

UNIVERSITY OF CHESTER
Faculty of Science and Engineering
ASSIGNMENT BRIEF

Module No SE7048	Module Title AI for Modern Use-Cases	Academic Year 2022/23	Assessment No 3
Submission Deadline (Date/Time) 5 May 2023 (Friday) / 5:00 PM			
Assignment Title Group Project			
Learning Outcomes Assessed 2. Learners will be able to identify which AI algorithm to apply for achieving optimal solution for a given application 3. Learners will be able to use appropriate software tools to design and implement an effective and efficient solution for a given application			
Submission Information Submission for this assignment will be online, via the Turnitin box on Moodle SE7048. You must submit your work as a SINGLE document in .html format. Documents submitted through other routes (eg. via email) or in other formats (eg. MS-Word / PDF / Open Office) will not be marked. You must ensure you retain a copy of your completed work prior to submission.			
Extensions and Plagiarism Extensions In Exceptional Circumstances it is possible to apply for a 7-day self-certified extension for this piece of work with sufficient reasoning , approval can only be granted by your Head of Department. For extensions above 7 days, LWP waivers and Deferrals in Exceptional Circumstances you must provide evidence , these can only be granted by your Head of Department. Late work is penalised at the rate of 5% per day. All extension/late work waivers must be applied for via the online system – Sign In (chester.ac.uk) Full details of the exceptional circumstances policy can be found via this link - Exceptional Circumstances (chester.ac.uk) Academic Integrity Breaches of academic integrity can take a number of forms, including, but not confined to plagiarism, falsification of data, submitting work written by someone else, collusion and cheating in examinations. The material you submit must be your own work. The penalties for breaching Academic Integrity are severe . Further information is available at Portal > Support Departments > Academic Quality Support Services > Academic Integrity https://www1.chester.ac.uk/academic-quality-and-standards/student-affairs/academic-integrity			

Important Information – Please Read Before Completing Your Work

Any queries that you may have on the requirements of this assessment should be e-mailed to Mohammad Samar Ansari (m.ansari@chester.ac.uk). No queries will be answered after the submission date.

You must ensure you retain a copy of your completed work prior to submission.

You must read the information about academic malpractice, which is available on Portal. The site helps students to understand what constitutes academic malpractice and tells you what procedures will be followed if academic malpractice is suspected.

Referencing

When you are writing academic work you are invariably engaging with the ideas and arguments of the broader academic community. In order that this is done fairly and consistently, procedures for the referencing and acknowledgement of the work of others have been developed. All academic work must follow these procedures and fully acknowledge its sources. Failure to do so is considered to be plagiarism and the University, in line with other Higher Education institutions, follows a policy on academic malpractice.

In referencing academic work, the Faculty of Science and Engineering expects you to follow the [APA](#) system.

Assignment Brief

Assessment Component: Group Project (individual report to be submitted)

You should prepare and submit a written project report along with the Python code as a combined Google Colab / Jupyter Notebook, and convert/save it as **.html** file with all text, comments, code, and results included, in accordance with the information and instructions provided in **Appendix-A (page 3 of this document)**.

Marking Criteria

Marking Criteria for assessment is based on the generic marking criteria for level 7 detailed in the Programme Handbook and Moodle page.

Specifically, for this coursework component, the submission should demonstrate:

- Clear understanding of the background of, and the methodology adopted for the project work.
- Evidence of competence pertaining to the tasks assigned in the project.
- Clear and concise reporting of the results and inferences.
- Clear and detailed commenting on the important portions of the code
- High quality of communication skills and overall presentation of the written document including correct referencing.

Further Support

Academic Skills staff are available at the main campus.

Find out about all the ways Study Skills can help you with your academic writing by visiting their portal <https://portal1.chester.ac.uk/Iti/Pages/study-skills-for-students.aspx>

The Academic Skills Moodle pages are at <https://moodle.chester.ac.uk/course/view.php?id=8136>

Instructions:

- This project is to be done in groups of 3-4 students per group, with individual reports to be submitted for each student.
- Each student must submit their individual report on Turnitin.
- **Only ONE .html file will be accepted from each student.**
- **Python code must be included, along with the results (images and code outputs), tables and text comments in the report.**

Description of the project

For this project, you are required to design a lightweight deep learning model for the following use-case:

- Fire detection in 2D images

The reference paper for the task is available here:

<https://arxiv.org/abs/1905.11922>

The task for this project is to design a deep learning model which is 'better' than the model proposed in the reference paper above. The definition of 'better' is the following (for this project):

- The designed model must have a lower trainable parameter count than the reference model.
- The values of Accuracy, Precision, and Recall must all be better (higher) than those of the model in the reference paper (obtained for the author's own dataset – which you will also be using for this project).
- You should disregard all results on Foggia's dataset in the reference paper, as you will not be using that dataset for training and testing of your model.

For the training and testing of the model that you will be designing, you **must** use the datasets available here:

<https://tinyurl.com/mw5jm5xh>

S. No.	Task	Marks
1.	Print 5 randomly selected images from the Train dataset, and 5 randomly selected images from the Test dataset, with their corresponding labels. Include the Python code for this as well as all the subsequent steps in this assignment. Clear and detailed commenting on the important portions of the code must also be included for all the code(s) in this entire assignment.	5
2.	Design and implement a lightweight model for fire detection as described above (in the description). Include the appropriately commented Python code in your report. Use the images in the training dataset (obtained from the link provided above) for the training and validation of the model.	30
3.	Present a tabular comparison of the Number of Trainable Parameters, and the Accuracy, Precision, and Recall for your model versus the reference paper's model for the images in the test dataset obtained from the link provided above.	5
4.	Include the inference results of your designed model for 10 'new' images of scenes with fire in them, and 10 images which do not contain fire. These images must be other than the ones in the training and test datasets. <i>Hint:</i> you can go to an internet image search engine to search for, and download, the 10 fire images. For the non-fire images, you can choose any 10 random images from the internet.	10