



2018

Amazon E-Commerce Dormant User Activation

Presenter: Jijun Du

Content:

- 01 Situation, Key Question, and Plan
- 02 Project Workflow
- 03 Prediction for Targets
- 04 Next Step





Key Question: How to Increase Revenue by 10% in Next Year?



SITUATION

E-commerce business started from Jan'15, selling products divided into tangible goods and digital goods



COMPLICATION

Revenue grew steadily but increased slowly recently



KEY QUESTION

How to increase revenue given historical data?



Project Goal: Target and Predict the Most Profitable Customer to Increase Revenue



Key Focus

- Recognize the most profitable customer group
- Predict the repurchase ones within target group



Data Source

- Daily transaction data from Jan'15 to May'17
- Product and category data
- Customer demographic data



Step 1 Analysis: Business Model?



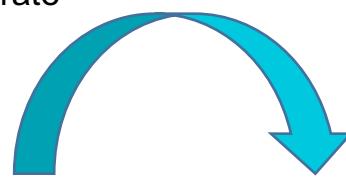


Brain storming: revenue generation methods?

Website Design for E-commerce

Top funnel: Bring traffic to E-commerce Business page

- Utilize SEO and SEM to increase reach, impressions and click through rate (Ratios in E-commerce)
- Lower cost per thousand impressions and cost per click-through



Middle Funnel: Keep visitors on the page and help them make purchasing decisions

- A/B test call-to-action buttons, promotion efforts, cross merchandising and reminders
- Product / category exploration and add-to-cart action, help generate more leads.
- Increase sales per order and generate more account sign-ups for new customers.

Strategy for more visitors

Returning Customer

Lower funnel: Close the deal smoothly and maintain customer relationship.



Hypothesis: Increase returning customers.

The screenshot shows a news article from business.com. The title is "Returning Customers Spend 67% More Than New Customers - Keep Your Customers Coming Back with a Recurring Revenue Sales Model". Below the title, it says "BY MARKET EXPERT" and "Business.com / Sales / Last Modified: February 22, 2017". There are social sharing icons for LinkedIn, Facebook, Twitter, and Google+. On the left side of the main content area, there's a graphic of red blocks spelling out "CUSTOMER LOYALTY" and "LOYALTY MY CUSTOMER". The main text of the article includes a quote: "It's common business knowledge that it's cheaper to retain a current customer than it is to attract a new one. A great way to retain..." followed by "It's common business knowledge that it's cheaper to retain a current customer than it is to attract a new one." and "Acquiring new customers costs 5 to 10 times more than selling to a current customer - and current customers spend 67% more on average than those who are new to your business (Inc). ([Tweet this stat!](#))". The article concludes with "That's why companies focus on great customer service - to keep their current".

Reason: returning customers are one of the most valuable resource in E-commerce company.

- Bring new customers
- More acceptance rate to new launch products
- More predictable cashflow

Approach~ Marketing program to Activate dormant users

- Special sales (Not Black Friday)
- Refer – coupon

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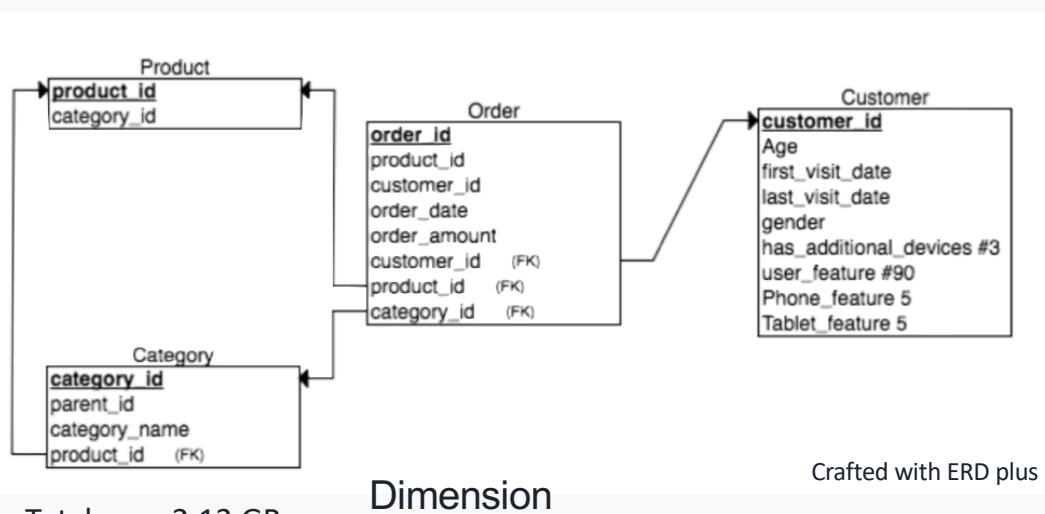
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Data exploration

Relational Schema



Total: 2.13 GB

Customer: 1.37 G

Order: 0.47 G

Product: 0.28 G

Category: 10 kb



Identify who are the dormant users

Frequency

Identify key customer group

Regular Buyers

Constant buyers, but non-value customers

Loyal Customers

Most valuable customers, Constantly generate revenue, part of **brand value**

One time buyer

No need for extra spending

Big Fish

Forget our website but make huge purchases

Turn the big fish
to
loyal customers!

