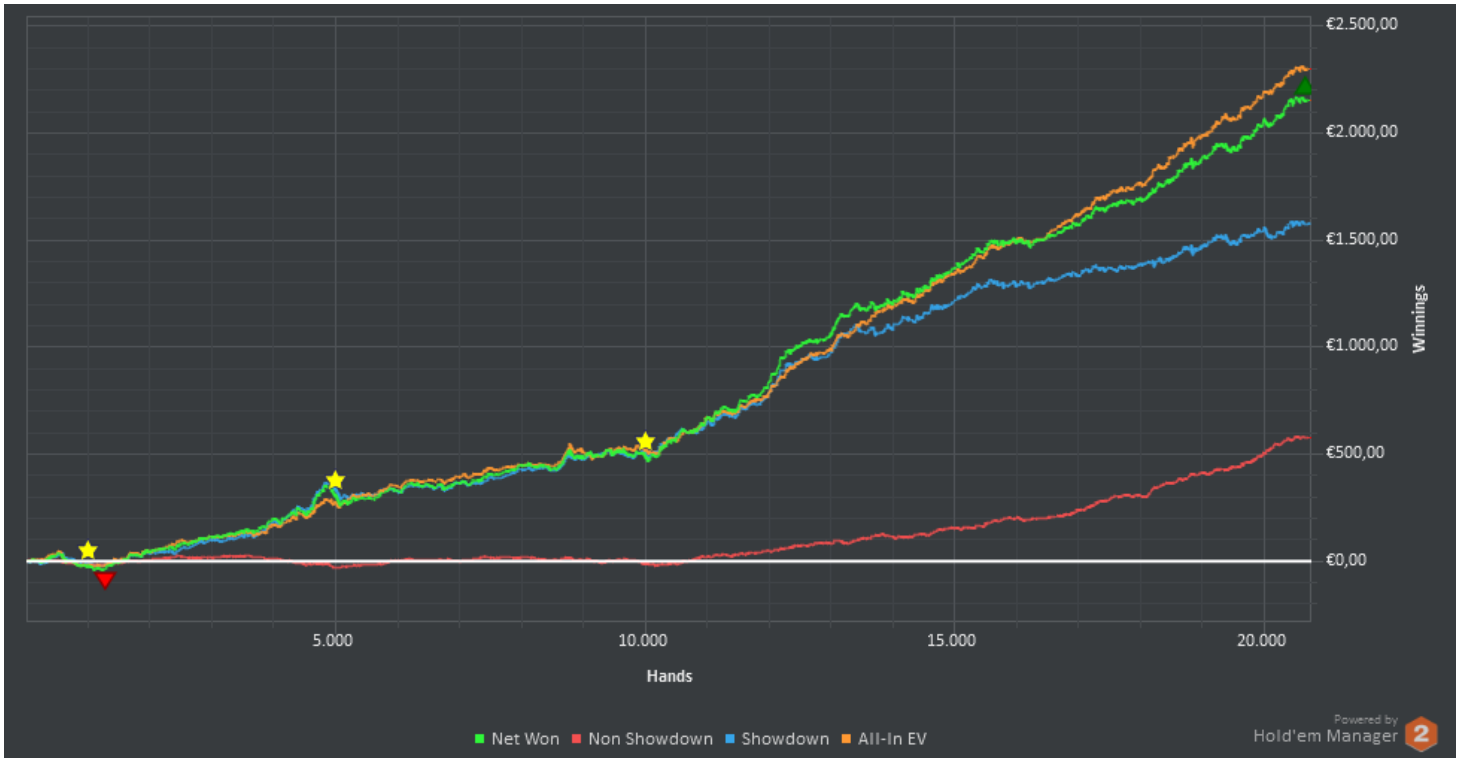
EX3: vpip>50% this is usually sufficient to call a player “fish”.

Screenshots from Holdem Manager and pokerstove.



