Marketing Analytics
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Lecture 28
Pricing (Contd.)

Hello everybody, welcome to marketing analytics course, this is Doctor Swagato Chatterjee from VGSOM, IIT Kharagpur, who is taking this course for you and we are in week 5 and we are discussing about pricing. And in this particular video I will give a small case on price sales promotion and how sales promotion works, so let say.

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There is a problem that has been given here at the top there are three types of customers in the market who values a product 40 dollars, 50 dollars and 60 dollars and currently there are

270 customers distributed in this three groups equally. Now, every year 30 new customers come in each of this group.

And the product has 30 % chance of lasting for 1 year that means if you have bought in this year you will have a 30 % probably that you will buy in the next year again. And it has 70 % chance of buying in lasting 2 years that means you have 70 % chance that you will not buy in the next year but you will buy in the next to next year.

So then, the buyer set time period t + 1 you check this thing whatever written is, whoever was, whoever not bought in the last period why he did not buy because, they had a product which was still working. Now, it is still working at that time period that means that in the next time period we will definitely fail because, the time line is at max 2 years.

So, all the numbers at time period t and then all the buyers at, buyers - t, buyers at t - sales at t means I am interested to buy but, there I could not buy because of this price. Whoever was there in that group they will also become the buyer means potential buyer in time period t + 1.

And then those who bought in time period t 70 % of them actually yes, sorry so 30 % of them will buy actually in the next time period and 0.5 new so new customers whoever is coming 50 % of them might be buyers and how many whoever is non buyers, the non-buyers will be 0.5 × new and then 70 % of the guys who were bought because, this particular product has 30 % chance of lasting for 1 year and 70 % chance of lasting for 2 years.

So, this is something that is the function that I got, now in the first time period these 270 guys are actually distributed in to this 6 groups that means high group, medium group, and low group. And then buyer and non-buyer group. So, each of them absolutely evenly that means what we have 45, 45, 45.

So, if by chance the price was 1, I start with 1 individual single price that every time period the price code is 1, what is a corresponding price, so we look up 1 in this particular table 2 , false that means if this particular code becomes 2, this price will become 60 if this code becomes 3 this price becomes 80 right now I am keeping it as 1, so 40.

So, if this is 40 at these are the buyers then how much sales will happen, the high sales is = D14 that means whoever is, see whatever be the price here, the high buyers will always buy, because the willingness to pay is 80 rupees. Where the medium buyers will buy only if this

price is less than their willingness to pay so C14 if that is < E11 which is 60, then only the guys who are medium buyers will actually convert to sales otherwise not, otherwise 0.

Similarly, if that is lower than or = actually, not lower than, lower than is not possible because 1, 2, 3 other 3 options that we have so 40, 60, 80 are the three prices that we have, if the prices exactly = 40, these guys will buy otherwise not buy.

So, if by chance it becomes 2, you see these two guys buy but these guys do not buy. It becomes 3, these two guys do not buy or these guys buy. So, that is something that we have and the corresponding revenue, revenue is nothing but the summation of these 3 × the price. Now, if there is situation in the first time period where is the situation is in the second time period.

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Now, you think about the situation in second time period in second time period, whoever was non buyer will buy will has a chance of buying so, they might be the buyers + buyers at t - sales at t + 0.7 × sales at t + 0.5 × new and new I will put a F4 so, these are the buyers that I am getting.

Similarly, what is a case here, so I will quickly do for the medium buyers, medium buyers is non buyers + medium buyers - medium sales + 0.7 × medium sales + 0.5 × these thing for each group that comes that is why for each of them 0.5 × E7.

Similarly, how much for this one, quickly non buyers + low buyers - low sales + 0.7 × sales at t + 0.5 × the new buyers so, these are the people who are potentially buying time period 2, and belong to the low group. Now, who are the potentially non buyers, these guys are 0.5 × this and I will put a F4 here + 0.3 into the sales at t so, this one.

So, that is something that is common I will copy it and paste it here, copy it and paste here, and check for this one it is not L4 it should be K4, K14 and for these guys it should not be N14 it should be L14. Now, I have created this and I will drag it up, so I got, and by chance if this was my coding.

