**Assignment**

**Brief - General**

|  |  |
| --- | --- |
| Unit: | Neural Network Rapid Prototyping |
| Unit Level: | **HND** |
| Unit Code: | **NNR** |

|  |  |
| --- | --- |
| **Student Name:** | **Date of Issue: 24/04/2020** |
| **Student ID:** | Date of Submission: 19th July, 2020 |

**Plagiarism** is presenting somebody else’s work as your own. It includes copying information directly from the Web or books without referencing the material; submitting joint coursework as an individual effort; copying another student’s coursework; stealing coursework from another student and submitting it as your own work. Suspected plagiarism will be investigated and if found to have occurred will be dealt with according to the procedures set down by the College. Please see your Student Handbook for further details of what is / isn’t plagiarism.

**Coursework Regulations:**

1. All coursework must be submitted via stpmoodle***: http://technology.stpmoodle.net/***

2. Please submit all work on time. The submission deadline is the 19th of July 2020. Coursework submitted late is subject to being capped at a Pass.

3. Requests for an extension must be in accordance with the guidelines set out in the college regulations, with the necessary documentary evidence to support your request. Refer to The Student Handbook.

4. General guidelines for preparation of coursework:

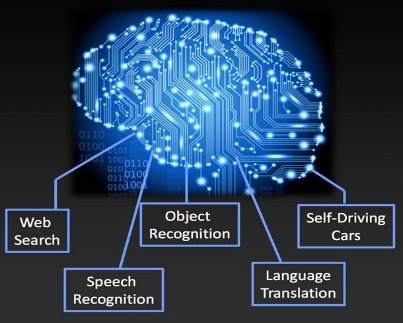
a) All work must be word-processed.

b) Document margins should not be more than 2.5cm or less than 1.5cm.

c) Font size in the range of 11 to 14 point distributed to include headings and body text. Preferred typeface to be of a common standard such as Arial, Calibri, or Times New Roman for the main text.

d) All work completed including any software constructed may not be used for any purpose other than the purpose of intended study without prior written permission from St Patrick’s College.

**Remember to keep evidence of your submitted coursework.**

****

**Assignment front sheet**

|  |  |  |  |
| --- | --- | --- | --- |
| **Qualification** | | **Unit number and title** | |
| Pearson BTEC HND Diploma in Network Engineering and Telecommunications Systems | | Custom Unit: **Neural Network Rapid Prototyping** | |
| **Student name** | | **Assessor name** | |
|  | | Gayathri Karthick | |
| **Date issued** | **Completion date** | | **Submitted on** |
| May 2020 |  | |  |
|  | |  | |
| **Assignment title** | Assignment:  **Neural Network Rapid Prototyping** | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| LO | Learning outcome  (LO) | AC | In this assessment you will have the opportunity to present evidence that shows you are able to: | Task no. | Evidence  (Page No) |
| LO 1 | Be able to analyses the concepts of neural networks and their applications in modern working environments | 1.1 | Explain the concept of neural networks | 1 |  |
| 1.2 | Investigate the different paradigm of neural networks | 1 |  |
| 1.3 | Assess various neural network applications and experiment with various neural network software models. | 1 |  |
|  |  | 1.4 | Compare SDLC model with ANN | 1 |  |
| LO 2 | Be able to produce a neural network-based solution to problems | 2.1 | Download the Dataset | 2 |  |
| 2.2 | Apply pre-processing and post-processing techniques | 2 |  |
| 2.3 | Implement the neural network model. | 3 |  |
| 2.4 | Train and test the neural network model | 3 |  |
| LO 3 | Be able to manage a neural network project | 3.1 | Evaluate the results of your projects | 3 |  |
| 3.2 | Tuning the Model | 3 |  |
| 3.3 | Build the prototype | 3 |  |
|  |  |  |  |  |  |
| Learner declaration | | | | | | |
| I certify that the work submitted for this assignment is my own and research sources are fully acknowledged.  Student signature: Date: | | | | | | |

**Assessment Guidance**

|  |  |  |
| --- | --- | --- |
| **In addition to the above PASS criteria, this assignment gives you the opportunity to submit evidence in order to achieve the following MERIT and DISTINCTION grades** | | |
| **Grade Descriptor** | **Indicative characteristic/s** | **Contextualization** |
| **M1 Identify and apply strategies to find appropriate solutions** | Effective judgements have been made.  An effective approach to study and research has been applied. | To achieve M1 effective judgements will have to be made in presenting the concept on the fundamental of Neural Network. [AC 1.1, AC 1.2 & 1.3]. |
| **M2 Select/design and apply appropriate methods/techniques** | Coherently present with appropriate methods. | To achieve M2, Learner must provide detailed and justified discussion on the approach and techniques used. [AC 2.1, 2.2 & 2.3] |
| **M3 Present and communicate appropriate findings** | Presentation have been used appropriately and technical language has been accurately used. | To achieve M3 you must analyses various Neural Network paradigms and evaluated the results. [AC 2.4 & 3.1] |
| **D1 Use critical reflection to evaluate own work and justify valid conclusions** | Conclusions have been arrived at through synthesis of ideas and have been justified. | To achieve D1, your findings should justify which Neural Network software model and on choice of your Neural Network Algorithm [AC 1.4, & AC 3.1] |
| **D2 Take responsibility for managing and organising activities** | Check validity when collecting, analyzing, and processing information/data  Adopt and correctly use a recognized referencing scheme ***e.g. Harvard Referencing*** | Successful demonstration of the understanding of pre and post processing technique using a programming language such as R/python [AC 2.2]. |
| **D3 Demonstrate convergent/lateral/ creative thinking** | To achieve D3 the learner needs to demonstrate the successfully implement a Neural Network model with significant level of complexity. | To achieve D3 the learner needs to demonstrate the successfully implement a Neural Network model with significant level of complexity. [3.1, 3.2 & 3.3]. |