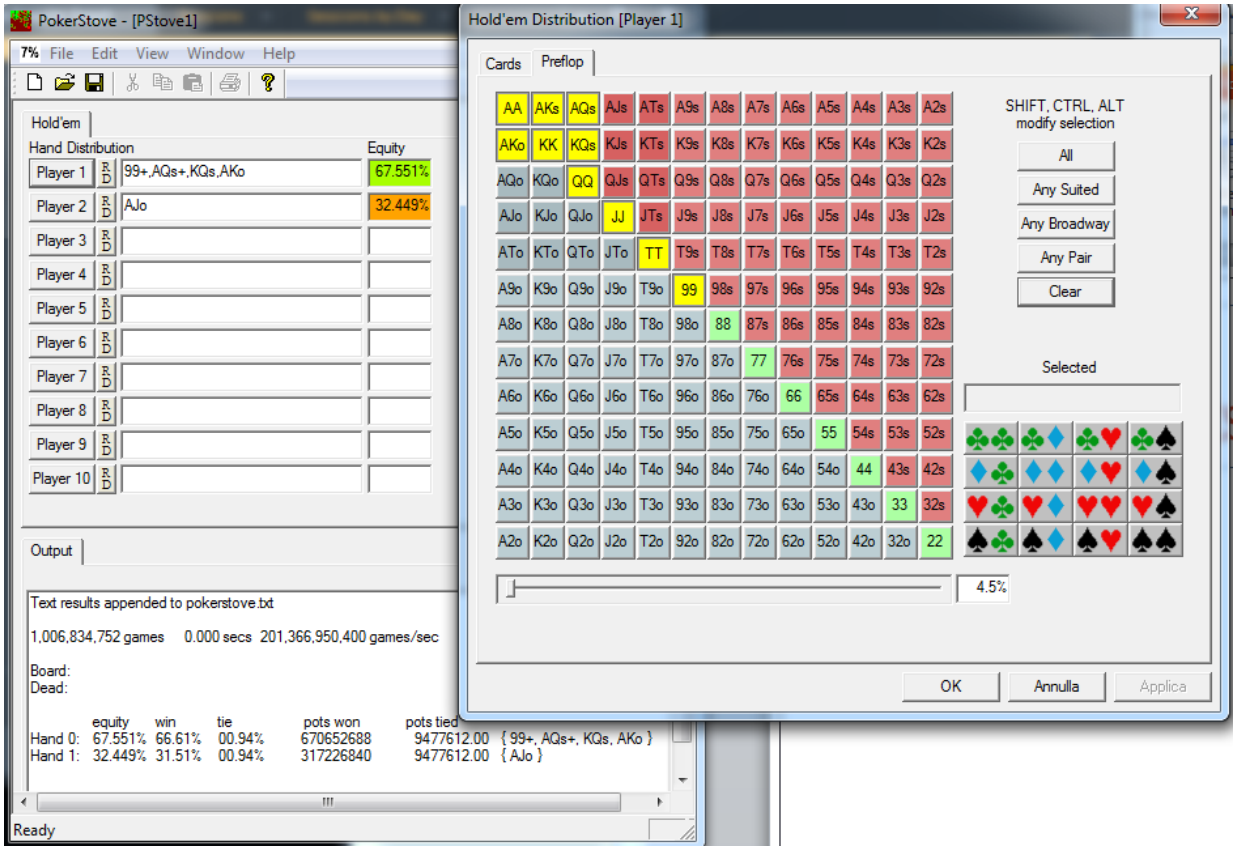
The FishFinder (from table scanner, a feature of the tracking software) scans automatically the poker lobby in order to find tables full of fishes.

Screenshots from Holdem Manager and pokerstove.



