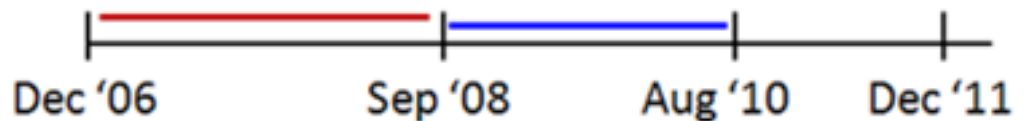

Life-Time Value Modeling of Big-ticket Items

Bruce Ratner PhD
DM STAT-1 CONSULTING
1 800 DM STAT-1 www.DMSTAT1.com



Objective



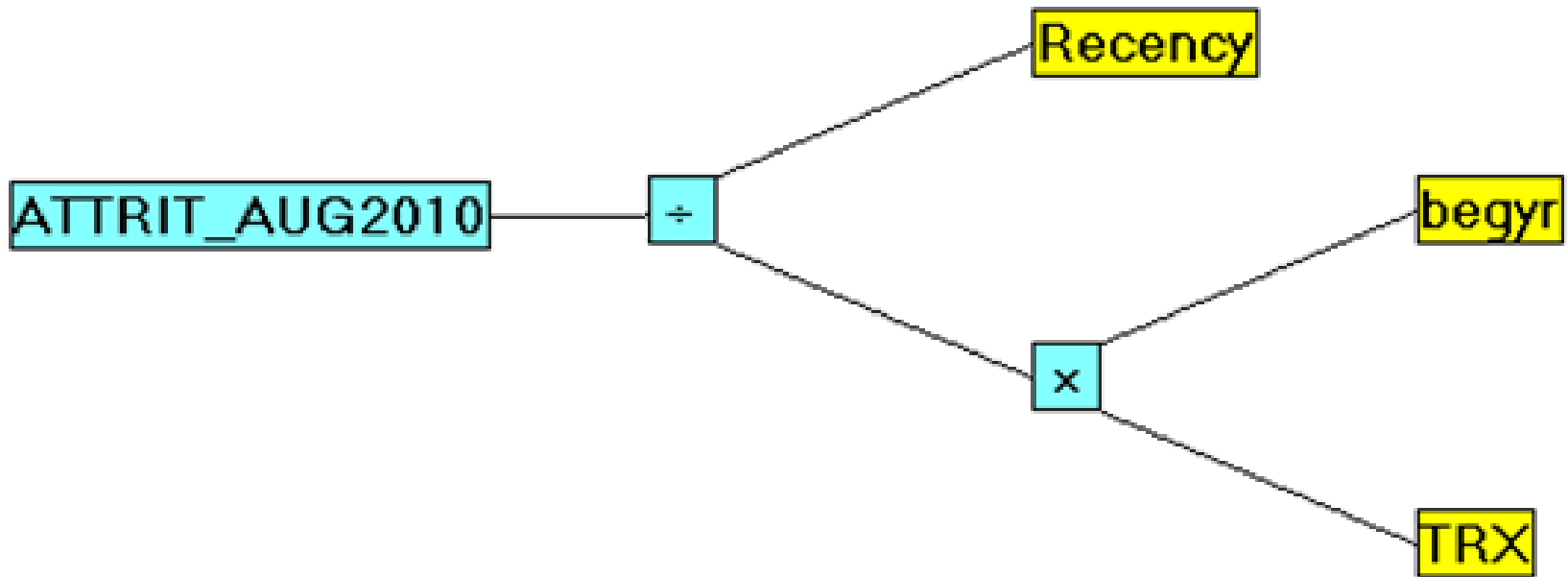
- To build a LTV5 Model based on sales transaction data from Dec., 2006 – Dec., 2011
- The window of Sep '08 – Aug '10 is for defining the ATTRITION and LTV5 variables
 - ATTRITION = 1 if there are no sales in the monthly window
 - = 0 if there is at least one sale in the mos wndw
 - LTV5 = $LTV2 * 2.5$ where $LTV2$ = total sales in the mos wndw
- In addition to monthly sales, which reflect few big-ticket items and many \$0s, the three basic variables are also put in play for machine-learning data mining (Predictors are defined in Dec '06 – Aug '08):
 1. REGENCY = last month in which a sale occurrence was observed for a rep.
 2. TRX = total number of monthly sales transactions observed
 3. BEGYR = first year in which a sales occurrence was observed

