Final Class Project

“Coupon Optimization”

Course: Machine Learning in Marketing

Due date: ***TBD***

In homework 03 you helped Dr. S to build a recommender system for one of his small grocery stores on the basis of the grocery store’s loyalty card program. After the successful implementation of the recommender system prototype, Dr. S would like to start differentiating prices by offering personalized discounts.

Dr. S distributed random coupons (random product and discount selection) over the last couple of months so you are able to use these data to infer shoppers’ price sensitivities. The basket data and coupon assignments are available on Moodle - Final Class Project:

`baskets.parquet`	Customers’ past purchases (week, shopper, product, price in Euro Cents) for weeks 0 to 89.
`actions.parquet`	Coupons customers received in the past (week, shopper, product, discount in percent) for weeks 0 to 89.
`coupon_index.parquet`	See below.

The file `coupon_index.parquet` serves as input for producing personalized coupons. For every shopper, select five products to be promoted. The benchmarking will focus on 2,000 shoppers and you need to provide five coupons per shopper, so the output should contain 10,000 observations. You can assign discounts of 15%, 20%, 25% or 30%. Dr. S will distribute your suggested coupons to shoppers. Success is determined by measuring revenue in week 90. In addition, Dr. S will calculate coupon conversion rates.

shopper	week	coupon	product	discount
1	90	1	?	?
...	...	...	...	...
1	90	5	?	?
2	90	1	?	?
...	...	...	...	...
2	90	5	?	?
3	90	1	?	?
...	...	...	...	...

APPROACH

In developing your approach, consider the following questions:

1. What is the business goal?
2. How can you formalize the business problem?
3. How are marketing managers addressing this goal today? What are shortcomings of existing solutions?
4. How can you use machine learning to tackle the problem? What components are required for the project's pipeline?
5. How can you evaluate your solution offline?
6. What are meaningful reference solutions?
7. What are limitations of your approach? What are possible future extensions?

In tackling the final class project, follow the KISS principle (i.e., *keep it simple, stupid*). Your success (and the grade) in the final class project is not determined by the level of sophistication of your implementation but by excellence in execution.

SUBMISSION

Your submission must include the following three parts:

1. A written report (7-10 pages including figures and tables) that summarizes the goal, your approach, and your results. You can provide additional necessary information in a short appendix. Closely follow the outline presented in the Presentation and Report Guidelines.
2. The code that produced your results. The code package must contain a readme that contains all necessary steps to set up the project. The readme must also contain instructions for executing the code.
3. The coupon assignments for 2,000 shoppers (see `coupon_index.parquet`).

Upload all materials as a zip archive to Moodle (Final Class Project) by 17:00, ***TBD***.

GRADING

The final class project replaces the written exam so uploading the solution before the deadline is required for passing the exam. Your submission is graded as a whole, and grades are based on the

1. quality of your report (structure, approach, exposition),
2. the quality of your code (structure, documentation, usability), and
3. the performance of your solution in the benchmark.

All the best :)