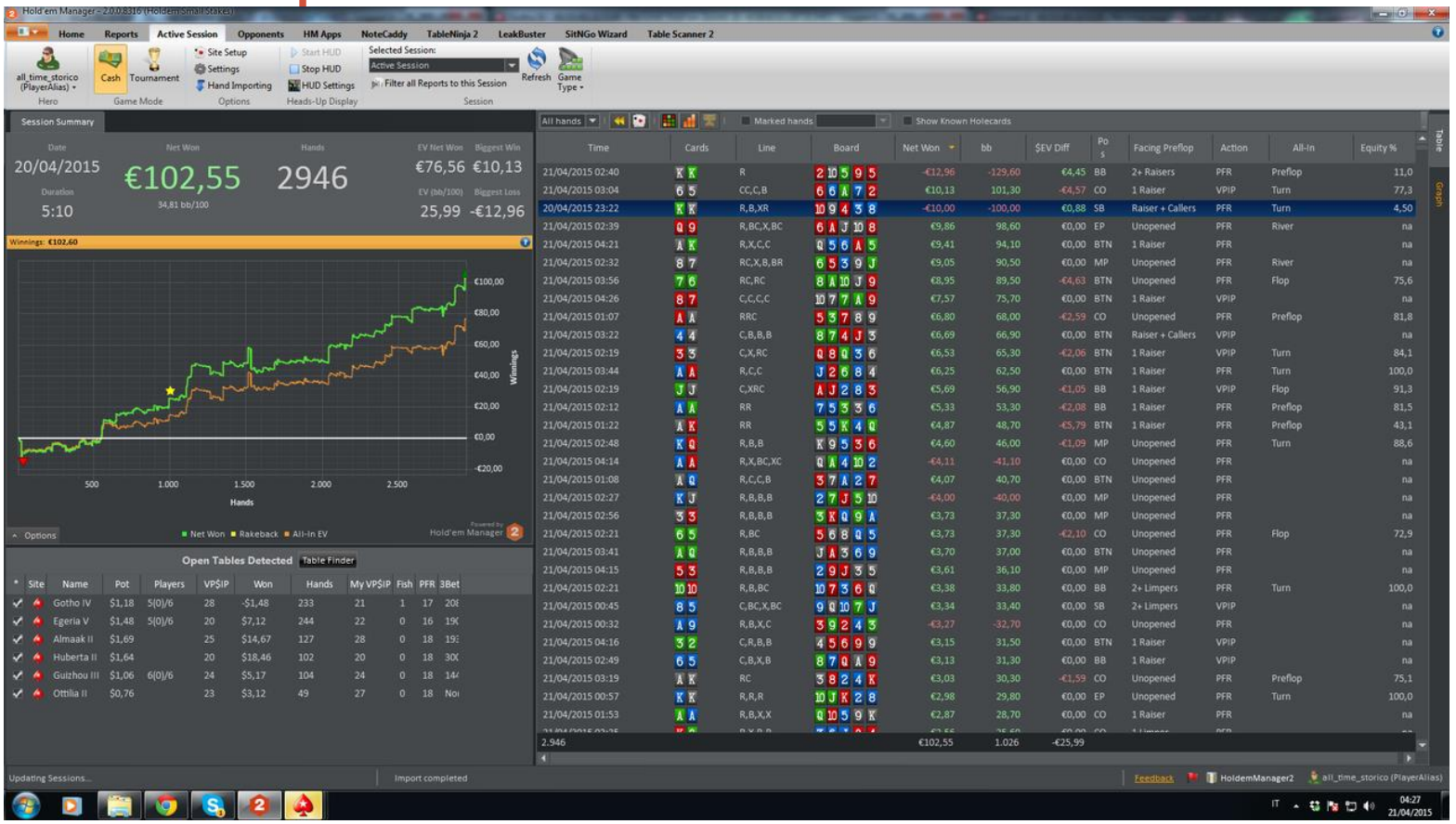
A filtered graph with my winnings in position (last to act) in the last 20000 hands.

Screenshots from Holdem Manager and pokerstove.



A montecarlo equity evaluator against an opponent who is 3betting 4.5%. The output suggest to fold my Ace-Jack hand...

Screenshots from Holdem Manager and pokerstove.



A very lucky session, effective duration is about 3 hours, the other two are used to study the details of the sessions (lucky spots, opponents, etc...)

Aim of the current work.

Aim of the work will be to set up and train a Neural Network to identify fishy opponents from reg ones. It will also be used in a more refined way to distinguish the different types of regs.

The network will be implemented in matlab and will be a single hidden layer network.

The order of magnitude of the training and validation sets will be discussed, among with the outputs given by the network and the related discussions.

Thanks for reading,

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