

Department of Computing: DTA

Module Title: Artificial Intelligence Overview	
Module Code: N/A	
Method of Assessment : 1. Report work of 1500 words weighted at 70%. 2. Coding and report (500 words) weighted at 30%	
Weighting: 100%	Module Credits: 20
Level: 4	Semester/Teaching block:
Session Delivery: Online	Course Instructor:
Additional Information (if any): SEGway module	

Module Title: Artificial Intelligence Overview
Module Code: SEGWAY
Weighting: : 100% (70% + 30%)

This assignment will assess the following learning outcomes:

<ol style="list-style-type: none">1. Know and be able to articulate the differences between artificial intelligence and machine learning, and to be able to define and give examples of different machine learning techniques.2. Differentiate between AI and rule-based/expert systems.3. Understand and articulate the differences between supervised, unsupervised and reinforcement learning.	AI Part I – 05 credits
<ol style="list-style-type: none">1. Understand the principles of correlation and linear regression, and be able to carry out correlation and regression analyses using WEKA.2. Understand classification and be able to carry out data classification tasks with K-means and Naïve Bayes techniques using WEKA.3. Articulate the principles and architecture of an Artificial Neural Network (ANN).4. Apply your knowledge of machine learning techniques to create basic classification and regression models using Python and scikit-learn.	AI Part II – 05 credits
<ol style="list-style-type: none">1. Understand the principles that differentiate evolutionary algorithms in machine learning from other types of learning mechanism.2. Know key techniques in extending ML algorithms to evolutionary equivalents, including hill-climbing, gradient descent and greedy search.3. Understand the principles of Generative Adversarial Networks (GANs) and their application in solving problems, such as image classification.	AI Part III – 05 credits
<ol style="list-style-type: none">1. Describe how artificial swarm intelligence is modelled on the natural world.2. Understand the operation of key algorithms used for modelling swarm intelligence.3. Understand how swarm optimisation is used in real-world applications.4. Implement different swarm intelligence algorithms using the Python language	AI Part IV – 05 credits

Assignment Details

This assignment is divided into two parts with 70% in Part A and 30% in Part B.

In the first part (Part A), you are required to prepare and submit a research report as an assignment of 1500 words.

In the second part (Part B), you would need to use Google Colab and the given dataset and code in python and create a Machine learning model and prepare a small report of 500 words describing each step.

Assignment Scenario

You are working in a bank as a data scientist. The bank is located 3 countries Germany, Spain and France. Based on the location and other factors, you have been given a dataset which consists of the following features:

1. Customer ID
2. Surname
3. Credit Score
4. Geographic location
5. Gender
6. Age
7. Tenure
8. Balance
9. Number of Products
10. Has Credit cards
11. Is active Member
12. Estimated Salary
13. Exited

The last column “Exited” is the target variable or the dependent variable.

Part A – Research Report – Assess the LOs of Part I and Part III

Maximum number of words: 1500 words

In the report you would need to justify how you think that Artificial Intelligence is currently used to solve different issues and risks banks face. You should be giving a broad introduction to the report and explain why you think this is an area where Artificial Intelligence can play a big part. From here, you would need to chose algorithms that were taught in this module and you think would be able to solve the above identified problem and discuss briefly about them. You would need to discuss in detail how these algorithms work, what is the concept/logic behind them, and how these algorithms can help to make logical business decisions. You would need to study and refer different research papers to back

your findings. You can link the dataset (given for Part B) and provide screenshots from your codes in different sections for this report.

The assignment needs to have the following contents, but you can add and edit the contents according to your choice. For example:

1. Motivation and Introduction to the domain area
2. Current Issue Analysis
3. Machine Learning Algorithms and their justification – A literature review (maybe?)
4. Conclusion and Recommendation
5. References (if any)

As specified above, you can choose any style of contents. But you need to use the following in your work:

1. Font: Times New Roman
2. Font size: 12
3. Line spacing: 1.5
4. Referencing: Harvard

Part B – Python coding and report – Assess the LOs of Part II and Part IV

Length: 500 words

Your task as a data analyst is to create two models using some of the algorithms which were taught in this course

1. Regression model which can be used to predict if a customer would be exiting the bank or not.
2. Classification model to classify if a customer has left or not (binary classification)

Using Google Colab and the dataset provided, create two Machine learning/neural network model. You would need to do data pre-processing step, data visualisation step, feature selection step and compare the results between different algorithms that you have used for both the models and recommend the algorithms which gives the highest accuracy. You would also need to write a report of around 500 words on the steps you have taken to create your models. After creating the model you need to download the model in .ipynb format and submit.

