

## Raw data

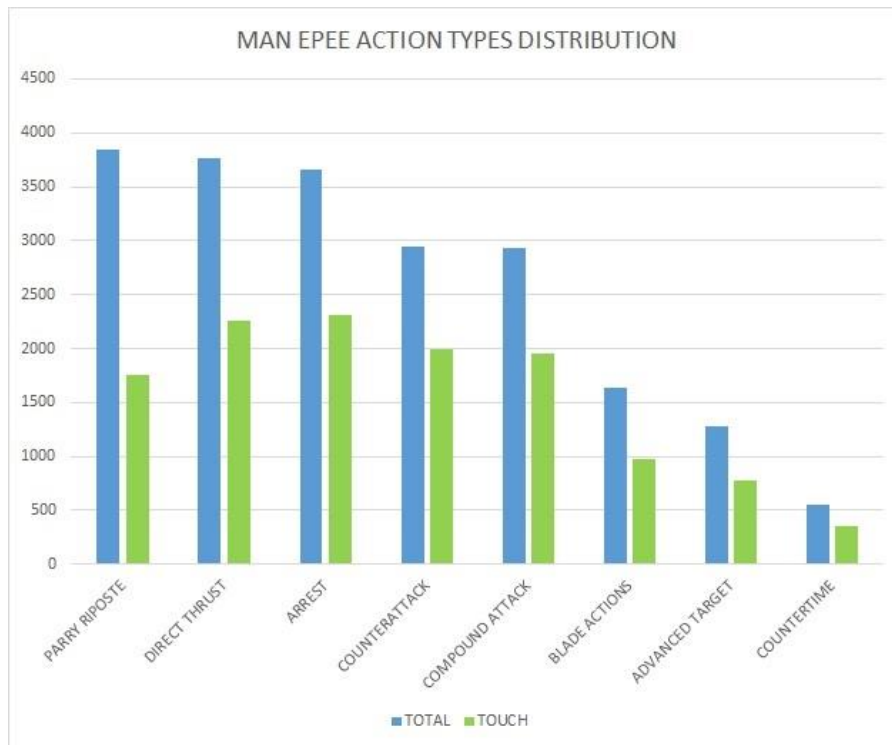
**Table 1:** The notational analysis of 730 epee man matches produces 20600 actions, which have been classified into 8 categories: Parry riposte, Countertime, Arrest, Direct Thrust, Counterattack, Blade Actions, Advanced Target, Compound Attack. Each record is also tagged with the result of the action (Touch, no Touch).

ACTION ID	MATCH ID	FENCER ID	ACTION TYPE	START	END	TOUCH	NO TOUCH
1	1	35	8	625	825	1	0
2	1	100	3	625	825	0	1
3	1	100	6	1617	1817	1	0
4	1	35	1	1617	1817	1	0
5	1	100	4	2551	2751	1	0
6	1	35	3	2551	2751	1	0
7	1	100	6	3191	3391	1	0
8	1	35	3	3191	3391	1	0
9	1	100	8	4134	4334	1	0
10	1	35	1	4134	4334	0	1
11	1	100	4	4707	4907	1	0
12	1	35	3	4707	4907	1	0
13	1	35	8	5463	5663	0	1
14	1	100	1	5463	5663	1	0
15	1	100	4	8927	9127	1	0

## Modern Epee Action Distribution

**Table 2 - Figure 1:** We observe that the prevailing actions in modern man epee are narrowed to the defensive actions (Parry and Arrest) and simple attack (Direct Thrust), followed by counterattack and compound attack, while other popular foil actions (blade action and countertime) are less common. Counterattack is the action with the highest percentage of success while parry riposte is the action with the higher risk of failure.

