



**K2 Analytics**  
Building Skills, Building Individuals

## **Rank Ordering**

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**Earning is in Learning**  
**- Rajesh Jakhotia**

# Context

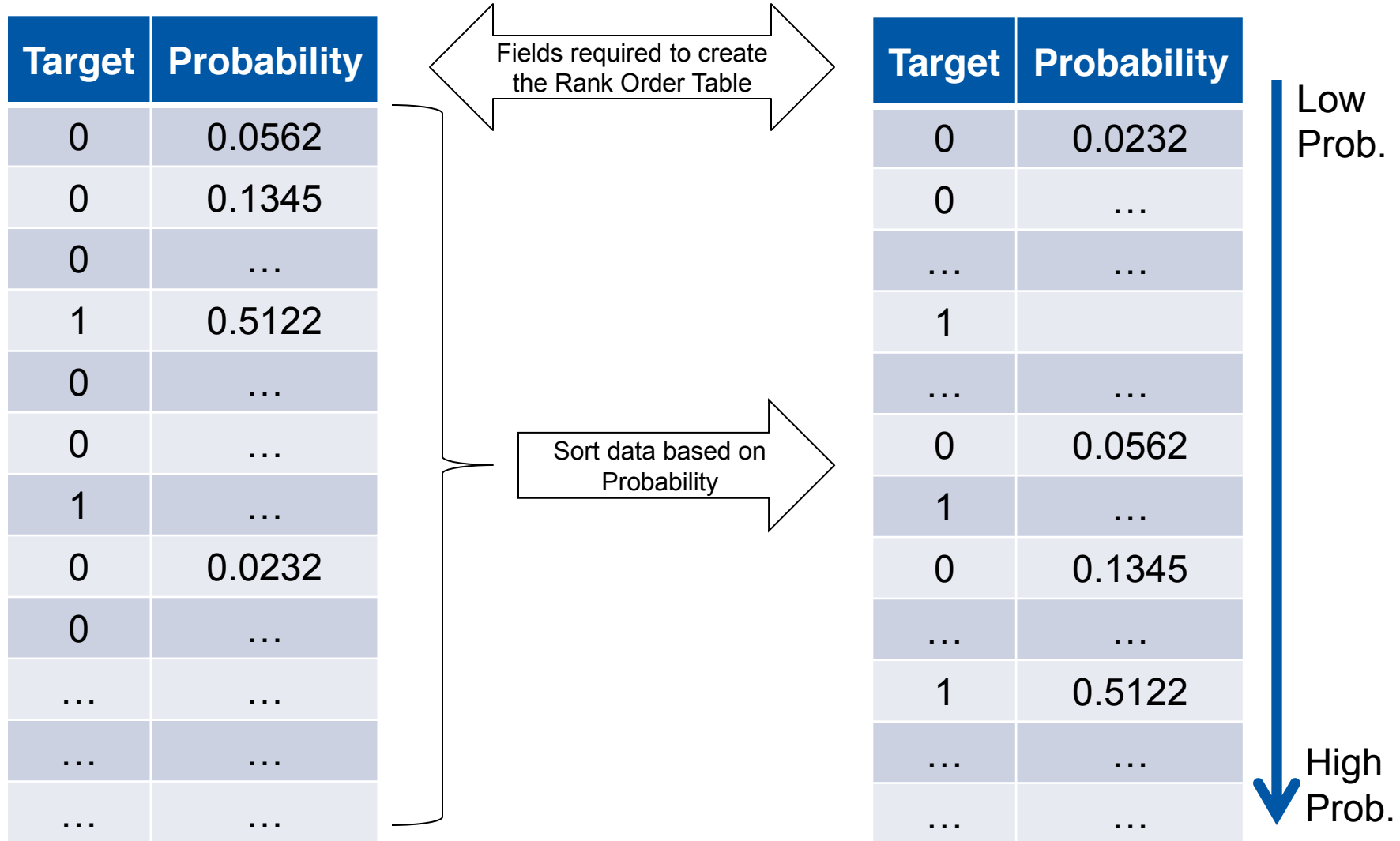
- Rank Ordering is often used as one of the key Model Performance Measure in Predictive Modeling
- Predictive Models e.g.
  - In Marketing, predictive models are used to predict the likelihood of customer responding to the marketing offer
  - In Risk, predictive model are used to predict the probability of default of the customer applying for loan
- Rank Ordering as model performance measures helps:
  - assess ability of the model to relatively rank the customers
  - see how well the model separates the Responder Class from the Non-Responder, or the Defaulters from Non-Defaulters and likewise Attriters from Non-Attriters
  - on an ongoing basis track the utility of the model

