College Dublin
Computing • IT • Business

CONTINUOUS ASSESSMENT / ASSIGNMENT

Programme Title/Year:	**MLAI_BScCompIT_Sept20 Year 4**
Module Title(s):	**Machine Learning for AI**
Lecturer Name(s)	**David McQuaid**
Assessment Title:	**MLAI_BScCompIT_Sept20_CA3**
Assessment Type:	**INDIVIDUAL**
Assessment Weighting:	**40% of Module Grade**
Date Issued:	**04/05/2021**
Due Date (Deadline):	**30/05/2021**
Late Submission Penalty:	Late submissions will be accepted up to **5** days after the deadline. All late submissions are subject to a penalty of **10%** of the mark awarded. Submissions received more than 5 days after the deadline above **will not** be accepted.
Method of Submission:	**Moodle**
Feedback Method:	**Results posted in Moodle gradebook**
Instructions for Submission:	**You are required to upload to Moodle:** **a Jupyter Notebook File, yourName_MLAI_CA3.ipynb.** **Please note that no other submission type will be graded**

Module Learning Outcomes Assessed:

- **MLO 1 -** Distinguish between the different types of machine learning and the underlying concepts that enforce their limitations.
  (Linked to PLO 1 (Stage 4 SLO 1))

- **MLO 2 -** Understand how to use analytics for AI with the inclusion of labelled and unlabelled data.
  (Linked to PLO 3 (Stage 4 SLO 3))

- **MLO 5 -** Develop a machine learning strategy for a given domain, communicate this strategy effectively to peers and project stakeholders
  (Linked to PLO 4, PLO 6 (Stage 4 SLO 4 / SLO 6))

Assignment Detail

Data Dictionary of Data Set column description:

1. Id number: 1 to 214
2. RI: refractive index
3. Na: Sodium (unit measurement: weight percent in corresponding oxide, as are attributes 4-10)
4. Mg: Magnesium
5. Al: Aluminium
6. Si: Silicon
7. K: Potassium
8. Ca: Calcium
9. Ba: Barium
10. Fe: Iron
11. Type of glass: (class attribute)
    -- 1 building_windows_float_processed
    -- 2 building_windows_non_float_processed
    -- 3 vehicle_windows_float_processed
    -- 4 vehicle_windows_non_float_processed (none in this database)
    -- 5 containers
    -- 6 tableware
    -- 7 headlamps

This is an Individual Project

You are required to use the dataset contained within the file "glass_data.csv" and then perform the following analysis using a neural network:

- Perform an initial analysis of the data (EDA) using python in your Jupyter notebook. Discuss your findings and what relevance they might have on your planned Neural Network model.
- Perform any preparation of the data, that you feel is necessary, using python in your Jupyter notebook. Explain your rationale behind your data preparation and how it will assist you.
- Create and implement a Neural Network that will output a classification based on the Type of glass: (class attribute) feature. Test this model and try to improve it using different configurations of neurons/layers/loss functions/activation functions and discuss your findings and final rational for the Neural network configuration.
- Make a classification using your test data, using your final Neural Network configuration and comment on the accuracy differential between the training and testing set.

Requirements

Perform an initial analysis of the data (EDA) using python in your Jupyter notebook
Discuss your findings and what relevance they might have on your planned Neural Network model
Perform any preparation of the data, that you feel is necessary, using python in your Jupyter notebook
Explain your rationale behind your data preparation and how it will assist you
Create and implement a Neural Network that will output a classification based on the Type of glass: (class attribute) feature
Test this model and try to improve it using different configurations of neurons/layers/loss functions/activation functions
Discuss your findings and final rational for the Neural network configuration
Make a classification using your test data, using your final Neural Network configuration
Comment on the accuracy differential between the training and testing set
All written work to be provided in Jupyter Notebook as Markdown
Min word count 1500 Not including references or code
All references to be in HARVARD style

Marking Schedule

Description	Weighting
Perform an initial analysis of the data (EDA) using python in your Jupyter notebook	5%
Discuss your findings and what relevance they might have on your planned Neural Network model	5%

Perform any preparation of the data, that you feel is necessary, using python in your Jupyter notebook	5%
Explain your rationale behind your data preparation and how it will assist you	10%
Create and implement a Neural Network that will output a classification based on the Type of glass: (class attribute) feature	10%
Test this model and try to improve it using different configurations of neurons/layers/loss functions/activation functions	25%
Discuss your findings and final rational for the Neural network configuration	25%
Make a classification using your test data, using your final Neural Network configuration	5%
Comment on the accuracy differential between the training and testing set	10%
Total	**100%**