The purpose of this template is to provide opportunities for you to share all the components of your ONLINE final assessment. Please have your Peer Reviewer complete the GREEN highlighted section prior to submitting.

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| Term | 2247 |
| Professor | Dr. Savita Seharawat |
| Course Code | AIG140 |
| Course Section letter | NAA |
| Date of Final Assessment | **12/10/2024** |
| Duration of Final Assessment | 2 hour |
| Weight of Final Assessment | **20%** |
| Mark breakdown  PART 1: Performance Evaluation 10 marks  PART 2: Edge Detection **10** marks  PART 3: Segmentation 20 marks  TOTAL MARKS 40 marks  (Total marks for the Final Assessment) |  |

Integrity Question / Statement

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| SENECA’S ACADEMIC HONESTY POLICY |
| As a Seneca student, you must conduct yourself in an honest and trustworthy manner in all aspects of your academic career. A dishonest attempt to obtain an academic advantage is considered an offense and will not be tolerated by the College. |

Add this declaration to your submission file:

I, ------------ (mention your name), declare that the attached assignment is our own work in accordance with the Seneca Academic Honesty Policy. I do not copy any part of this assignment, manually or electronically, from any other source including web sites, unless specified as references. I do not distribute my work to other students.

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| Section/Part 1 | (10 marks) |
| Instructions and Announcements  **Classification Problem**  **Bank client data (input variable)**  **• Age (numeric)**  **• Job : type of job**  **• Marital : marital status**  **• Education**  **• Default: has credit in default? (“yes”, “no”)**  **• Balance: average yearly balance, in euros**  **• Housing: has housing loan? (“yes”, “no”)**  **• Loan: has personal loan? “yes”, “no”)**  **• Contact: contact communication type**  **• Day: last contact day of the month**  **• Month: last contact month of year**  **• Duration: last contact duration, in seconds (numeric)**  **• Campaign: number of contacts performed during this campaign and for this client**  **• Pdays : number of days that passed by after the client was last contacted from a previous campaign (-1 means - client**  **was not previously contacted)**  **• Previous: number of contacts performed before this campaign and for this client**  **• Poutcome : outcome of the previous marketing campaign**  **Dependent Variable (desired target)**  • y: has the client subscribed a term deposit? (“yes”, “no”)  Import the following file:  https://raw.githubusercontent.com/jackty9/Handling\_Imbalanced\_Data\_in\_Python/master/bank-full-encoded.csv | |
| Question 1 (1 marks) Import the data set and Check the datatypes of the attributes. | |
| Question 2 (1 marks) Are there any missing values in the dataset? | |
| Question 3 (1 marks) Splitting the Data-Set into Independent and Dependent Features. | |
| Question 4 (1 marks) Convert categorical variable into numeric Using one hot encoding method. | |
| Question 5 (1 marks) Divide the dataset to training and test sets. | |
| Question 6 (1marks) Normalize the data set. | |
| Question 7 (2 marks) Use the K-nearest neighbor (KNN) to predict the test set out values. | |
| Question 8 (2 marks) Display the confusion matrix to evaluate the model performance and Evaluate the model performance by computing Accuracy. | |

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| Section/Part 2 | (10marks) |
| Instructions and Announcements  Download Credit.jpg’ from blackboard. | |
| Question 1 (2 marks) Open ‘Credit.png’ image and convert it to greyscale. Display the greyscale image. | |
| Question 2 (4 marks) Use the OpenCV Sobel function to find the edges on the image. Use a Sobel filter. Display the results for the following parameters as well as two output datatypes, i.e., CV\_8U and CV\_64F (paste results here):   * dx =1 , dy = 0 * dx =0 , dy = 1 * dx =1 , dy = 1   What do you notice for datatypes? Explain.  What do dx and dy show? Explain. | |
| Question 3 (2 marks) Compare your result for (Question 2) with the result of applying a Canny edge detector. Experiment with different threshold values and display two samples here. | |
| Question 4 (2 marks) How is threshold changing the results? Then, explain how is the Canny map different from the previous maps? | |

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| Section/Part 3 | (20 marks) |
| Instructions and Announcements | |
| Question 1 (2 marks): Load the Fashion MNIST data from keras. datasets and preprocess the data (similar to the MNIST Digits dataset) to be fed to a dense (FCN) model. | |
| Question 2 (6 marks): Build a CNN with the following configurations. (Note: only construct the network and compile, do not train (i.e., do not call fit function))  Configurations:   * 3 Convolutional layers with kernel size of (3x3) and activation functions ‘relu’ and filter (channel) sizes of [32,64,64]. The first and second Conv layers are followed by a max pooling layer of size (2x2). * The classification part has one dense layer of 64 units and relu activation. (Add the last layer yourself). * Optimizer = ‘rmsprop’ | |
| Question 3(6 marks): Perform cross-validation by setting "validation\_split=0.1", “Batch size= 64” and "epochs=50", and generate validation loss and accuracy plots. What seems to be an ideal number of epochs? Save the trained model. | |
| Question 4( 6 marks): Re-train the model using the number of epochs identified in question 3, and test the performance over the test set. Report the accuracy value. | |