



OLLSCOIL NA GAILLIMHE
UNIVERSITY OF GALWAY

Alternative Assessment 2022/23

End-of-Module Assignment

Module Code: MS5106

Module Name: DATA SCIENCE & BIG DATA ANALYTICS

- Assignment Title: Value in Analytics -

Objective	<p>The objective of this assignment is to assess your understanding of the following learning outcome(s):</p> <ul style="list-style-type: none">• Apply analytic techniques and tools to analyse big data, create models, and identify insights that can lead to actionable results.• Deploy a structured lifecycle approach to data science and big data analytics projects.• Demonstrate an understanding of the challenges of creating business value in a big data environment
Lecturer	Anastasia Griva
Marks Awarded	<p>This assignment carries 30% of the overall marks for the module.</p> <p>Guidelines for grading this assignment are included at the end of this document.</p>
Submission	<p>You should submit your completed assignment through Blackboard's Assignment tool.</p> <p>If you are <u>unable</u> to submit your assignment via Blackboard, please email it to your lecturer by email at anastasia.griva@nuigalway.ie , whilst also emailing the same email to business@nuigalway.ie.</p> <p>You don't need to specifically name your assignment submission document if submitting it via Blackboard, but if you need to email in your assignment, please name your document (as an email attachment) as follows:</p>

	Student ID number ... Module Code ... Discipline ... Assignment title.pdf : e.g. 12345678_MS5106_BIS_Value_in_Analytics.pdf
Submission Deadline	<p>4/5/2023 at 4pm Irish time (+ 30 mins grace to 4:30pm for any upload issues)</p> <p>There will be an extra 30 mins (to 4:30pm) to accommodate any potential uploading issues. You will have multiple attempts to submit, and we will correct the last submitted version.</p> <p>To avoid technical issues we strongly advise you to upload your submission <u>well in advance of the deadline</u>. You may submit at any time on any day prior to the deadline.</p>
Academic Integrity	<p>Each module instructor reserves the right to follow up with a student by interview if there is any concern in relation to the integrity of the assignment.</p> <p>For any assignments not submitted via Turnitin, we reserve the right to check it using Turnitin where required.</p> <p>All students received an email from the Registrar about integrity. Additionally to this, you are required to include the following disclaimer statement as part of your submission:</p> <p><i>"In submitting this work I confirm that it is entirely my own. I acknowledge that I may be invited to undertake an online interview if there is any concern in relation to the integrity of my submission."</i></p>
Non- submission	Non-submission, or submission after the deadline (4pm + 30 mins grace) will carry a mark of zero in determination of overall marks for this sitting.
Deliverables	<p>An electronic file (or multiple files) constructed using Microsoft Office or equivalent. Ideally your submission should be typed in 12-point font, 1.5 spaced, with pages numbered. Your document should ideally be in one of the following formats: pdf, Word, or Excel (where relevant). Students can install Microsoft Office 365 on up to 5 devices, see https://www.nuigalway.ie/o365/overview/</p> <p>However, if necessary you may handwrite your document and scan/photo it for submission, but it must be fully legible, page-numbered, organised and complete. In this instance, write only on one side of each A4 page, number each page at the bottom using 'Page 1/5' or 'Page 2/5', clearly number each question you're answering, write your ID number at the top of every page, and ideally use a dark black pen. Combine scanned pages into one document before uploading or emailing it in, ensuring that all pages are the right way up (that is, don't have some pages upside down).</p>

	Your submission should <u>not exceed 1,500 words</u> , excluding graphs, tables, and the disclaimer, but including any appendices.
Special Requirements	If you are registered with the Disability Support Service (DSS), you will find recommended accommodations listed on your Learning and Educational Needs Summary (LENS) report . If the alternative assessment offered for this module does not fully meet the recommendations in your LENS report, please email your lecturer as well as business@nuigalway.ie , stating clearly how you feel the recommendations are not being met. Please ensure you attach a copy of your LENS report to this email.
Referencing	If you are using any references, please use the Harvard referencing style, instructions for which can be found on the NUI Galway Library Website, section Styles & Styles Guide: Citing & Referencing: http://libguides.library.nuigalway.ie/c.php?g=672922&p=4791378
Plagiarism	NUI Galway Plagiarism Code of Practice All work submitted by students for assessment, for publication or for (public) presentation, is accepted on the understanding that it is their own work and contains their own original contribution, except where explicitly referenced using the accepted norms and formats of the appropriate academic discipline. Plagiarism is the act of copying, including or directly quoting from the work of another without adequate acknowledgement, in order to obtain benefit, credit or gain. You are required to familiarise yourself with the NUI Galway Plagiarism Code and ensure that the work you submit does not contain plagiarised elements. http://www.nuigalway.ie/plagiarism/
Assignment Details	PriMarket is a well-known retailer in Ireland selling garments for adults. PriMarket is currently trying to transform their stores and make them IoT-enabled using several technologies. For instance, in one PriMarket store there are 26 wi-fi routers installed on the ceiling. Assume that each router is used to track customers within the specific store area (i.e. areas 1-26 as these are noted in Figure 1). When customers are connected to the store wi-fi (exploiting the installed infrastructure), the retailer can anonymously track how they are moving in their store. PriMarket, also owns a mobile app, that gives the opportunity to its customers to create a digital loyalty card and use it to gather points after each purchase. When customers are using this mobile app in the store, then their tracking becomes eponymous (this includes that customers have given their consent). As such, using this infrastructure, the retailer has gathered a <u>wi-fi dataset</u> . In more detail for the eponymous customers this dataset contains the following fields: Customer id, visit id, date, time, area (ranging from 1-26), area name (e.g. socks, blouses, pants etc.), duration (i.e. time spent at each area). For the anonymous customers the dataset is the same, but we are not aware about their customer id.

