

Customer Analytics

Saumya Bhatnagar

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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

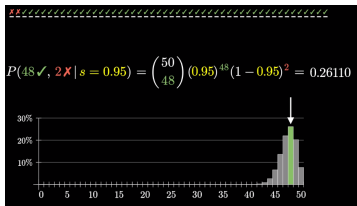
what to optimize? what's the model?

$P(+ve\ rev) = \text{success rate} = \text{we don't know}$; 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 $j < 0.95$ 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???

$P(\text{data} | \text{success rate}) = \text{to get this run simulations multiple times, assuming success rate; the resulting distribution will be Binomial from which you could get the \%age}$

Bayesian Reviews II



2. Bayesian updating - PDF

$$P(\text{success rate} | \text{data}) = P(\text{data} | \text{success rate}) * P(\text{success rate})$$

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

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

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

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

$$\text{Avg Customer Value} \times \text{Avg Customer Lifespan}$$

$$\text{LTV} = \text{ARPU} \times \sum_{n=0}^N (1 - \text{CR})^t \dots \quad [N = \text{num months to examine}]$$

$$\text{ARPU} / \text{CR}_n \dots [\text{ARPU} = \text{Avg rev per User, for } n \text{ months}]$$

$$\text{ARPU} / \text{CR}_n \times \text{DR} \dots \dots \dots [\text{for variable churn \& } n \text{ months}]$$

$$\text{ASP} / \text{CR} + m(1 - \text{CR}) / \text{CR}^2 \dots [\text{for account expansion}]$$

$$\text{CLV} = \text{AGM} \times \sum_0^{\text{numTransactions}} \text{Transaction} \quad [\text{AGM} = \text{Avg Gross Margin}]$$

$$((T_{\text{avg}} \times \text{AOV}) \text{AGM}) \text{ALT} = \text{GML} (\text{gross margin per user lifespan})$$

$$\text{GML} (R / (1 + D - R)); [\text{account expansion}]$$

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

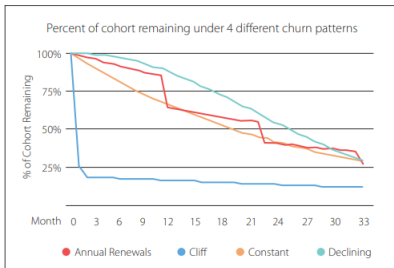
to adjusts for mix churn (Annual Renewals, Constant, Declining and Cliff

Steps to LTV:

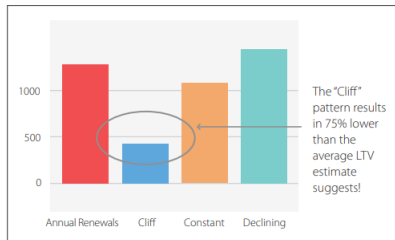
- ▶ Normalizing to Acquisition Date: Bin users into buckets like Day 0, Day 1, Day 2 or Week 0, Week 1, Week 2, and so on.
- ▶ Normalized to a Closed Time Limit: Broader questions “What is my total CLTV,” should be replaced with “What is our 3-year or 5-year LTV?” & should be based on:
 1. Average Customer 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.



Effect on LTV:



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Types

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The Kaplan-Meier curve

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Cox proportional hazards regression

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Frailty models

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Discrete Time Model using logistic regression

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Social Network Analysis

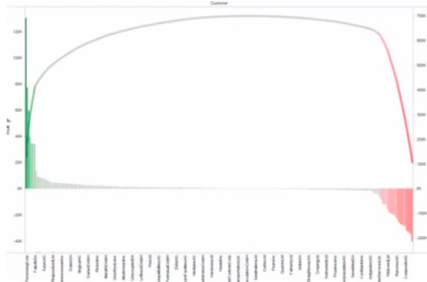
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Whale Curve Analysis

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



Diminishing Marginal Utility

"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!