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Screenshot 1:

Row 1-3 (header text): There are three types of customers in the market who values a product $40, $50 and $60. Currenly there are 270 customers equally distributed in these 3 groups. Every year 30 new customers come in each group. The product has 30% chance of lasting 1 year and another 70% chance of lasting 2 years.

New 30

Why Have Sales?

Buyerst+1=Nonbuyerst+(buyerst-salest)+.7*salest+.5new
Nonbuyerst+1=.5New+.7Salest

totalrevenue

	Code	Price
	1	40
	2	60
	3	80

80 60 40

Period	Code	Price	High buyers	High nonbuyers	Medium buyers	Medium nonbuyers	Low buyers	Low nonbuyers	High sales	Medium sales	Low sales	Revenue
1	1	40	45	45	45	45	45	45	45	45	45	5400
2	1	40	91.5	28.5	91.5	28.5	91.5	28.5	91.5	91.5	91.5	
3	1	40	107.55	42.45	107.55	42.45	107.55	42.45	107.55	107.55	107.55	
4	1	40	132.735	47.265	132.735	47.265	132.735	47.265	132.735	132.735	132.735	
5	1	40	155.1795	54.8205	155.1795	54.8205	155.1795	54.8205	155.1795	155.1795	155.1795	
6	1	40	178.4462	61.55385	178.4462	61.55385	178.4462	61.55385	178.4462	178.4462	178.4462	
7	1	40	201.4662	68.53385	201.4662	68.53385	201.4662	68.533845	201.4662	201.4662	201.4662	
8	1	40	224.5602	75.43985	224.5602	75.43985	224.5602	75.439847	224.5602	224.5602	224.5602	
9	1	40	247.632	82.36805	247.632	82.36805	247.632	82.368046	247.632	247.632	247.632	

Screenshot 2:

market who values a product $40, $50 and $60. Currenly there are 270 customers ery year 30 new customers come in each group. The product has 30% chance of lasting 2 years.

30

Buyerst+1=Nonbuyerst+(buyerst-salest)+.7*salest+.5new
Nonbuyerst+1=.5New+.7Salest

Price								totalrevenue
40								=SUM(
60								
80				80	60	40		

High nonbuyers	Medium buyers	Medium nonbuyers	Low buyers	Low nonbuyers	High sales	Medium sales	Low sales	Revenue
45	45	45	45	45	45	45	45	5400
28.5	91.5	28.5	91.5	28.5	91.5	91.5	91.5	10980
42.45	107.55	42.45	107.55	42.45	107.55	107.55	107.55	12906
47.265	132.735	47.265	132.735	47.265	132.735	132.735	132.735	15928.2
54.8205	155.1795	54.8205	155.1795	54.8205	155.1795	155.1795	155.1795	18621.54
61.55385	178.4462	61.55385	178.4462	61.55385	178.4462	178.4462	178.4462	21413.538
68.53385	201.4662	68.53385	201.4662	68.533845	201.4662	201.4662	201.4662	24175.9386
75.43985	224.5602	75.43985	224.5602	75.439847	224.5602	224.5602	224.5602	26947.21842
82.36805	247.632	82.36805	247.632	82.368046	247.632	247.632	247.632	29715.83447

Screenshot 3:

High nonbuyers	Medium buyers	Medium nonbuyers	Low buyers	Low nonbuyers	High sales	Medium sales	Low sales	Revenue
45	45	45	45	45	45	45	45	5400
28.5	91.5	28.5	91.5	28.5	91.5	91.5	91.5	10980
42.45	107.55	42.45	107.55	42.45	107.55	107.55	107.55	12906
47.265	132.735	47.265	132.735	47.265	132.735	132.735	132.735	15928.2
54.8205	155.1795	54.8205	155.1795	54.8205	155.1795	155.1795	155.1795	18621.54
61.55385	178.4462	61.55385	178.4462	61.55385	178.4462	178.4462	178.4462	21413.538
68.53385	201.4662	68.53385	201.4662	68.533845	201.4662	201.4662	201.4662	24175.9386
75.43985	224.5602	75.43985	224.5602	75.439847	224.5602	224.5602	224.5602	26947.21842
82.36805	247.632	82.36805	247.632	82.368046	247.632	247.632	247.632	29715.83447
89.28959	270.7104	89.28959	270.7104	89.289586	270.7104	270.7104	270.7104	32485.24966
96.21312	293.7869	96.21312	293.7869	96.213124	293.7869	293.7869	293.7869	35254.4251
103.1361	316.8639	103.1361	316.8639	103.13606	316.8639	316.8639	316.8639	38023.67247
110.0592	339.9408	110.0592	339.9408	110.05918	339.9408	339.9408	339.9408	40792.89826
116.9822	363.0178	116.9822	363.0178	116.98225	363.0178	363.0178	363.0178	43562.13052
123.9053	386.0947	123.9053	386.0947	123.90533	386.0947	386.0947	386.0947	46331.36084
130.8284	409.1716	130.8284	409.1716	130.8284	409.1716	409.1716	409.1716	49100.59175
137.7515	432.2485	137.7515	432.2485	137.75148	432.2485	432.2485	432.2485	51869.82248
144.6746	455.3254	144.6746	455.3254	144.67456	455.3254	455.3254	455.3254	54639.05326
151.5976	478.4024	151.5976	478.4024	151.59763	478.4024	478.4024	478.4024	57408.28402
158.5207	501.4793	158.5207	501.4793	158.52071	501.4793	501.4793	501.4793	60177.51479

If I just drag it up then corresponding sales and etc everything get, details gets a populated and if I further populate the revenue, I get the total then what is a total revenue, the total revenue is nothing but the summation of all these revenue values.

So, I have taken up to a time period of 20 where you can take more than that as well, now if this is my situation then my job is to maximize this total revenue by changing what, by changing this pricing. And I am saying that this pricing codes are 1 2 or 3, either it will be high price or medium price or low price and I will try to maximize this.

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So, what do I do for that, I go to data I click on solver just check what we have written change maximize M10 by changing B14 to B30 see that means this particular column where B14 and B30 are between 1 and 3 and they are integers. And I am using evolutionary and I

am solving it so, it is quickly trying to solve it using evolutionary method and I will continue a little bit more because, it is giving me result very quickly and I will further continue it is still giving me very quickly and see what is the result coming up.

So, after some period of time I will. Now, the results will only vary based on the assumptions of the lifecycle of that particular product. If it is 2 years, instead of that if it is 1 years majorly 1 year, means 0.7 % 1 year and 30 % 2 year then only the whole table, things will change, otherwise you will get similar kind of result.

So, I have run for significant amount of time and I will probably stop or it will give you the result in another probably 1 minute but, I will not wait till 1 minute so, I will try to stop here, and if I stop here.

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You will see there is a classic case that is coming up in this particular place. So, in this particular place we focus on this part of the thing, now there is 2 1, 2 1, 2 1 so these 2 1 is a classic case what is I am saying that in 1 time period I will have low price in other time period I will have medium price. If you change this proportions that if it is 0.3 or 0.7 or something this 2 1, 2 1 guys will become 3 1, 3 1 guys.

So, all I am trying to say is this is a parodic sales promotion strategy that we generally, will see that there is 1 time period over the year sales promotion is given but, once it is given then, another 2 is or 1 month it is not given, again it comes back. So, now right now big billion day happens probably 2, 3 times in a year and that actually comes from this kind of a suggestion that you give here promotion, people buy and then you do not give a promotion.

And then you gain give a promotion people again buy and do not give a promotion so, in the non-promotion period majorly the high buyers buy and the promotion period is majorly where the low buyers buy, high buyers also buy but low buyers is something that you try to track.

So, this is also a classic sales promotion problem that is available in the market and we try to solve using this, so thank you very much for being with me in the pricing related problems we will try to solve the case study at the end of the semester probably end of this particular course some case studies which is also related to with pricing.

I will see what can be done on that but we have fairly different kinds of pricing strategies we have covered and from the next week we will talk about marketing mixed problems advertising, probably sales promotion how instead of only focusing on pricing how, demand and sales and etc might depend on all of these things.

And how you can allocate your resources in all of these things so that you get the maximum output is something that we will focus on, thank you very much for being with me and I will see you in the next video.