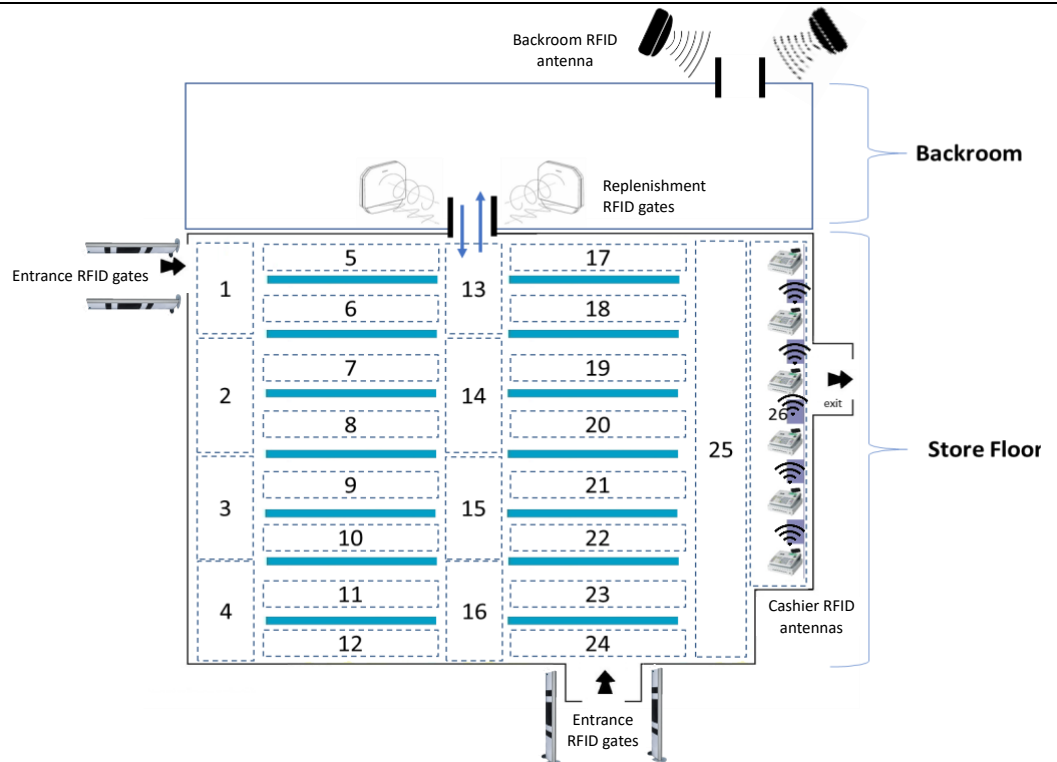


Figure 1: Store layout

Apart from the wi-fi routers on the ceiling, the retailer has also placed RFID tags on each garment. Based on different RFID antennas placed in the store (i.e. Backroom RFID antenna, Replenishment RFID gates, Entrance/Exit RFID gates, Cashier RFID antennas – see also Figure 1), the retailer is able to gather RFID data and track the garments' in-store movements.

Be careful, using this infrastructure the retailer is not able to track which customer carries which garments, or which garments are in each store area; but, it is able to track the garments solely in specific areas i.e., those areas having RFID antennas as described above (i.e. backroom, replenishment, entrance, cashiers).

Based on the above you are asked to answer the following questions:

- (A) Formulate one interesting data-driven question based solely on the wi-fi dataset and shortly describe how you would answer it reflecting on the phases of the "analytics lifecycle". Regarding the last phase of the analytics lifecycle (i.e. operationalisation), present at least two actionable insights/results.

(15 Marks)

- (B) How would you leverage the given RFID data to extract actionable insights and create more value for the retailer and its customers? Use examples, to explain your answer.

(8 Marks)

- (C) Can you think of any impediments and challenges arising when trying to leverage the actionable insights as described in questions A and B? Use examples, to explain your answer.

(7 Marks)

PLEASE ANSWER ALL THE QUESTIONS

To help with expectations of standard of submission, following is a general set of Grade Descriptors as proposed by the NUI Senate.