REPORT MARKING CRITERIA (Part A)

%	Report Marking Criteria
70+	Demonstrates a high degree of perception and originality. Is factually faultless and comprehensive in coverage of the salient points. Shows complete comprehension of material and exceptional insight in interpretation/analysis/evaluation. Evidence of extensive appropriate wider reading and independent research. Arguments supported by examples/evidence/case studies. Structure/grammar/referencing outstanding.
60-69	A good answer but with good evidence of insight or originality. Demonstrates understanding of the material but may have some errors, inaccuracies, or omissions. Interpretation/analysis/evaluation generally good. Use of examples reasonable. Evidence of appropriate wider reading and independent research. Structure/grammar/referencing of a good standard.
50-59	A good answer but with satisfactory evidence of insight or originality. Demonstrates satisfactory understanding of the material but with some errors, inaccuracies, or omissions. Interpretation/analysis/evaluation present but not highly developed. Some use of appropriate examples/case studies. Reliance on lecture notes evident. Limited evidence of reading beyond basic module texts. Structure/grammar/referencing of a moderate standard.
40-49	A competent answer demonstrating basic understanding of the material but with errors, inaccuracies, or omissions. Interpretation/analysis/evaluation weak. Little use of appropriate examples. Significant reliance on lecture notes. Only basic texts consulted. Some statements unsubstantiated. Structure/grammar/referencing of a moderate/weak standard.
30-39	Some relevant material but with major omissions and inaccuracies. Limited in understanding. Interpretation/analysis/evaluation weak and unsubstantiated. Poor use of relevant citations. Very little evidence of any reading. Structure/grammar/referencing poor.
20-29	Largely irrelevant. Only partial understanding of the question. Very weak interpretative/analytical/evaluative skills. Lacking in material to answer the question. Considerable errors and inaccuracies. Structure/grammar/referencing very poor.
0-19	Almost totally irrelevant. The bulk of the answer is a misunderstanding of the question. Extremely limited interpretative/analytical/evaluative skills. Unacceptably brief/or unacceptably verbose. Mostly inaccurate and erroneous. Structure/grammar/referencing very poor.

Coding and report marking criteria (Part B)

Coding and Essay marking criteria (PART B)	Marks (30%)
Importing Necessary Libraries	5
Importing the dataset	2.5
Reading the dataset	2.5
Checking the head, info etc	2.5
Data preprocessing steps	2.5
Data split into training and testing	2.5
Applying Machine learning models	2.5
Getting results	5
Essay (max 500 words)	5
Total	30

PART A (70%) + PART B (30%) = 100 %

SUBMISSION OF ASSESSMENTS

Submission Method: email the report and the python file to Yolanda Granja-Rubio at Yolanda.Granja-Rubio@staffs.ac.uk. ***Please submit via OneDrive or Dropbox if you are submitting large files.***

Files to be submitted:

Part A: Report

Part B: Code file and report

Date of Submission: 10/10/2023 by 23:59

Plagiarism Warning

Summary

- Plagiarism occurs if you use somebody else's work in an assignment or exam answer, but fail to state where you got the material from. You need to be also very careful about the number of words you are using from somebody else's work.
- It can happen in any type of assessment where you are given the questions or tasks in advance.
- If another student uses your work in his/her answer(s), both you and he/she will be punished when caught.
- Punishments for committing plagiarism can be very severe.

The details

Plagiarism is a form of cheating in which students use the work of others and present it as their own. Staffordshire University publishes a fully detailed description of what the term 'plagiarism' means on the University's main website under the heading '*Procedures for dealing with suspected cases of academic dishonesty*'. We strongly recommend that you go and read the full document at the above address. Meanwhile, here is an extract of some of the relevant content. You will have committed plagiarism and may be caught, reported and punished (as described below) if you:

- Copy extensively from the work of others (from sources such as books, journals, websites for example) and submit the work as your own. It is acceptable to refer to the work of others as long as you do not use too much and reference your sources properly.
- Copy other students' work and submit it for assessment under your own name.
- Allow another student to copy *your* work and they then submit it for assessment under *their* name

This last item is of particular importance; few students seem to understand what it means. If, for example, you allow another student to borrow your work and they subsequently copy some of that work and present it as their own, you and they will *both* be punished even though someone else copied your work.