Marketing Analytics Exam – 4th call

You will have **60 minutes** to answer ten multiple-choice questions and to solve an exercise on Excel composed of 3 tasks. By the end of the exam, you must submit the form by answering the questions, indicating possible assumptions made in the exercise resolution, and uploading the .xlsx file containing all the calculations performed during the test.

In the uploaded Excel file, you need to state and highlight the solutions of the exercise clearly. **If the answers to the exercise are not clearly presented, the exercise will not be considered as valid.**

* Obbligatoria

* Questo modulo registrerà il tuo nome, inserire il nome.

1

Name *

2

Surname *

3

Personal Code *

Exercise

Pinky SPA, renowned as a leading long-term rental company in Italy, has carved a niche for itself in the highly competitive market. With its exceptional range of rental services and unwavering commitment to customer satisfaction, Pinky SPA has become the go-to choice for individuals and businesses seeking long-term rental solutions across the country.

Pinky SPA offers different options to its customers, but in all the cases they require a fixed advance payment of 15% of the value of the lent car. This payment is made una-tantum at the beginning of the renting, and the fee will not be returned to the customer. Furthermore, Pinky SPA prioritizes transparency and strives to ensure a hassle-free rental experience. Their rental agreements are clear and comprehensive, outlining all terms and conditions, as well as any associated costs, to avoid any surprises along the way. When entering into the contract, it is clearly specified that all the customers will pay the monthly fee in advance, for each of the available contracts. All contracts have a duration of 5 years, at the end of which the Pinky SPA gets back the cars.

You can assume that, at the end of the contract, Pinky can re-sell the cars on the second-hand market at a price of 20% of the initial value of the car.

Pinky SPA offers three different classes of cars:

- Economy cars, which are affordable and quite versatile, suitable for city dwellers. The average value of this car is € 12,000. Pinky requires a monthly fee to its customers of € 320.

- SUVs and Crossovers, more spacious and comfortable cars. The cars have an average market value of €27,000. Pinky charges its customers a monthly fee of €450.

- Luxury cars, reserved for a discerning clientele with high purchasing power. The average value is €60,000, and a customer looking to rent this car will need to pay an annual fee of €19,000.

Insurance services cost Pinky SPA an average of 4% of the value of the car each year, while annual maintenance costs are fixed and cost € 400, € 550, and € 890 for economy, SUVs and Crossovers, and Luxury Cars respectively.

Pinky has estimated that every year there is a 1% probability of an accident (in which the driver is found guilty of a misconduct) so severe that the car cannot be repaired. In that case, the customer is required to pay a penalty equal to the 30% of the remaining fees plus a fixed management costs of € 500, regardless of the class.

Analyzing its customer base, Pinky SPA estimated that about 50% of customers have an active "Economy cars" contract, 40% have a SUVs or a Crossovers rental, while the remaining part has an active contract for a luxury car. The monthly discount rate is 0.8%.

a) Calculate the CLV in the first five years of a customer in Economic-, SUVs and Crossovers-, and Luxury-segments, respectively.

Please report here only the final values separated with semicolons (";") expressed in €:

Il valore deve essere un numero

5

b) Pinky SPA has 150,000 customers.

What is the CLV of the whole customer base?

Please report here only the final value expressed in €:

[   ]

Il valore deve essere un numero

6

c) Pinky SPA is considering the launch of a short-term rental service only for luxury cars with no advance payment and in which the customer chooses every month whether to continue or not. They estimate a monthly retention rate of 90% in the first year, and 95% monthly retention rate from month 12 on. The monthly fee shall be double than in the long-term rent. A simplified reasoning on the residual value leads to think that the car can be sold for:
- the 70% of its original value when customers rent for less than one year
- the 60% of its original value when customers rent between one and two years
- the 50% of its original value when customers rent between two and three years
- the 40% of its original value when customers rent between three and four years
- the 30% of its original value when customers rent between four and five years
- the usual 20% after the fifth year.

Disregarding the discount rate, should Pinky launch this new offer?

Please report 1 if the answer is "Yes", 0 otherwise:

[   ]

Il valore deve essere un numero

7

Please report here any assumption you relied on for the exercises:

[   ]

8

Upload here your solution: *

[↑ **Carica file**]

Limite del numero di file: 1   Limite di dimensioni del file singolo: 100MB   Tipi di file consentiti: Word, Excel, PPT, PDF, Immagine, Video, Audio

Select the wrong option with respect to K-Means clustering:

◯ The number of clusters is an output of the algorithm.

◯ The number of clusters should be identified considering both the robustness and convergence of the algorithm.

◯ The number of cases in each cluster should be considered in defining the parameter k.

◯ The convergence of the algorithm can be assessed through the iteration history.

What is a dummy variable?

◯ A variable which takes the value of 0 or 1 to indicate the absence or presence of a given category.

◯ It is the equivalent of the Discount Rate in the CLV calculation.

◯ It is a continuous variables ranging from 0 to 1.

◯ It is a categorical variable with more than 2 categories.

Take into consideration a Binomial Logistic Regression Model. What does the following formula represent?

$$\frac{\text{deviance(fitted logistic, saturated model)}}{\text{deviance(null model, saturated model)}}$$

◯ It represents the R squared of the model

◯ It represents the F squared of the model

◯ None of the other

◯ It represents the support of the model

Which of the following analytical techniques represent clustering methods?

○ K-means, Varimax, Dendrogram

○ Partition methods, ANOVA, hierarchical methods

○ Varimax, Oblimin, Quartimax

○ None of the above

"churn" is a dataset containing the information of 1,000,000 customers including a unique identifier and a column "Churn" which is 1 if the customer is a churner, 0 otherwise. What is the objective of the following piece of code in R?

sample <- sample(c(TRUE, FALSE), nrow(churn), replace=TRUE, prob=c(0.7,0.3))
t1 <- churn[sample,]
t2 <- churn[!sample,]

○ To create two dummy variables t1 and t2.

○ To split data from "churn" into training and test sets.

○ To create two datasets t1 and t2, with the same variables contained in "churn" and a new variable called "sample".

○ To create two datasets t1 and t2, with the same columns and rows contained in "churn", but with different values.

With respect to Prediction Accuracy assessment of a model, which of the following is false?

○ Precision and sensitivity are synonymes.

○ Recall depends on the number of true positives and false negatives.

○ Sensitivity depends on the number of true positives and false negatives.

○ Precision depends on the number of true positives and false positives.

With respect to RFM Analysis, which of the following is true?

○ New customers typically skew the models influencing monetary values, since those tend to buy cheap products to test the company's products

○ Recency, Frequency, and Monetary values are usually more than enough to fully predict the purchasing behaviours of all the customers.

○ New customers do not typically influence frequency values.

○ The number of transactions is a good metric of monetary value

What is the goal of churn analysis?

○ Understand why customers churn

○ Understand which customers are at risk of churning

○ Investigate how to retain the customers at risk of churning

○ All of the above

Attribution Modelling:

○ Helps quantifying the impact of marketing inputs on sales

○ Is a top-down approach that aims at giving the credit for the sale to the right channel

○ May use the so called "removal effect" to understand the effect of each touchpoint

○ Uses aggregate data on marketing investments, contextual elements and conversions

In the process of developing a marketing mix model:

○ The first step is to map the possible touchpoints and customer journeys

○ It is important to take into account that the contribution of the digital touchpoints is usually over-estimated by these models

○ It is not possible to use non-parametric models

○ It is important to include also environmental, macroeconomic and contextual variables that may influence the response