Identification of the Relationships that Define Attrition(=1-Retention) and LTV5

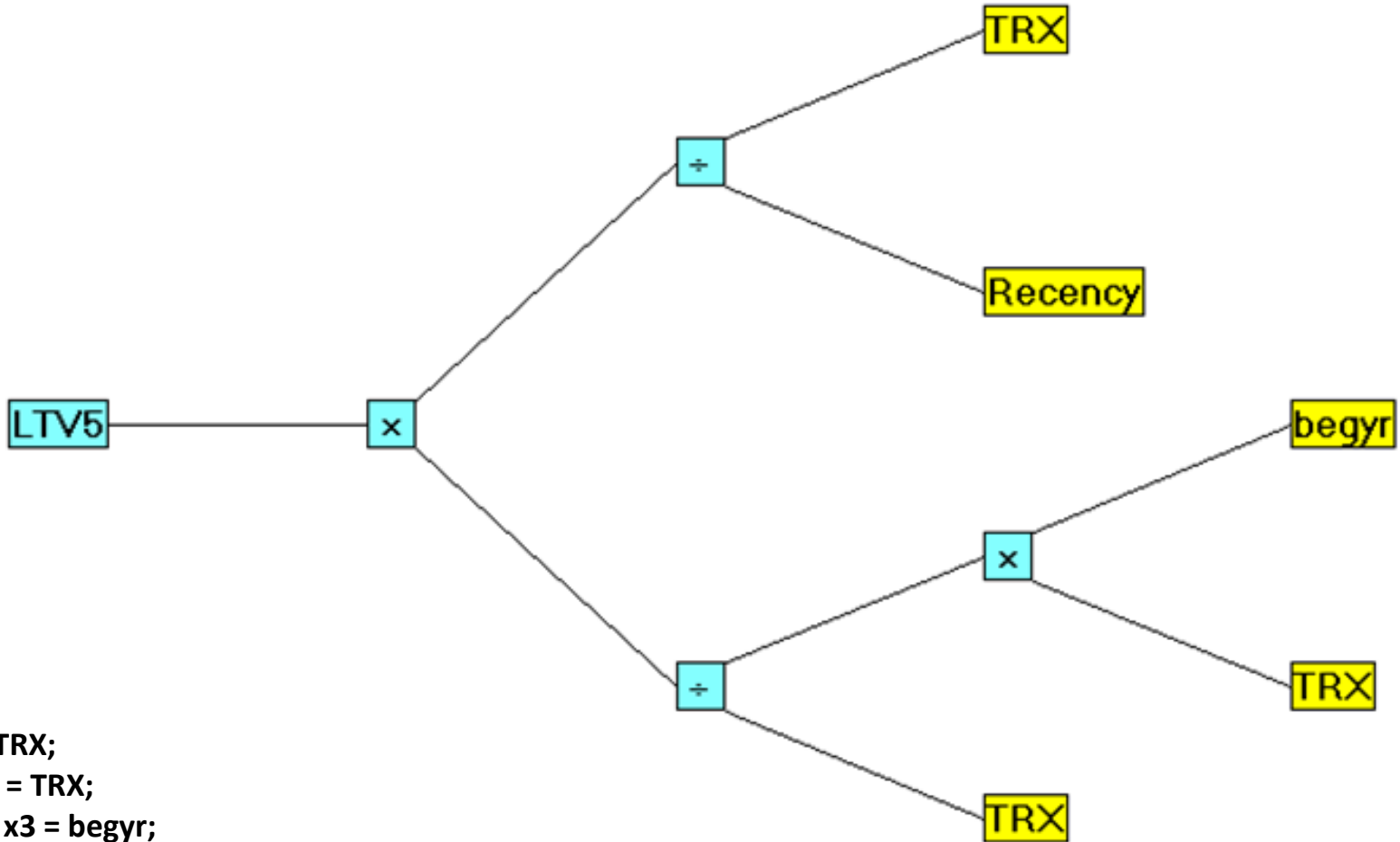
- Machine-learning data mining identifies surprising relationships