# How does the data look like?

ID	PV1	PV2	PV3	...	...	...	PVn	Target	Probability
1								0	0.0562
2								0	0.1345
.								0	...
.								1	0.5122
.								0	...
								0	...
n								1	...

<b>ID</b>	Unique Identifier for each row, e.g. Customer ID
<b>PV</b>	Predictor / Independent Variables
<b>Target</b>	Flag indicating whether the event occurred or not. E.g. - In case of marketing the 1's indicate customer responded to the offer and 0's indicate the customer did not respond to the offer
<b>Probability</b>	The probability score as computed based on the model. Let us assume that the probabilities given above are for customer responding to the marketing offer

# Rank Order Computation Steps I Sorting



# Rank Order Computation Steps I Deciling

Target	Probability	Decile
0	0.0232	1
0	...	1
...	...	...
1	...	...
...	...	2
0	0.0562	2
1	...	..
0	0.1345	...
...	...	...
1	0.5122	...
...	...	...
...	...	10

- Deciling is process of splitting the data into 10 buckets each having 10% of the observations

# Rank Order Computation Steps I Aggregations

Decile	Base_Cnt	Resp_Cnt
10	1,000	295
9	1,000	176
8	1,000	115
7	1,000	75
6	1,000	35
5	1,000	30
4	1,000	23
3	1,000	18
2	1,000	13
1	1,000	6
Total	10,000	787

- After Deciling, we aggregate the data based on Decile column
- Note: The table here is with some hypothetical numbers to explain the further calculations in Rank Ordering