GRADE DESCRIPTORS, AS PROPOSED BY THE NUI SENATE

Explanatory Note:

The Grade Descriptors below are offered as indicative descriptors. It is accepted that these indicative descriptors are particularly appropriate for examinations based on essay-type questions but may be found less suitable for examinations in subjects where there are detailed marking schemes.

Grade	Marks %	Descriptor
1 st CLASS HONS	90-100	<p><u>Supreme</u> performance, engaging profoundly, systematically and comprehensively with question set, brilliantly demonstrating</p> <ul style="list-style-type: none"> a superlative mastery of the subject matter, richly supported by evidence and citation, reflecting deep and broad knowledge and understanding as well as extensive reading an outstanding ability to organise, analyse and express ideas and arguments in an original, sophisticated and discriminating manner an optimal capacity for critical analysis the display of rare penetrative insight, originality and creativity
	80-89	<p><u>Exceptional</u> performance, engaging deeply and systematically with the question set, with consistently impressive demonstration of</p> <ul style="list-style-type: none"> a comprehensive mastery of the subject matter; amply supported by evidence and citation, reflecting deep and broad knowledge and critical insight as well as extensive reading an exceptional ability to organise, analyse and present arguments fluently and lucidly with a high level of critical analysis a highly-developed capacity for original, creative and logical thinking;
	70 -79	<p><u>Excellent</u> performance, engaging closely and systematically with the question set, with consistently strong evidence of</p> <ul style="list-style-type: none"> a comprehensive mastery of the subject matter, ably supported by evidence and relevant citation excellent ability to organise, analyse and express arguments fluently and lucidly with a high level of critical analysis a highly-developed capacity for original, creative and logical thinking
2 nd CLASS HONS (Grade 1)	60-69	<p><u>Very Good</u> performance, engaging substantially with the question set, demonstrating strong grasp of the subject matter, well supported by evidence and relevant citation</p> <ul style="list-style-type: none"> well-developed capacity to analyse issues, organise material, present arguments clearly and cogently some original insights and capacity for creative and logical thinking

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2 nd CLASS HONS (Grade 2)	50-59	<p><u>Good</u> performance - intellectually competent answer (i.e. factually sound) with evidence of a reasonable familiarity with the relevant literature and techniques</p> <ul style="list-style-type: none"> • acceptable grasp of the subject material • ideas stated rather than developed and insufficiently supported by evidence and relevant citation • writing of sufficient quality to convey meaning but some lack of fluency and command of suitable vocabulary • omission of parts of the subject in question or the appearance of several minor errors • average critical awareness and analytical qualities • limited evidence of capacity for original and logical thinking
3 rd CLASS HONS	<p>45-49</p> <p>40-44</p>	<p><u>Satisfactory</u> performance – intellectually adequate answer with evidence of some familiarity with the relevant literature and techniques</p> <ul style="list-style-type: none"> • basic grasp of subject matter, but somewhat lacking in focus and structure • main points covered in answer, but lacking detail • some effort to engage, but only a basic understanding of the topic portrayed • some development of argument • only some critical awareness displayed • no evidence or relevant citation included in answer • appearance of several minor errors or one major error • lacking evidence of capacity for original and logical thinking <p><u>Acceptable</u> performance – intellectually adequate answer with limited familiarity with the relevant literature and techniques</p> <ul style="list-style-type: none"> • basic grasp of subject matter but limited focus on question asked • unclear presentation of argument, random layout, with some omissions or inaccuracies in answer • argument insufficiently developed • no evidence or relevant citation supplied • appearance of one major error and minor errors • inclusion of unsubstantiated statements and/or irrelevant material • descriptive rather than argumentative or analytical answer presented • an attempt to solve moderately difficult problems related to the subject material and an attempt to examine the material in a critical and analytical manner only partially successful • an incomplete or rushed answer e.g. the use of bullet points through part / all of answer
FAIL*	35-39	<p><u>Unacceptable</u> performance, with either</p> <ul style="list-style-type: none"> - insufficient understanding of the question displayed - failure to address the question resulting in a largely irrelevant answer - a display of some knowledge of material relative to the question posed, but with very serious omissions / errors and/or major inaccuracies included in answer - or answer left somewhat incomplete for lack of time <p><u>Also:</u></p> <ul style="list-style-type: none"> • limited understanding of question displayed • a random layout / underdeveloped structure - not planned sufficiently • poor analytical skills, with an absence of argument • random and undisciplined development - limited structure • lack of clarity, poor spelling • material of marginal relevance predominating
FAIL	<35	<u>Wholly unacceptable</u> performance, with

		<ul style="list-style-type: none"> - deficient understanding of the question displayed - complete failure to address the question resulting in an irrelevant answer - inadequate knowledge displayed relative to the question posed - or answer left incomplete for lack of time <p>Also:</p> <ul style="list-style-type: none"> • very poor analytical skills, with an absence of argument • random and undisciplined development –poorly structured answer • confused expression, poor spelling • irrelevant material predominating
Fail* - within 'Pass by Compensation' range		