HSE and University of London Double Degree Programme in Data Science and Business Analytics

Statistical Methods for Market Researh, 2023-2024

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Class 10: A/B Summary

Task 1

Consider the following table:

	Age	
Desire to travel abroad	Under **45**	**45** or older
Yes	50%	50%
No	50%	50%
Column totals	100%	100%
Number of participants	500	500

(a) Is there significant association between variables?

(b) Measure the strength of association.

Let's introduced gender as the third variable.

	Gender			
	Male age		Female age	
Desire to travel abroad	Under **45**	**45** or older	Under **45**	**45** or older
Yes	60%	40%	35%	65%
No	40%	60%	65%	35%
Column totals	100%	100%	100%	100%
Number of participants	300	300	200	200

(c) Is there significant association between variables within the subgroups?

(d) Measure the strength of association.

(e) Calculate Pearson residuals for Female under 45.

Task 2

(a) What problems may occur when conducting A/B tests?

(b) Explain the difference between A/A, A/B and A/A/B tests

Let

– A, C, E – groups for which the machine learning model predicted 1.

– B, D, F – groups for which the machine learning model predicted 0.

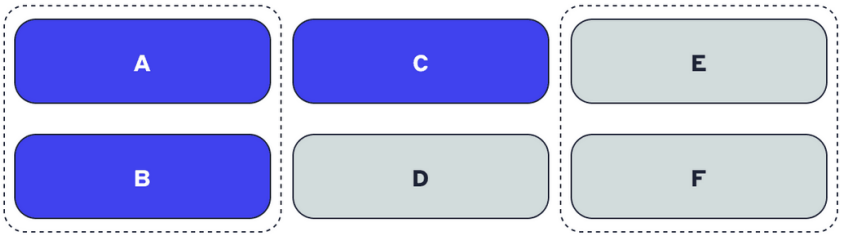

Figure 1:

– Blue – Treatment group

– Gray – Control group

(c) What comparing A-B or E-F does?

(d) What does comparing - or D-F does?

Task 3 Case Study 1: Improving Customer Engagement

Uber Eats Customer Relationship Management (CRM) team in Europe, the Middle East, and Africa (EMEA) launched an email campaign to encourage order momentum early in the customer life cycle.

Goal: Looking for best subject line in the email among 10 candidates via MAB methods

The experimenters plan to run a campaign with ten different email subject lines and find out the best subject line in terms of the open rate and the number of open emails.

Topic: The Marketing CRM team in EMEA wanted to test a large number of email subject lines.

Business Problem: Uber Eats EMEA team designed new email campaign and hoped to know which subject line had the highest open rate. The team had a large number of candidates and thus it was a better use case for MAB than for *AB* tests to test the candidates.

Modeling Component: Building Thompson sampling algorithm to dynamically change the allocation of treatment groups to quickly find the best treatment group.

Impact:

CRM teams from all regions as well as Finance teams started to use MAB.

The engineering team starts to improve the existing infrastructure to adopt continuous experiments.

(a) What are sequential experiment design? What are two competing goals?

(b) How bandits help optimize email campaigns and enhance rider engagement?