



Figure 2: Action history of an example entity

Table 6: Features with high profile ranking

profile	global rank	type	Feature name	Description
user	96	merchant aggregation	U_merchant_buy_item_num_avg	average number of unique items bought from merchants by the user
	18	merchant aggregation	U_merchant_click_item_num_avg	average number of unique items clicked in merchants by the user
merchant	1	user aggregation & gender related	MG_user_buy_day_num_std	standard deviation of the number of days that users made a purchase from the merchant, only users of a particular gender are considered.
	82	user aggregation	M_user_buy_day_num_avg	average number of days that users made a purchase from the merchant
user-merchant	2	product diversity	UM_click_item_num	number of unique items clicked by the user in the merchant
	7	overall action count	UM_total_buy_action_num	total number of purchases made by the user from the merchant
brand	245	user aggregation & gender related	BG_user_buy_day_num_std	standard deviation of the number of days that users purchased the brand, only users of a particular gender are considered
	468	repeat buyer & gender related	BG_repeat_buy_user_day_ratio	proportion of repeat buy days of the brand, only users of a particular gender are considered.
category	404	user aggregation	C_user_buy_item_num_avg	average number of items in the category that were bought by users
	392	repeat buyer & gender related	CG_repeat_buy_user_ratio	proportion of repeat buyers of the category, only users of a particular gender are considered.
item	74	monthly action count	X10_item_0	times that the item was clicked in October
	178	monthly action count	X9_item_0	times that the item was clicked in September
user-brand	151	overall action count	UB_total_buy_action_num	total times that the user bought the brand
user-category	582	overall action ratio	UC_user_buy_action_num_ratio	ratio of the times that the user purchased the category to the total actions taken by the user on the category
merchant-brand	3	user aggregation	MB_user_buy_day_num_std	standard deviation of the number of days that users bought the brand from the merchant, only users of a particular gender are considered.
merchant-category	12	user aggregation	MC_user_buy_day_num_std	standard deviation of the number of days that users bought the category from the merchant, only users of a particular gender are considered.

Table 7: Features with high global ranking

global rank	profile	type	Feature name	Description
4	merchant-brand	repeat buyer	MB_repeat_buy_day_ratio	proportion of repeat buy days of the brand in the merchant
5	user-merchant	trend	user_seller_store_visit_day_count_MDP	deviation of the number of times the user clicked the merchant in the latest month from the mean of the previous months normalized using mean
6	merchant-brand	user aggregation	MB_user_buy_day_num_avg	average number of days users bought the brand from the merchant
8	user-merchant	product diversity	UM_click_cat_num	number of unique categories clicked by the user in the merchant
9	merchant	user aggregation & gender related	MG_user_buy_day_num_avg	average number of days users bought some item from the merchant, only users of a particular gender are considered
10	merchant-category	user aggregation	MC_user_buy_day_num_avg	average number of days that users bought the category from the merchant.
11	merchant	repeat buyer & age related	MA_repeat_buy_user_day_ratio	proportion of repeat buy days of the merchant, only users of a particular age group are considered.
13	user	monthly aggregation	U_monthly_click_merchant_num_std	standard deviation of the number of merchants clicked by the user every month
14	user-merchant	similarity score	UM_buy_action_num_brand_merchant_user_share_simscore_sum	similarity score between the user and the merchant, and the score is obtained by first calculating the product of the times that the user bought a brand and the brand's user share within the merchant, and then taking sum over all brands in the merchant.
15	user-merchant	product diversity	UM_buy_item_num	number of unique items purchased by the user in the merchant
16	merchant-category	repeat buyer	MC_repeat_buy_day_ratio	proportion of repeat buy days of the category in the merchant
17	category	user aggregation	C_user_buy_day_num_avg	average number of days that users bought the category.
19	user	merchant aggregation	U_merchant_click_day_num_std	standard deviation of the number of days that the user clicked merchants.
20	user	product diversity	U_buy_merchant_ratio	ratio of the number of merchants that the user made a purchase from to the total number of merchants that the user took some actions