Customer Analytics

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April 5, 2020

Laplace's rule of succession

Just another answer
add one positive and one negative review to N reviews
$n/N \rightarrow (n+1)/(N+2)$

- 10 out of 10 $\rightarrow 11/12 = 92\%$
- 48 out of 50 $\rightarrow 49/52 = 94\%$
- 186 out of 200 $\rightarrow 187/202 = 93\%$

Bayesian Reviews I

1. **Set-up the model - Binomial dist**
   what to optimize? what's the model?
   P(+ve rev) = success rate = we don't know; e.g. take the review
   rating of 10/10, underline success rate could be 0.95 (assumption),
   choose a random num between 0 and 1, if ¡0.95 record positive rev
   else negative review. select 10 random numbers, there's a possibility
   to get 10/10 in some simulations
   WE DON'T KNOW P(+ve rev)
   Long run frequency???
   P(data|success rate) = to get this run simulations multiple times,
   assuming success rate; the resulting distribution will be Binomial from
   which you could get the %age

Bayesian Reviews II

$$P(48\checkmark, 2\times \,|\, s = 0.95) = \binom{50}{48}(0.95)^{48}(1 - 0.95)^2 = 0.26110$$
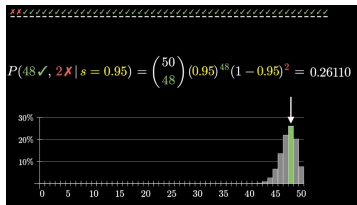
2. **Bayesian updating - PDF**
   P(success rate|data) = P(data|success rate) * P(success rate)

3. Analyse Model - Beta dist

Churn or Retention Analysis

Customer Retention Rate: The percentage of customers who repurchase in a given time period compared to an equal and preceding time period
Churn Rate: The inverse of Customer Retention Rate, or the percent of users who did not repurchase or whom you lost

proactive churns: losing customers due to cancellations
passive churn: failures to renew

Cohort Analysis and Life Time Value (LTV)

LTV: The expected amount of profit/revenue from a user

CLV = NPV (net present value) of the sum of all future revenues from a customer, minus all costs associated with that customer

Why LTV: - Tracking your LTV to Customer Acquisition Cost (CAC) ratio: Companies typically use the 3:1 CAC ratio or Cost Per Acquisition (CPA)

- Evaluating your most valuable marketing channels

- Focus on retaining your most valuable customers

Historic CLV: sum of the gross profit from all historic purchases for an individual customer

$$\text{Avg Order Value, AOV} = \frac{Revenue}{Orders} \quad ; \quad \text{Avg Purchase Rate} = \frac{Orders}{NumCustomers}$$

$$\text{Avg Customer Value} = \frac{AvgPurchaseVal}{AvgPurchaseRate}$$

$$\text{Avg Customer Lifespan} = \frac{SumCustomerLifespans}{NumCustomers} \quad \text{gives LTV}$$

$\text{LTV} =$	Avg Customer Value X Avg Customer Lifespan
	$\text{ARPU} \times \sum_{n=0}^{N}(1 - CR)^t$ .... [N=num months to examine]
	ARPU/CR_n ...[ARPU=Avg rev per User, for n months]
	$\text{ARPU}/CR_n \times \text{DR}$ .... [for variable churn & n months]
	$\text{ASP}/CR + m(1\text{-}CR)/CR^2$ ... [for account expansion]
$\text{CLV} =$	$\text{AGM} \times \sum_{0}^{numTransactions} Transaction$ [AGM=Avg Gross Margin]
	$((T_{avg} x AOV)\text{AGM})\text{ALT} =\text{GML}$(gross margin per user lifespan)
	$\text{GML}(R/(1+D\text{-}R))$; [account expansion]

CR=Churn rate; ASP=Avg Selling Price; m=↑ARPU/user/month;
T_avg = avg monthly transactions; ALT=avg User Lifespan (in months)
D=monthly discount rate; R=monthly retention rate; DR=Discount Rate to
adjusts for mix churn (Annual Renewals, Constant, Declining and Cliff patterns)

Steps to LTV:

- Normalizing to Acquisition Date: Bin users into buckets like Day 0, Day 1, Day 2 or Week 0, Week 1, Week 2, and so on.
- Normalized to a Closed Time Limit: Broader questions "What is my total CLTV," should be replaced with "What is our 3-year or 5-year LTV?" & should be based on:
  1. Average Customer Lifespan
  2. Customer Retention Rate
  3. Churn Rate: The inverse of Customer Retention Rate.
  4. Time to General Profitability Against Acquisition Costs: If your business is a "Loss Leader" Model this time may be a longer length than businesses with lower acquisition costs and lower profitability.
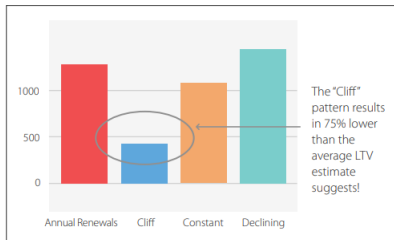 5. Rate of Discount

Types of churn and LTV

- Annual Renewals: larger churn at each contract renewal.
- Cliff churn: majority of the churn within the first month, and then a small constant churn thereafter.
- Constant: steady, constant churn rate (shown as 3.5%).
- Declining: churn rate starts at zero, increases each month.
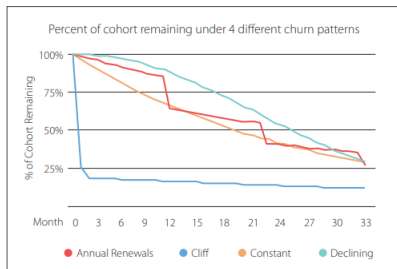
Box Cox...

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Types

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The Kaplan-Meier curve

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The log-rank test

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Cox proportional hazards regression

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Parametric models

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Frailty models

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Competing risk models

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Discrete Time Model using logistic regression

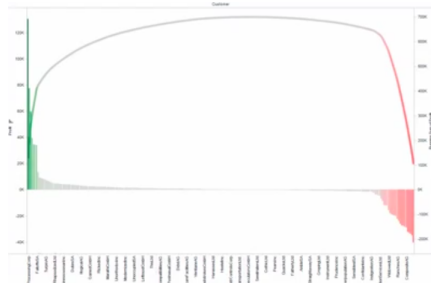content...

Social Network Analysis

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Whale Curve Analysis

Technique to visualize the data
Sort the data before plotting
Pareto Principle: for many events, roughly 80% of the effects come from
20% of the causes

Production Possibility Curve

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"Loss Leader" Model

"Loss Leader" Model, where you introduce new customers at a high cost in the hope of building a customer base or securing future revenue?

Market Basket Analysis

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Propensity of Cross-sell

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Thank You!