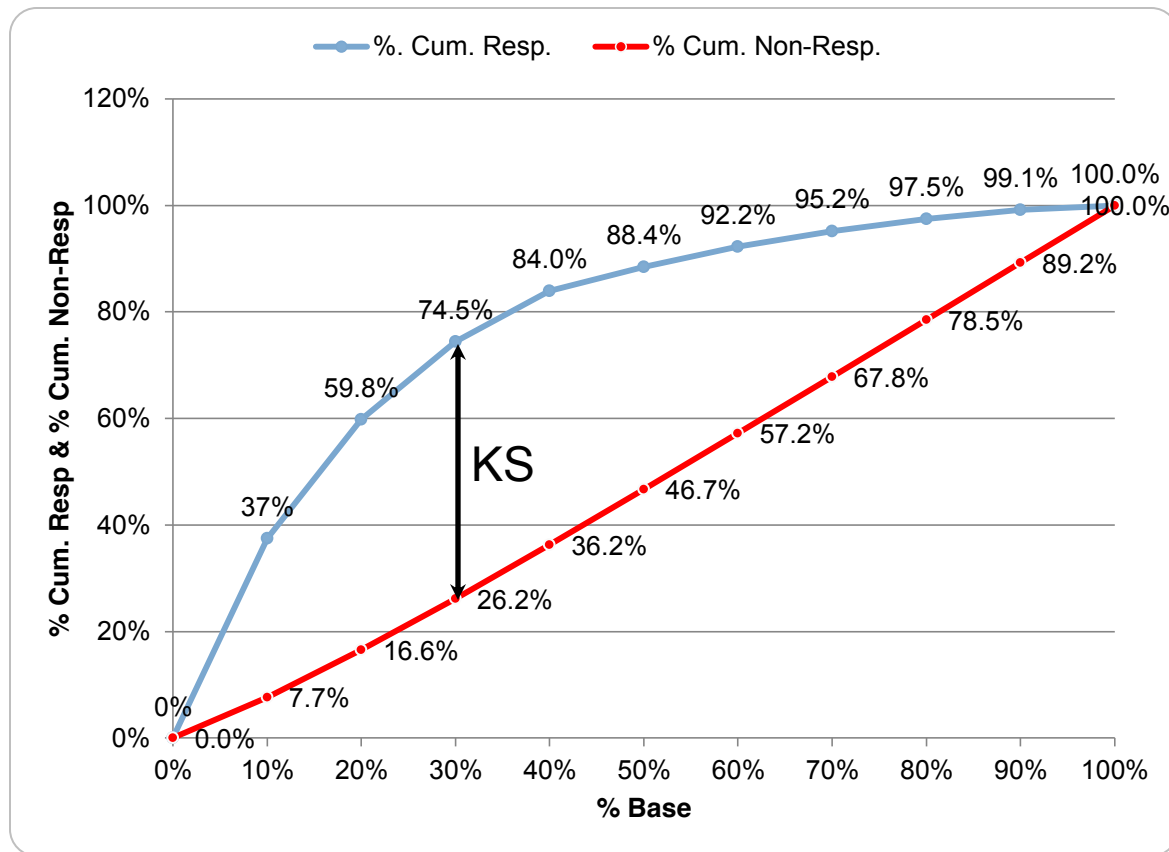
<b>Base_Cnt</b>	Count of Observations in each decile
<b>Resp_Cnt</b>	No of Observations with Target = 1. Here we are assuming these cases are responders and hence the name Resp_Cnt to indicate count of responders

# Rank Order Table Creation

Decile	Base Cnt	#Resp	# Non-Resp	% Resp. Rate	Cum. Base	Cum. Resp.	Cum. Non-Resp	%Cum. Base	%Cum. Resp.	%Cum. Non-Resp	KS
A	B	C	D = B - C	E = C / B	F	G	H	I	J	K	abs (J- K)
10	1,000	295	705	29.5%	1,000	295	705	10%	37.5%	7.7%	29.8%
9	1,000	176	824	17.6%	2,000	471	1,529	20%	59.8%	16.6%	43.3%
8	1,000	115	885	11.5%	3,000	586	2,414	30%	74.5%	26.2%	48.3%
7	1,000	75	925	7.5%	4,000	661	3,339	40%	84.0%	36.2%	47.7%
6	1,000	35	965	3.5%	5,000	696	4,304	50%	88.4%	46.7%	41.7%
5	1,000	30	970	3.0%	6,000	726	5,274	60%	92.2%	57.2%	35.0%
4	1,000	23	977	2.3%	7,000	749	6,251	70%	95.2%	67.8%	27.3%
3	1,000	18	982	1.8%	8,000	767	7,233	80%	97.5%	78.5%	19.0%
2	1,000	13	987	1.3%	9,000	780	8,220	90%	99.1%	89.2%	9.9%
1	1,000	6	993	0.7%	10,000	787	9,213	100%	100.0%	100.0%	0.0%
Total	10,000	787	9,213	7.9%	10,0000	787	9,213	100%	100.0%	100.0%	0.0%

# Rank Order Chart

%Cum. Base	%Cum. Resp.	%Cum. Non-Resp.
I	J	K
10%	37.5%	7.7%
20%	59.8%	16.6%
30%	74.5%	26.2%
40%	84.0%	36.2%
50%	88.4%	46.7%
60%	92.2%	57.2%
70%	95.2%	67.8%
80%	97.5%	78.5%
90%	99.1%	89.2%
100%	100.0%	100.0%
100%	100.0%	100.0%







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**Thank you**

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