ACTION TYPE	TOTAL	TOUCH
PARRY RIPOSTE	3850	1757
DIRECT THRUST	3772	2255
ARREST	3663	2314
COUNTERATTACK	2943	1998
COMPOUND ATTACK	2937	1952
BLADE ACTIONS	1632	969
ADVANCED TARGET	1280	782
COUNTERTIME	547	354
TOT	20624	12381



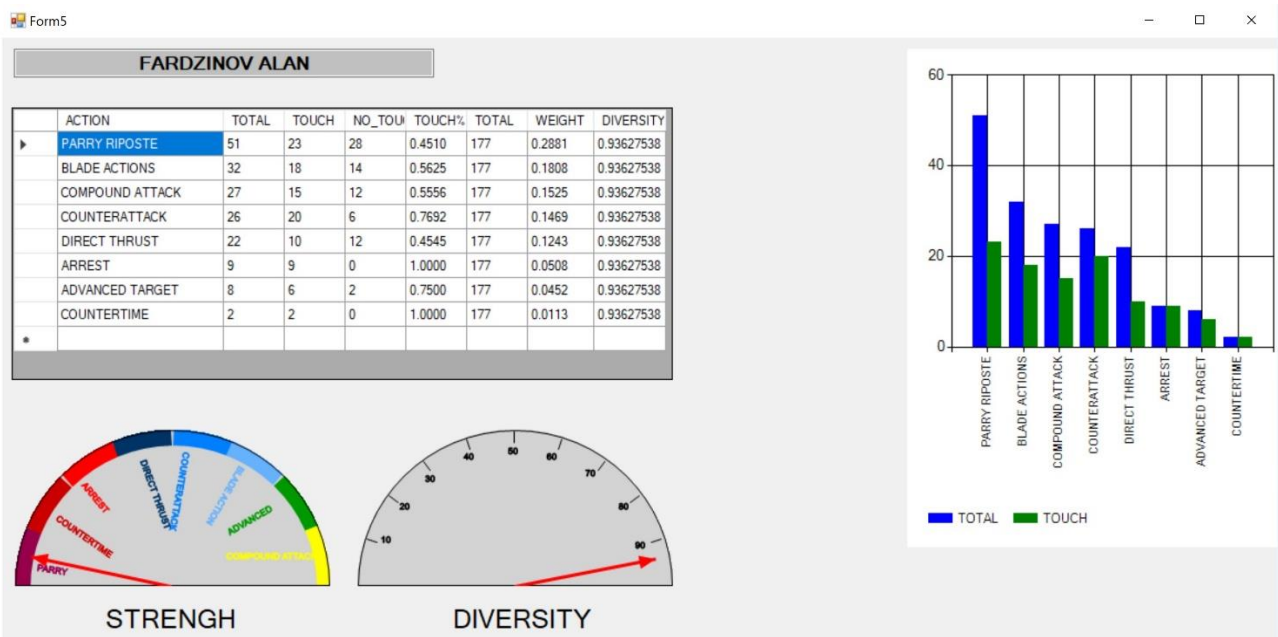
## Chi Square Test

**Table 3:** Action Type Frequencies are qualitative variables which can be grouped into different families, according to the year when the event took place (2015,2016,2017) and we can make a comparison between data recorded in different seasons. Chi Square Test compares the frequencies obtained for one season with the forecast expected from the previous year data. A Chi Square Test was computed initially on all data globally taken and then subdivided into different families like fencers belonging to a single nation or single specific fencers. All test statistics are higher than the distribution value for 7 degrees of freedom (14), therefore we could deduce that, based on the available data and the presented analyses, at the moment there is no evidence that we could forecast a fencer behavior based on previous behavior.