Value





Feature generation: the ‘Target group’ customers

Month 1-3

“Base”

Users who have make purchases in our store.

Month 7-9

“Training Data”

Design features for selected data.

Month 4-6

Dormant_3_month

Stay dormant for three months without any purchase.

To the Bright future

Then What?

Send relevant promotion code or recommended products through email campaign

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Use Machine Learning to Beat Benchmark

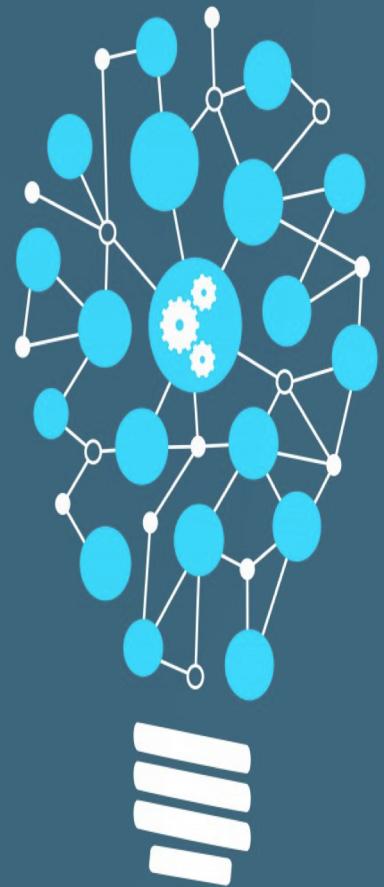
Benchmark:

Randomly pick a subset of users to target our marketing campaigns. The chances to have buyers in the picked group is around 8%, same as the organic buyer ratio.

Why? ML reduce the precision – recall curve

- Recognize underlying patterns for our datasets.
- Model make self adjustments for unsupervised data (90 in total)
- Adjustable with varies purposes.

MACHINE LEARNING



Machine learning process



Feature Extraction



Training



Prediction

- Retrieve data of interest

- Generate useful variables for building models.

- Train Models based on Random forest, [Lasso](#) and ridge regression, SVM
- Test its accuracy with test dataset

- Achieve 14.5% accuracy, We have improve the program efficiency by approximate 80%.

- Expected improvement of 80%

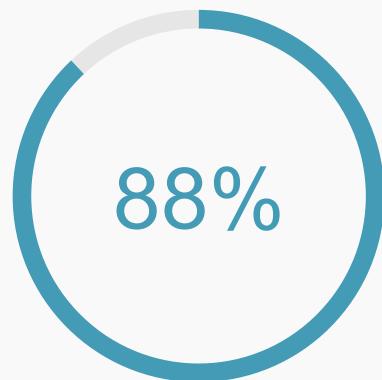
Model Comparison

RF: (200 subtrees and 6 layers)

Model name	Average Run time (in minutes)	Accuracy	Percentage improvement
Random Forest	2.5	14.60%	82.50%
Lasso Regression	3.5	14.16%	77%
Ridge Regression	6	14.28%	78.5%
Neural Network	Non		



Prediction Performance and Business Impact

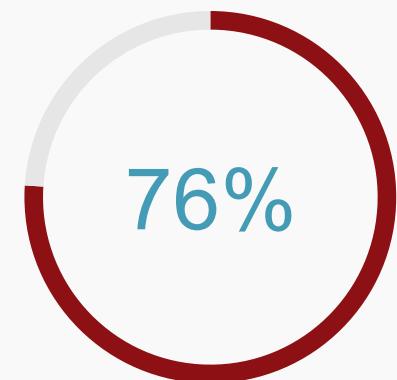


RF Model Accuracy

Impact

Acquire Revenue By Prediction:
1,738,959

Acquire Revenue By Random Choose: 988,045

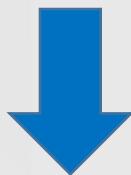


Revenue Increase

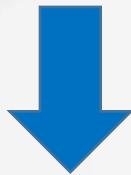


Next Step: Reactive Predicted Repurchase Customer with Limited Marketing Resource

Target List of customers



Launch different marketing campaign



1. Special discount
2. Membership discount
3. Refer code for new users

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Further I can do

Before implementation

Time Dimension

- Training data range.
- Testing data range.



Higher Accuracy

- Better model available
- Feature engineering



After implementation

Communication

- Email campaign
- Video Ads
- Discount based on recommendation



Others

- Different target group
- New market etc.