|  |  |
| --- | --- |
|  | |
| **Assignment title** | **Neural Network Rapid Prototyping** |
| **Task 1: Demonstrate your knowledge in Artificial Neural Network**   1. Explain the concept and different paradigm of Neural Network. (AC 1.1, 1.2, M1). 2. Analyse the Neural Network in Human-Centric Artificial Intelligence for Smart cities (AC 1.3, M1). 3. Assess various deep learning software models/tools introduce by market leader such as IBM, Google, Microsoft, etc. (Any 3 tools) (AC 1.3, M1). 4. Compare SDLC model with Neural Network model. (AC 1.4, D1)   **Note:**  *[For Task 1.1, you need to explain fundamentals of Artificial Network, AI and ML, Artificial Neural Network (ANN), any three types of ANN with diagrams and examples)*  *For Task 1.2, you need to present on how Artificial intelligence takes place in Smart cities using IoT.*  *For Task 1.3, you need to discuss about software tools uses Neural networks.*  *For Task 1.4, you need to show the differentiation between SDLC model and NNR model]*  **[Assessment Criteria: 1.1, 1.2, 1.3, 1.4, M1, D1]** | |
| **Task 2: Implement train and test a neural network model**  1. Download the data set from the following **URLs: https://archive.ics.uci.edu/ml/index.php** or <https://www.kaggle.com/> load the data set into Azure Machine Learning Studio. Discuss about implementation in the Azure ML studio. Explain how you prepared the data set for Neural Network Model with Screenshots (AC 2.1, M2).  2. Prepare the dataset for feeding into the neural network model. The preparation involves two activities.  a. **Data Preparation:** Transforming qualitative data into quantitative data. If necessary, normalize the data set (AC 2.2, D2).  b. **Partitioning Data (Split Data):** Partition the dataset into two sets (AC 2.2, 2.3, M2, D2).   * 1. Assess Training Dataset: to train the neural network model.   2. Assess Test Dataset: to validate the neural network model.   ***Note:***  *[For Task 2.1, you need to demonstrate choice of your dataset and how you have uploaded into the machine learning software with screenshots. For Task 2.2, you need to present findings on transforming into numbers from text, removing missing data and normalizing the range and addition package If you used any (Preprocessing techniques). For post processing, you need to present the split data. (Training and Test Data).]*  **[Assessment Criteria: 2.1, 2.2, 2.3, 2.4, M2, D2]** | |
| **Task 3: The accuracy of the final outcome using neural network model.**   1. Discuss about choice of your Neural Network Algorithm you used for your dataset and why? (AC 3.1, M3, D1). 2. Using training model/dataset train the model and discuss about the outcome (AC 2.4, M3). 3. Use the test dataset to validate your model. And discuss about the outcome of the model (AC 3.1, D3). 4. Tune the model to achieve the best possible outcome and discuss how you tuned the model to achieve the better outcome. Discuss about the accuracy of the outcome (AC 3.2, 3.3, D3).   **Note:**  *[For AC 3.1, you need to talk about different neural algorithms for choice of your dataset.*  *For AC 3.2, you need to discuss about the outcome of your trained model.*  *For AC 3.3, First, you need to discuss about the scored model and then, you need to show the final outcome such as details of iteration, no of nodes and percentage of your prototype.]*  **[Assessment Criteria: 2.4, 3.1, 3.2, 3.3 & M3, D2, D3]** | |
| **Task 4: [Complete Demo of your prototype] [Build the Prototype, AC 3.3, D3**]  The aim of the demonstration is for you to demonstrate how you have implemented the data set into Azure ML Studio. You are expected to show the accuracy of the outcome, train and test a Neural Network Model. Demonstration Sessions will take place each week starting from Week 9 and students will be presenting an agreed piece of Work. It will be a demonstration of 10 minutes together with 3 minutes for questions and answers. You are required to deliver 1 presentation during the 12 weeks of this unit; if you do not give a presentation on the expected session, your grade on that component of the assignment will be “referred”. [Recording of your work are to be submitted within the same folder as the other assessed components along with your assignment.] | |
| You are expected to research your topic using an appropriate selection of sources, the St Patrick’s library, a good selection of on-line academic articles and e-books online.  Note:   1. You are allowed to make any valid assumptions giving appropriate reasons for such assumptions and other possible alternatives. 2. Assignment Word Limit: 3500   Machine-learning-softwares | |