DATA FILTER	2015	2016	2017	( $\chi^2$ ) 2016	( $\chi^2$ ) 2017
ALL FENCERS	5910	12032	20624	164	33
ITALIAN FENCERS	888	1096	171	107	19
FRENCH FENCERS	969	2186	489	19	40
RANKING NO. 2 FENCER	49	444	25	167	13
RANKING NO. 3 FENCER	124	102	47	38	40
RANKING NO. 4 FENCER	155	228	92	42	19
RANKING NO. 5 FENCER	100	328	59	135	20
RANKING NO. 43 FENCER	139	280	20	26	28
RANKING NO. 78 FENCER	41	76	20	77	29

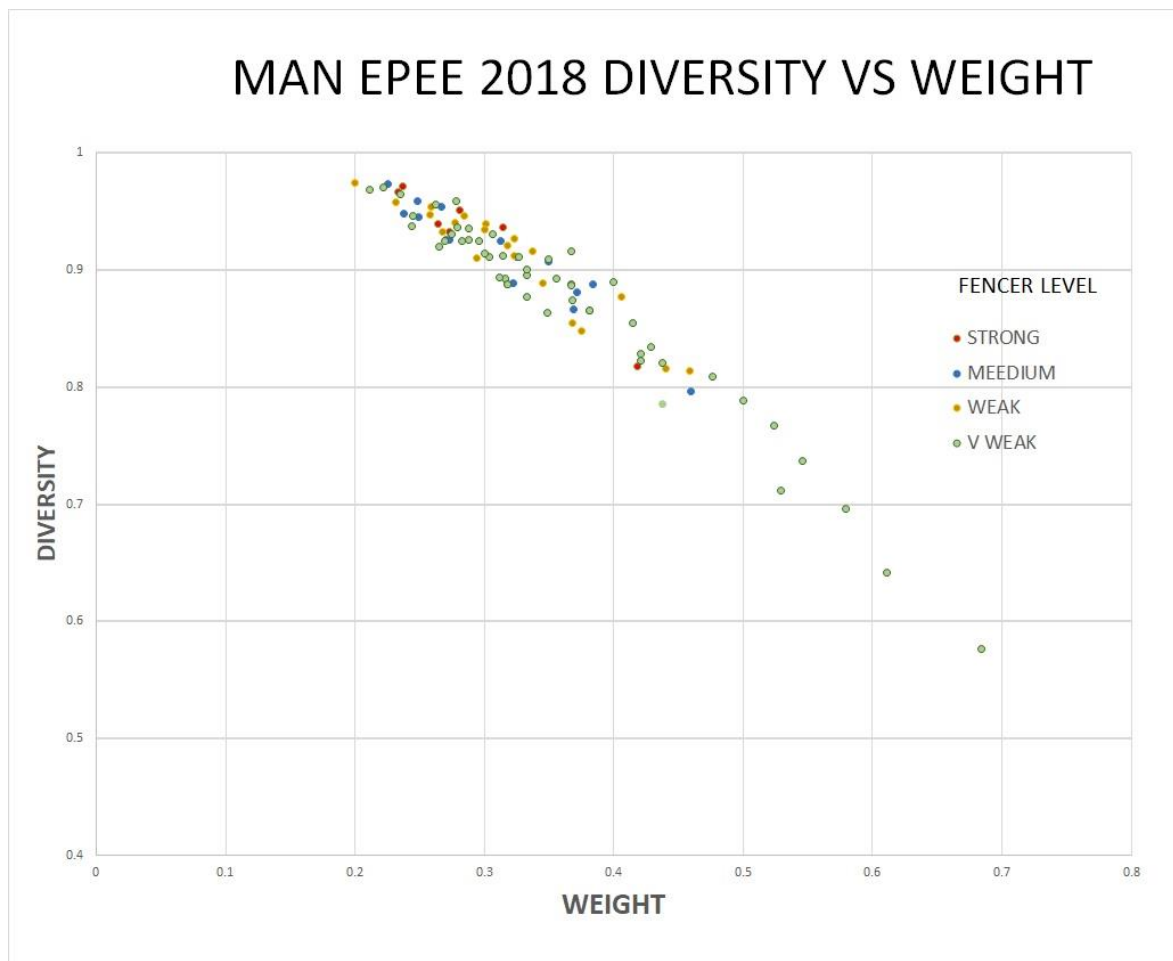
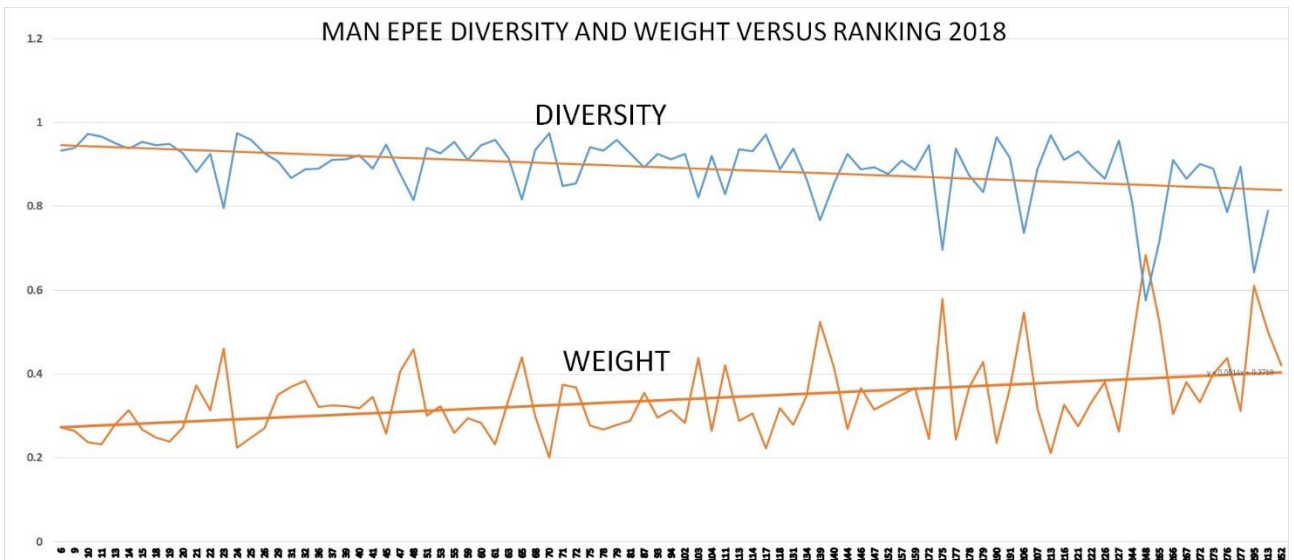
## Fencer Tactical profile

