Faegan's Cafe Optimal Demand and Inventory

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FÆGANS
café - pub
An Eating & Drinking Establishment
SINCE 1978

Agenda

Intro

Problem Statement and Objective

Data Collection

Newsvendor Model

Decision Tree

Management Tools Used

Results

Problem statement and Objective

PROBLEM:

FAEGAN'S CAFE OFTEN LOSES MONEY ON FOOD ITEMS GONE BAD

OBJECTIVE:

EFFICIENT FOOD INVENTORY AND KNOW DEMAND

HOW TO BEST DELIVER FOOD?

Data Collection

Asked Manager which beer was preferred at Faegan’s, and demand for each day of the week.

Results

Bud Light is the most popular beer!

Newsvendor Model

Model characterized by fixed prices and uncertain demand for perishable products. Used to determine optimal inventory levels.

Determine the critical fractile = $\frac{MP}{ML + MP}$ for the problem

Construct a probability table and add a cumulative probability column

Keep increasing x as long as $F(x) < \frac{MP}{ML + MP}$

- MP = Marginal Profit
- ML = Marginal Loss

Bud Light Demand Information

Using Normal Distribution we used newsvendor model.

Daily demand range per day of week table:

Day of week	Demand
Monday	40-45
Tuesday	40-47
Wednesday	50-60
Thursday	80-92
Friday	100-115
Saturday	100-119
Sunday	70-80

Newsvendor Model Weekday

Product	Budlight						
Cost	$ 1.50		Selling Price	$ 3.75		Profit	$ 2.25
Critical Fractile		0.6					
Demand Range	**Probability**	**Cumulative Probability**					
40	0.01752830049	0.01752830049					
41	0.1295175957	0.1470458962					
42	0.3520653268	0.4991112229					
43	0.3520653268	0.8511765497					
44	0.1295175957	0.9806941454					
45	0.01752830049	0.9982224458					

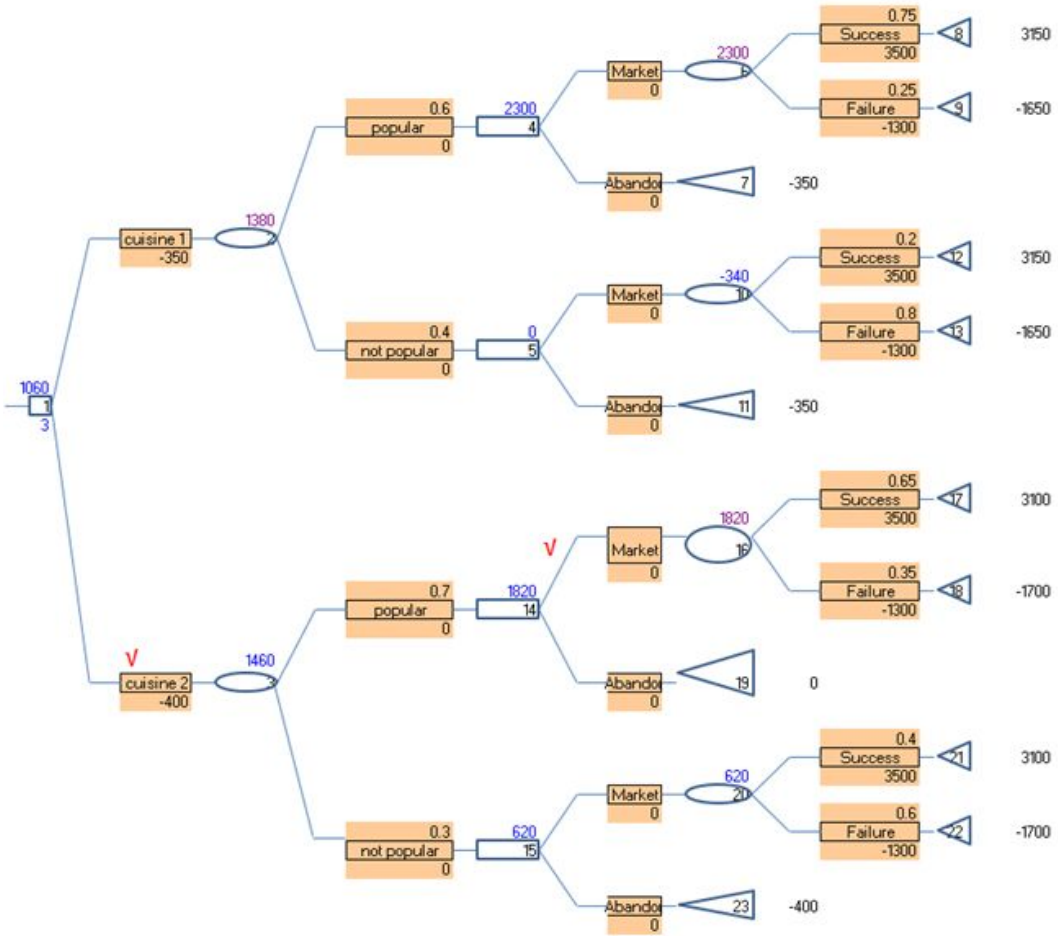
Newsvendor Model Weekend

Product	Budlight							
Cost	$ 1.50		Selling Price	$ 3.75		Profit	$ 2.25	
Critical Fractile		0.6						
Demand Range	**Probability**	**Cumulative Probability**						
100	0	0						
101	0	0						
102	0	0						
103	0	0						
104	0.00000000607588285	0.000000006085022624						
105	0.000001486719515	0.000001492804537						
106	0.0001338302258	0.0001353230303						
107	0.004431848412	0.004567171442						
108	0.05399096651	0.05855813796						
109	0.2419707245	0.3005288625						
110	0.3989422804	0.6994711429						
111	0.2419707245	0.9414418674						
112	0.05399096651	0.9954328339						
113	0.004431848412	0.9998646823						
114	0.0001338302258	0.9999985125						
115	0.000001486719515	0.9999999993						
116	0.00000000607588285	1.000000005						
117	0	1.000000005						
118	0	1.000000005						
119	0	1.000000005						
120	0	1.000000005						

Cusine Name	cost($)	P(popular)	P(not popular)	Success	Fail
broccoli cream soup	-350	0.6	0.4	3500	-1300
spicy beef burger	-500	0.7	0.3	5000	-2300

Cusine Name	P(success|popular)	P(fail|popular)	P(success|not popular)	P(fail|not popular)
broccoli cream soup	0.75	0.25	0.2	0.8
spicy beef burger	0.65	0.35	0.4	0.6

Decision Tree



Inventory Problem with Newsvendor Model

Applied mathematical newsvendor formula to determine optimal beer inventory.

Decision Tree without MS Tool:

Used MS QM to generate the tree and get the best decision.

Results

On weekday the optimal distribution is 43.

On Weekend the optimal distribution is 110.

Cafe should sell spicy beef burger.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