TU Dublin, Tallaght Campus
Enterprise Computing and Digital Transformation

HCAIM – Human Centric Deep Learning 2022/23
CA3 (50% Weighting) – Group Work

CA Overview:

Students an use any dataset that is available publicly. The only restrictions is that it must not be previously used in any HCAIM lab, or it should not be used in a students thesis project.

This group work will span the module, where students will develop a deep learning model for a specific context, with an emphasis on producing evidence of transparency, Explainability while using suitable XAI techniques.

CA Points:

All steps should be separated in a Jupyter notebook (sections), and two versions of the notebook are required on final upload of the elapsed CA: HTML(or PDF) and the .ipynb Jupyter notebook.

Note: The HTML(or PDF) will be run through TURNITIN, for plagiarism evaluation, where the institution's plagiarism policy will be applied[1].

Students are expected to discuss each piece of work, expanding on the rationale for selection of techniques and the processes applied to get to the final model, including the use of any visual aids such as tables, plots etc. The word count is a minimum of 3000 words. Code on its own, will not be considered as a passing grade. Students will also be expected to present their work in a presentation.

Please add your names and student numbers as the first block in markdown on the notebook.

Each student must upload the project, as well as their individual contribution document (point 8 in Appendix 1).

[1] https://www.tudublin.ie/for-students/student-services-and-support/student-wellbeing/disability-support-services/tallaght/open-book-exam-study-tips/policy-on-plagiarism/#:~:text=Plagiarism%20Policy%20Statement%20%2D%20TU%20Dublin%20%2D%20Tallaght&text=Globally%2C%20plagiarism%20is%20recognised%20as,recognition%20to%20the%20original%20source.

CA Headings:

The CA will be graded under the following headings. Where each heading should have (where appropriate) a rationale and description expanding the approach and its findings, code that executes the work, and in some cases a visual aid to further compound your findings. Use standard Jupyter Notebook markdown, to crate headings and sections. A grading Rubric is also provided in Appendix 1.

The following headings should guide your project:

- Introduction, background and rationale on the dataset
- Opening the dataset, data exploration (for data bias) and data pre-processing
- Model development
- Model performance evaluation
- XAI for the model
- Discussion on the model performance and Explainability
- Student individual contributions (not graded but needs to be listed in the JN)
- Summary and conclusion

Non headings but deliverables:

- Presentation (15 minutes)

CA Notes:

At all stages, precautions must be taken to ensure work is competed by the CA deadline.

It is up to the student to select the notebook platform (such as locally, Google CoLab or on Azure Data Science Virtual machines) and it is the student's responsibility to ensure that the platform has the required version of Python, Anaconda and required libraries.

Appendix 1 – Grading Rubric

1. Introduction, background and rationale on the dataset
2. Opening the dataset, data exploration (for data bias) and data pre-processing
3. Model development
4. Model performance evaluation
5. XAI for the model
6. Discussion on the model performance and Explainability
7. Summary and conclusion
8. Student individual contributions (not graded but needs to be listed in the JN)
9. Presentation (15 minutes) (each student must present a section 5 minutes per student)

ID	Marks	Poor example	Average Example	Strong example
1	5	Little to no discussion on the dataset and its overall structure. No rationale discussed.	Some discussion on the dataset and/or structure. No rationale discussed or weak rationale.	Strong understanding of the dataset and its structure presented. Rationale presented for selecting this dataset and project context.
2	10	Dataset opened, little to no data exploration and no pre-processing. No bias investigation conducted.	Dataset opened, and some pre-processing completed, little or no discussion on the process. No bias investigation conducted.	Dataset opened, data was explored, correct preprocessing was applied and a strong investigation and discussion on data bias.
3	10	One network developed, no rationale for the selection of models or the order of development.	Two networks developed, one glass box and one black box, but tuning and development weak.	Two networks were developed, strong rationale for the selection of models (one glass box and one white box).
4	5	Little or no model evaluation, no comparison between Glassbox and Blackbox models.	Basic model evaluation, no comparison between Glassbox and Blackbox models.	Strong model evaluation, strong comparison between Glassbox and Blackbox models.
5	25	Little to no XAI applied or only applied to one prediction or class type or to one model (Glassbox and Blackbox).	Some XAI applied and basic analysis per prediction type or class type or to one model (Glassbox and Blackbox).	String XAI applied and strong analysis per prediction or class type (for example 2 examples of incorrect predictions [or high RMSE] and 2 examples or correct predictions [or low RMSE] for both Glassbox and Blackbox.
6	20	Little to no discussion and no relation to the predictions.	Some discussion on what the XAI means with respect to correct and incorrect predictions, but not well related.	Strong discussion on what the XAI means with respect to correct and incorrect predictions.
7	5	Summary weak, and no relation to Glassbox and Black box models.	Summary is average, and some relation to Glassbox and Black box models.	Summary is string, and strong relation to Glassbox and Black box models.
8	0	Students are required to upload individually a document (maximum 500 words) detailing their contribution to the project.		
9	20	Weak presentation, little to no understanding of the points and meaning that the student is discussion.	Average presentation, some understanding of the points and meaning that the student is discussion.	String presentation, string understanding of the points and meaning that the student is discussion.
Total	**100**			