**Figure 2:** For each fencer we can define a tactical profile panel which consists of a set of information displayed in the same board. In order to compare profiles of different fencers, all information has been summarized into three parameters: Strength, Weight and Diversity. Strength is the action type which is most exploited by the fencer, Weight is the percentage of the strength as compared to the total action of the fencer, while diversity (Gini Coefficient of the fencer action types distribution) represents the amplitude of the fencer's repertoire, where 0 means all actions concentrated in one single type and 1 means all actions equally distributed among the 8 different types.



## Weight and Diversity vs Ranking

**Figure 3 - 4:** Some indication on coaching methodology can be deduced if we compare both Weight and Diversity against fencer Ranking position. The linear regression trend of both data indicates that strong fencers exhibit high diversity and low weight, while weaker fencer mostly rely on the few actions where they feel more comfortable. For the coaches this translates on the indication that it would be better teaching a wide range of different actions instead of insisting on reaching perfection on few of them.



## Match Profile and Match Result

**Figure 5 - 6:** For each match we can define a match tactical profile (Strength, Weight, and Diversity for each fencer in each single match), and we can then check the coincidence between match profile and fencer profile against the match result. A high percentage of matches won with the fencer imposing his own profile over the opponent (as indicated by Fig. 5), could mean that - in order to win a bout - the fencer will need to force his strength against the opponent strength. However it is a wrong indication, checking over for the lost matches we obtaining again high percentage of coincidence (Fig 6). Therefore we can conclude that a winning fencer will not try to impose his own stile over the opponent but instead will need to accommodate his stile to the opponent profile.