$$\text{ATTRITION_var} = \frac{\text{RECENCY}}{\text{TRX*BEGR}}$$

$$\text{LTV5_var} = \frac{\text{TRX*BEGR}}{\text{RECENCY}}$$



```
x1 = TRX;  
x2 = begyr;  
x1= x1 * x2;  
x2 = Recency;  
If x1 NE 0 Then x1 = x2 / x1; Else x1 = 1;  
GenIQvar = x1;  
GenIQ_ATTRITION_probability = 1 / (1 + Exp(-(-1.681222 + GenIQvar * 2.162148)));
```



```

x1 = TRX;
  x2 = TRX;
    x3 = begyr;
  x2 = x2 * x3;
  If x1 NE 0 Then x1 = x2 / x1; Else x1 = 1;
  x2 = Recency;
  x3 = TRX;
  If x2 NE 0 Then x2 = x3 / x2; Else x2 = 1;
  x1 = x1 * x2;
GenIQvar = x1;
GenIQ_Profit_estimate = 92985.88 + 10.44172 * GenIQvar;
  
```

Identification of the Relationships that Define Attrition(=1-Retention) and LTV5

- Estimating the vars, we have

$$\text{Logit_ATTRITION} = -3.8434 + (2.1622 * \text{ATTRITION_var})$$

$$\text{PROB_ATTRIT_est} = \exp(\text{Logit_ATTRITION}) / (1 + \exp(\text{Logit_ATTRITION}))$$

$$\text{LTV5_var} = (\text{TRX} * \text{BEGYR}) / \text{RECENCY}$$

$$\text{LTV5_estimate} = 92986 + (10.44172 * \text{LTV5_var})$$

Applying the attrition factor to the LTV5 score, and performing a decile analysis, I have:

PROB_RETENTION_X_LTV5_estimate

DECILE	NUMBER OF INDIVIDUALS	TOTAL LTV5_X_Prob_RETENTION	DECILE INDIVIDUALS LTV5_X_Prob_RETENTION	C U M INDIVIDUALS LTV5_X_Prob_RETENTION	C U M LIFT
top	314	\$232,710,018	\$741,115	\$741,115	250
2	314	\$213,618,166	\$680,313	\$710,714	240
3	314	\$163,741,817	\$521,471	\$647,633	219
4	315	\$104,534,666	\$331,856	\$568,500	192
5	314	\$65,088,053	\$207,287	\$496,303	168
6	314	\$43,271,710	\$137,808	\$436,586	147
7	315	\$32,566,870	\$103,387	\$388,878	131
8	314	\$25,824,931	\$82,245	\$350,579	118
9	314	\$24,618,194	\$78,402	\$320,359	108
bottom	314	\$24,618,194	\$78,402	\$296,178	100
	=====	=====			
	3,142	\$930,592,619			

Any Questions?

Please contact [me](#).

A handwritten signature in black ink that reads "Bruce". The signature is written in a cursive style with a large, looping initial 'B'.

Next Slide ...

Statistical and Machine-Learning Data Mining

Techniques for Better Predictive Modeling
and Analysis of Big Data

Second Edition



Bruce Ratner



Next Slide ...

תודה
Dankie Gracias
Спасибо شكراً
Merci Takk
Köszönjük Terima kasih
Grazie Dziekujemy Dēkojame
Děkujeme Vielen Dank Palies
Kiitos Tänne teie 谢谢
Thank You Tak
感謝您 Obrigado Teşekkür Ederiz
Σας Ευχαριστούμ 감사합니다
Бодхон
Bedankt Děkujeme vám
ありがとうございます
Tack