BCG Gamma - Data Science challenge

Instructions and policy

Campus Data Challenge

The challenge

- Several schools have been invited to prepare a case and present their results.

- Act as a data scientist and explain your technical solution and business recommandation to the client, represented by the BCG Gamma jury.

- Prepare a model and present your solution in teams (in French language, max 10 minutes of presentation, 5 minutes for Q&A).

Note: it is absolutely crucial that you respect the timeframe given to avoid delay throughout the entire event

Prize

- BCG Gamma Jury will determine the winning teams!

- The jury of 4/5 will select the 3 best solutions and announce the reward.

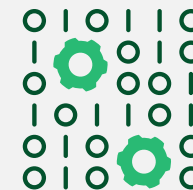- The top 3 will receive a prize.

Guidelines

Why participating ?

You will have the occasion to work on different themes:
- Data manipulation
- Feature engineering
- Predictive algorithms
- Solution application

And also:
- Networking with other schools' students and BCG Gamma Data Scientists
- Discussion with recruiting

Preparation

- You have two weeks to prepare your solution: code, model, PowerPoint presentation
- You are free to choose the number of slides, mind the time limit of 10 minutes per group
- Prepare your data analysis and business insights extracted from the data
- Decribe your model and justify your technical choices
- Demonstrate the impact of your solution on the company's strategy

Details
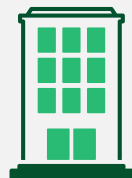
When & Where

November 10th, 2018
Arrival between 8:30 and 9am

The Boston Consulting Group
24-26 rue Saint Dominique
75007 Paris
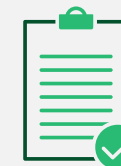
Logistics details will be
shared later.

D-Day

Time for passage will be
disclosed upon arrival

Tentative schedule (subject to
changes)
8:30 – 9:00 arrival & breakfast
9:00 – 9:15 welcome speech
9:15 – 12:30 case presentations
12:15 – 12:35 deliberation
12:35 – 12:45 verdict announced
12:45 – 13:45 lunch & networking

Your to do

Send your presentation deck +
code to
fremont.emeline@bcg.com
by November 9th, before 6pm

Format: both PDF &
Powerpoint for the
presentation + your code

Title of your documents:
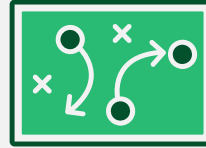Team lead name & first name

The case

The client

CareCo a private health insurance in the French market.

The mission

Recommend a strategy to contain health expenses of CareCo's clients.

How and where CareCo should invest its 10M € budget for preventive healthcare?

Materials

A comprehensive database detailing public heath expenses.

A description of CareCo's clients database.

The dataset : open damir

Description

- All health expenses reimbursed by the public health insurance in the French territory

- 9 years of transactions

- High volume dataset (55 variables, 5 go by month)

- Available at : ameli.fr (see slide 11 for details)

Core variables

- Level of reimbursement

- Year and month of care

- Type of transaction

- Medical specialty of prescriber/performer

- Sex, age and region of residence of the insured

Rules and guidelines

Mandatory actions

- Forecast health expenses by region and by categories for year 2020 and evaluate the accuracy of your predictions.

- Use those predictions to recommend strategy and actions to contain health expenses of CareCo's clients.

- Optimize the related levels of investments.

Advice

- Think about the granularity of your model.

- Think about visualisation tools that could be derived from your predictions.

Warnings

- Be prepared to be challenged at both datascience and business levels.

- Be prepared to be challenged on the robustness of your model.

A glance at CareCo's clients

Age structure

During the past 10 years CareCo undergo a significant ageing of its clients database, mostly due to a lack of renewing in the youngest age ranges.

Dynamic of expenses

A significant growth in dermatology and neurology expenses has been observed.

Other types of expenses seem to be similar to global dynamics, although CareCo did not perform an in-depth analysis.

Geography

CareCo has a significant market share in all major economic French cities. Aside from those urban areas, they also have a large part of their clients located in the south of France.

Finally, CareCo lacks clients in the center and east region, where the company is performing quite poorly against its competitors.

Where are CareCo's clients ?

Region[1]	CareCo's clients[1]
Régions et Départements d'outre-mer	3.00%
Ile-de-France	8.00%
Centre-Val de Loire	1.00%
Bourgogne-Franche-Comté	1.50%
Normandie	3.00%
Hauts-de-France - Nord-Pas-de-Calais-Picardie	4.00%
Grand Est	1.00%
Pays de la Loire	2.00%
Bretagne	4.50%
Aquitaine-Limousin-Poitou-Charentes	4.00%
Languedoc-Roussillon-Midi-Pyrénées	9.00%
Auvergne-Rhône-Alpes	5.00%
Provence-Alpes-Côte d'Azur et Corse	11.00%

1. E. g. 1% of Centre-val de Loire's population are clients of CareCo.

Cost and effectiveness of preventive healthcare

Action	Cost (p. 1000)	Cardiovasc.	Diabete	Cancer	Psychiatric	Neurology	DHO[1]	Orthopedics
Detection campaign	120 000	30%	10%	35%	10%	15%	10%	10%
Promotion of health at work	165 000	5%	15%	15%	35%	5%	10%	35%
Promotion of healthy lifestyles	80 000	35%	35%	10%	5%	15%	30%	25%
Prevention of addictions	90 000	40%	5%	40%	15%	5%	*	*
Prevention of complications	250 000	10%	30%	15%	5%	5%	*	30%

How to read the table :
Deploying a detection campaign for cancer costs 120 000 € for 1000 clients.
If implemented, it would globally reduce the expenses related to cancer by 35% on that cohort.

Links to Open Damir databases

The whole dataset is available at http://open-data-assurance-maladie.ameli.fr/depenses/index.php

Using "*Open Damir : base complète sur les dépenses d'assurance maladie interrégimes"* is mandatory :
- http://open-data-assurance-maladie.ameli.fr/depenses/download.php?Dir_Rep=Open_DAMIR&Annee=2009
- http://open-data-assurance-maladie.ameli.fr/depenses/download.php?Dir_Rep=Open_DAMIR&Annee=2010
- http://open-data-assurance-maladie.ameli.fr/depenses/download.php?Dir_Rep=Open_DAMIR&Annee=2011
- http://open-data-assurance-maladie.ameli.fr/depenses/download.php?Dir_Rep=Open_DAMIR&Annee=2012
- http://open-data-assurance-maladie.ameli.fr/depenses/download.php?Dir_Rep=Open_DAMIR&Annee=2013
- http://open-data-assurance-maladie.ameli.fr/depenses/download.php?Dir_Rep=Open_DAMIR&Annee=2014
- http://open-data-assurance-maladie.ameli.fr/depenses/download.php?Dir_Rep=Open_DAMIR&Annee=2015
- http://open-data-assurance-maladie.ameli.fr/depenses/download.php?Dir_Rep=Open_DAMIR&Annee=2016
- http://open-data-assurance-maladie.ameli.fr/depenses/download.php?Dir_Rep=Open_DAMIR&Annee=2017

Although this is optional, you can consider the use of other databases from http://open-data-assurance-maladie.ameli.fr

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