

Techniques and Tools for Business Analytics (MBAS902)

Trimester 2, 2023

Sydney Business School, UOW

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Assessment 3: Business Analytics Project – **Individual**Marks allocated: 100 Marks, Contributes to **50%** of the overall assessments.Due Date: **Saturday 29th July 2023**, by 11.30 pm (Submission via Turnitin)

Description

You have been hired as an analyst by MEGACORP, a toy manufacturing company. MEGACORP has several manufacturing facilities across the United States. Each manufacturing facility consists of two or more production units that create the products. Each unit manufactures toys for a product line (promotional material, action figures, games, and so on). Next month, the Board of Directors is meeting to discuss the future of the company. In the meeting, your manager has been asked to present a report focusing on profitability for MEGACORP. The report is necessary to help the Board understand the state of the company before it makes any decisions.

Dataset

MEGACORP2020 has daily data for each item produced by a unit between 05JAN2008 and 04JAN2020. The data dictionary contains information about the manufacturing facilities, production units, and products. In addition, the table also has information about expenses, revenues, and profits. If a unit did not produce a product on a day, one row is written to the table with a non-active unit status (closed, failure, upgrade, or upkeep). Because no products were produced on these units, product ID values are missing. Data quality stewards have already cleaned and grouped the data, created several new columns, and modified some data properties. You still need to ensure that the data used is ready for analysis and reporting.

Note: If you identify any outliers they can be removed from further analysis. You are required to justify and explain the process and list the cases being eliminated.

Goal

You are asked to:

- Q1. Build an interactive report that your managers from MEGACORP can use to:
 - Explore the data and
 - Derive insights from their vast pool of transactional data.
- Q2. Employ the following techniques to draw interesting insights and help MEGACORP making informed decisions:
 - Linear Regression,
 - Forecasting.
- Q3. Based on your findings, provide an assessment report of MEGACORP by answering the following questions:
 - Is MEGACORP a viable company in its present form?
 - What are your recommendations to make the company more profitable?

Q4. Include a personal reflection on how you can employ one of the four techniques (LR, clustering, DT, forecasting) to your work/research projects/studies (~300 words).

Questions Q1, Q2 and Q4 are open on purpose. The written report consists of a short introduction, data preparation, models, their interpretation, discussion, and a final recommendation to Q3.

Submission Information

- Due date: 29th July 2023 before 11:30 pm.
- Individual assignment.
- Use **only one** software.
- Demonstration of the dashboard:
 - Maximum 10 minutes
 - The demonstration is to be submitted in: “Final Assignment - Demonstration of the Interactive Report”
 - The demonstration should be named:
MBAS902_T223_A3_LastName_FirstName_StudentNumber.pdf
- Written report:
 - Maximum 2,500 words (excluding illustrations and appendices and summary).
 - Include a cover page with your name and a short summary.
 - An export of your interactive report should be attached to your written report.
 - Include figures to support your justifications.
 - Submission in: “Final Assignment - Written Report Submission”
 - Filename: MBAS902_T223_A3_LastName_FirstName_StudentNumber.pdf

Marking Criteria

Interactive Report		
	Notes	Marks: /35
Usability		/5
Correct use of charts		/5
Titles	Titles for graphs, tables; axis labels	/5
Layout	Arrangement of charts, cleanliness	/5
Organisation of interactive report	Different tabs for different categories	/5
Filters and controls		/5
Delivery of demo	Length (max. 5 min), clarity of speech, audio, and video quality (student's face should be shown)	/5
Written Report		
	Notes	Marks: /65
Exploration (1.A.)	Exploration of MEGACORP2020 data	/5
Descriptive analysis (1.B.)	Analysis of MEGACORP2020 data	/10
Finding insights (2.)	Explanation and interpretation of models	/20
Assessment (3.)	Assessment of MEGACORP	/10
Interactive report attached to written report	Printout of interactive report is to be attached	/2
Labels	Correct table and figure labelling and referencing	/3
Quality of the report	Cover page, organisation, language, formatting, file naming, word count	/5
Personal reflection		/10

Appendix: Data Dictionary

Variable	Details
City Latitude	Latitude for each manufacturing city in the US
City Longitude	Longitude for each manufacturing city in the US
Date	Manufacturing date (between 05JAN2008 and 04JAN2020)
Date by Month	Manufacturing month (between JAN2008 and JAN2020)
Date by Year	Manufacturing year (between 2008 and 2020)
Day of Week	Weekday identifier: 1=Sunday, 2=Monday, ..., 7=Saturday
Expenses	Total expenses
Facility	Unique identifier for each facility
Facility Age	Age of facility (in years)
Facility City	City in the US where manufacturing facility is located
Facility Region	Region in the US where manufacturing facility is located
Facility State	State in the US where manufacturing facility is located
Product	Type of product within each product line
Product Brand	Brand of the product (Toy or Novelty)
Product Description	Description of each product
Product ID	Unique numeric identifier for each product
Product Line	Product line within each product brand (Toy has Action Figure, Game, and Stuffed Animal; Novelty has Promotional)
Profit	Total profit (Revenue - Expenses)
Region Latitude	Latitude for each manufacturing region in the US
Region Longitude	Longitude for each manufacturing region in the US
Revenue	Total revenue
State Latitude	Latitude for each manufacturing state in the US
State Longitude	Longitude for each manufacturing state in the US
Unit	Unique identifier for each production unit
Unit Age	Age of unit (in years)
Unit Capacity	Maximum number of products that can be produced on a specific unit
Unit Downtime	Indicator for the unit being non-operational: 1 (true) or 0 (false)
Unit Reliability	Percentage of time a unit is operational
Unit Status	Operational status for a unit (active, closed, failure, upgrade, or upkeep)
Unit Yield (actual)	Actual number of products produced on a specific unit
Unit Yield (rate)	Percentage of actual production divided by targeted production
Unit Yield (target)	Targeted number of products produced on a specific unit