COMM1190 Sample Exam - T1 2022

Data, Insights and Decisions (University of New South Wales)

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UNSW SYDNEY

COMM1190: DATA, INSIGHTS, AND DECISIONS TERM 1 2022

SAMPLE EXAMINATION

QUESTION 1 — 30 MARKS

You have been brought in as a Data Science consultant on a court case. A chemical company has been found negligent after a chemical spill at one of their plants. All that remains in the court case is to decide on the extent of the damages for which the company is liable. One way the court has been deciding on this amount is to look at the impact the spill has had on the value of houses located near to the chemical plant where the spill occurred.

As the expert witness, you have been asked to evaluate some alternative strategies to estimate the impact on housing prices (*price*). Strategy A involves taking a sample of sales that occurred after the spill where the houses are classified as either being close to the plant or not. This feature was designated by a variable *near* that was equal to 1 if the house was deemed to be close to the chemical plant and zero otherwise. Then a regression analysis is performed using the following model (*MA*):

$$MA: price_i = \beta_0 + \beta_1 near_i + u_i.$$

Strategy B involves taking a sample of sales for houses near to the plant but where some sales occurred before the spill and some after. The variable *after* is equal to 1 if the house was sold after the spill and zero if the sale was before. Then a regression analysis is performed using the following model (*MB*):

$$MB: price_i = \beta_0 + \beta_1 after_i + u_i.$$

a) Explain A and B as strategies to estimate the impact of the chemical spill and critically evaluate each of them. Is either preferable to the other?
[max 200 words] (10 marks)

b) Suggest an alternative regression model that is preferable to MA given that you only have data from after the spill. Does this address all your criticisms of Strategy A that you outlined in Q1a)?
[max 150 words] (5 marks)

c) Using housing data models *MA* and *MB* are estimated, and the results given below. How do you interpret these results? (Note that $price$ is expressed in $1000)

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$$\widehat{price} = 131.9 - 40.0near$$
$$(4.0) \quad (7.6)$$
$$n = 142,\ R^2 = .165, standard\ errors\ in\ (.)$$

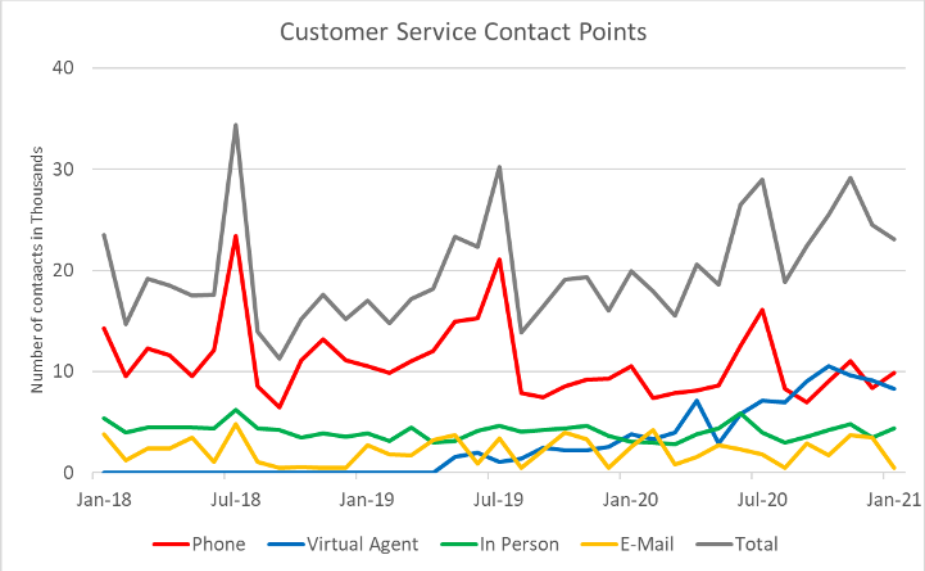
$$\widehat{price} = 63.7 + 28.3after$$
$$(5.9) \quad (9.1)$$
$$n = 96,\ R^2 = .094, standard\ errors\ in\ (.)$$

[max 200 words] (10 marks)

d) Suppose you have sales both near and not near to the plant as well as sales before and after the spill. Suggest an alternative strategy to estimate the effect of the oil spill on housing prices that is preferable to both *MA* and *MB*?
[max 150 words] (5 marks)

QUESTION 2 **30 MARKS**

Imagine you work for a large department store, which highly values customer service. The following chart shows how customers contact the customer service centres.



You begin to discuss the chart with your manager. Immediately, she has the following queries: "I want to see the overall trends, but it is difficult to see with all the seasonal spikes in the time series. I'd like a simpler view into the trend." You decide to create some charts to address your manager's queries.

a) Identify the type of chart you would use to address the query and explain why.
[max 100 words] (5 marks)

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b) Sketch two alternative charts for the query. For each chart, provide a brief explanation of your design choices. To sketch the chart, you can use any tool you want (e.g., you can use a software tool like infogram, excel, or R). Alternatively, you can sketch the chart using pencils, pens or markers on paper, then take a picture of the charts and paste them into your solutions document. You can access the underlying data "customer_service.xlsx" on Ed.
[max 300 words] (15 marks)

c) Evaluate your two charts and explain which you would select to further develop to present to your manager.
[max 200 words] (10 marks)

QUESTION 3 **20 MARKS**

Recall the Data Analytics Simulation: Strategic Decision Making that you played in Week 1's Workshop. The simulation provided first-hand experience in the benefits and challenges of making data-driven decisions.

1. Reflect on how the data visualisations, dashboards, and filters helped you make decisions and the challenges you experienced while playing the game.

2. Based on your experience, identify organisational benefits and challenges from using data and modern visualization to make decisions.

The critical reflection should include lessons learned during the game, with a focus on the value and challenges of working with data.
[max 400 words] (20 marks)

QUESTION 4 **20 MARKS**

You are a data analyst for AppCo. AppCo produces a smartphone app that allows users to virtually try on clothes. It is funded by having sponsored links to online clothing retailers. AppCo tells its users, "top brands, all sizes, best prices". AppCo has a dashboard that is used by Board members that shows sales, revenues and a comparison of sales by retailer. You have been asked to consider whether having a selection of the most popular sizes at a slightly lower price would increase revenue. The CEO has said, "well just use some of your magic A/B testing …".

a) Identify potential legal issues that may arise from A/B testing if AppCo users are unaware the experiment is taking place.
[max 100 words] (5 marks)

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b) Evaluate whether A/B testing would lead to any legal consumer issues?
[max 200 words] (10 marks)

c) Recommend steps to ensure that your organisation maintains good governance when developing analytics at AppCo.
[max 100 words] (5 marks)

— END OF EXAMINATION PAPER —

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