RECOMMENDING INSURANCE RIDERS

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Harel Insurance
Recommender Systems

New For You:

Sid Meier's Civilization V
2K Games
Windows
$49.99
Fix this recommendation

See more

Recommended

Clinton pushes extended West Bank construction moratorium
From Elise Labott, CNN
September 16, 2010 — Updated 2135 GMT (0535 HKT)

We recommend
- In Middle East talks, core issues now on the table
- U.S. envoy in Israel amid settlement dispute
- Pakistan al Qaeda's No.2 man says in statement
- Obama, Netanyahu prepare for meeting

Most Popular
- US: Government will not contribute to detained American's bail money
- Lawyer: Iran stoning woman has been whipped
- A kiss, a Rolls, a snake dancer: The Middle East through its own lens
- Nanny who saved Israeli boy during Mumbai attack honored in Israel
Typical Recommender System Issues: Big Data Problems

• Millions of users (Amazon, NetFlix, CNN)

• 10K-1M Items
  • Stories
  • Movies
  • Books, Electronics

• Low latency is crucial
...But Not Always

- In this talk we tackle a different RecSys problem
  - Small item set
  - No need for rapid response

- So why is it still interesting?
Call Centers

- Communication channel between customers and companies
  - Cell phone market
  - Insurance
  - …

- Focus here on outbound call centers
  - Goal is to increase sales
  - Representatives call (potential) customers
  - Need to offer clients attractive deals
Call Centers

- Representatives must offer attractive deals
  - There are many deals
  - Representatives offer only one “best offer” for everybody
  - In some cases there is a mapping from population groups to deals
    - Young people
    - Small/Medium/Large business owners
  - More accurate personalization requires experts

- Representatives are non-professionals (e.g. students)
  - Call center is designed to reduce costs
  - High exchange rate
  - For difficult domains, not knowledgeable
  - We cannot expect the representatives to offer appropriate deals to specific customers

- Possible solution – recommender systems
  - Recommend to representative items to be suggested to customers
Insurance Riders

• Base insurance policies
  • For a specific goal
  • Atomic

• Insurance riders
  • Customization of policies
  • Addendum to policies

• Sold by experts (insurance agents)
  • Companies use call centers to avoid agent fees
Insurance Riders

• The number of riders is relatively low
  • 64 in our Harel dataset

• Riders are complex
  • Various properties
  • Properties are hard to understand
  • Constrained – mutually exclusive
  • Typical customers need some time to understand a rider
  • Difficult for a customer to know whether a rider is appropriate for her

• Result:
  • Customers will not consider all riders
  • They will consider only riders suggested to them directly
Recommending Insurance Riders

• Goal: offer existing clients additional riders

• Method:
  • Show customer specific recommendations to the representative
  • Representative calls clients to suggest recommended riders

• Collaborative Filtering:
  • Use existing data on customer behavior
  • Compute personal recommendations
  • “People who buy rider X also buy rider Y”
## Comparing Insurance to Standard RecSys Applications

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<tr>
<th></th>
<th>Movies</th>
<th>Books</th>
<th>News</th>
<th>Gadgets</th>
<th>Vacations</th>
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<td>Very high</td>
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</table>
Experimental Evaluation

- Conducted with collaboration with Harel
- Dataset collected during 2010, Q4
- 30,000 customers
- 13 base policies (health only in this dataset)
- 64 riders
- 73,565 transactions
  - Insurance agents
  - Call-center
  - Other channels
Offline Experiments

• Task: recommend new riders given existing policy

• Simple item-item technique

• Conditional probability
  • \( pr(i|j) = \frac{\text{count}(i,j)}{\text{count}(j)} \)

• Given a customer \( u \) with several riders and base policies
  • \( pr(r|u) = \max_{i \in u} pr(r|i) \)

• Split data into train-test
  • 75% train data
  • Compute conditional probabilities on train data
  • Compute recommendation accuracy (precision-recall) on test data
Results – Precision-Recall
Recommendation list length from 1 to 6

- Observation – only 16% purchase more than 3 riders
- It is difficult to offer more than 2-3 good riders
- We can allow the algorithm to decide when to stop recommending
  - When probability of purchase drops below 0.5
Online Experiment

- Given the encouraging results ➔ an experiment with real customers
  - Run within Harel insurance company call-center
  - Outbound call-center
  - Calling existing customers to sell additional riders

- Several call-center representatives participated in the experiment
  - Each representative got a list of customers to call
  - We precomputed a list of recommended riders for each customer
  - List computed using the Truncated CP method
  - Representatives called and offered customers the riders
  - Experiment length was about 3 weeks

- The rest of the representatives used the regular method

- Sales following recommendations were about 3 times higher than using the regular suggestions!
Summary

• Recommendation systems can be helpful in call-centers

• Different properties than standard RecSys applications

• We show a value in an Insurance call center
  • Very simple CF technique
  • Recommending to the representative, not the customer
  • Encouraging results in an offline study
  • Good results in a small scale online experiment
Future Work

• An extended online experiment is needed

• Our dataset is very biased
  • Many existing sales are based on “special offers”
  • Some insurance agencies tend to sell specific packages
  • Packages for large organizations

• We would like to collect more unbiased data
THANK YOU

We thank Harel Insurance for the extensive help with this work