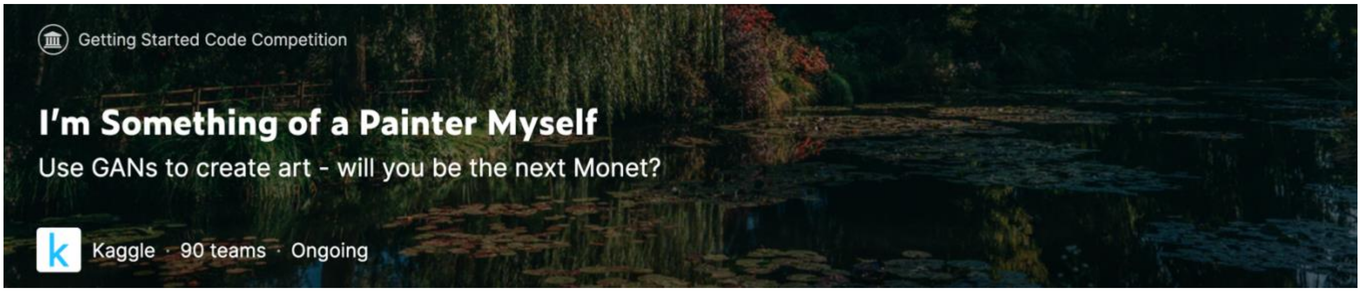
Deep Learning
Final Project - 2023

The main goal of this mid semester project is to summarize the main topics that we have discussed in the course using some practice and theory.

In this project you will solve the Kaggle competition:
https://www.kaggle.com/competitions/gan-getting-started



Getting Started Code Competition

I'm Something of a Painter Myself

Use GANs to create art - will you be the next Monet?

Kaggle · 90 teams · Ongoing

The monet directories contain Monet paintings. Use these images to train your model. The photo directories contain photos. Add Monet-style to these images.

But...in this project you have one more constrain…

The original Monet directory in this challenge contains 300 Monet paintings sized 256x256 for training.

You are allowed to use only 30 paintings in the training as part of this competition.
The method you choose to collect these 30 paintings should be calculated and specific for the above problem. During the implementation of the project, you will need to detail and explain the algorithm or method you used (In the notebook and the report).

You will find the template notebook in the following link:

https://colab.research.google.com/drive/18ne5AICyCK3qvRv7JIj7RFoJJI8HyTZS?usp=sharing

After entering the notebook click on the "File" tab and then on "Save a copy into drive".
You can then work on the project within your personal drive environment.

Your goal is of course to be the best. do not forget this is a competition.

Guidelines:

1. As mentioned above, **you are allowed to use only 30 paintings**. Show in detail in the report the algorithm or method by which you selected those 30 pictures.

2. Use Python & standard DL platform: Keras, TensorFlow, PyTorch.

3. In addition to the Kaggle submission, you need to supply also 2 google colab notebooks. One notebook for a training phase and one for the test environment.

4. For this project you will need to implement two different architectures of generative models. When one of them must be Cycle-GAN, the second architecture is up to you. One of the discriminators of the above architecture will be a Patch-GAN when its receptive field will have a **different size than 70x70**.
   The best architecture will be the one you submit to the Kaggle competition.

5. The size of the generated images from your networks will be 320x320 (For the academic submission). For the submission to the Kaggle contest use imresize() to resize the image from 320 to 256.

6. You are **not allowed to use any pre-trained models like transfer learning methods, external metadata etc**. Create and train the models yourself. Remember: We want to see your understanding of DL and not your ability to use libraries and modules.

7. You are **not allowed to use any architectures** that you haven't learnt in the course.

8. **Experiments (Must)** - In your final report, compare different approaches, different hyperparameters, different architectures etc.
   Show graphs (In the notebook and report) comparing the different parameters and different methods.

9. For every experiment, in each architectures, Show (In the notebook and report) the results of the model (the output images) during training and a convergence graph (Loss according to the number of epochs). In addition, explain in details what the architecture of the network and the hyper parameters that you chosen, the method you worked on and the thinking behind it.
   Even if you did not solve the problem - supply visual results and show what you came up with.

10. The notebook of the test environment will be built according to the video we attached to the submission box. The test environment will load the trained weights/trained model (for each of the two different architectures) and will be ready to receive a 256x256 image from the user, pass it through the model and present the user with a 320X320 generated image.

11. All training outputs will be displayed in the notebook.

12. Submit a final report in pdf format when your ID numbers are included in the file name.

13. You need to supply your code as Google Colab notebooks. Such that the course team can run it.

14. **Write a clean code**! Separate code cells and make extensive use of text cells. A sloppy notebook will result in a lower grade.

15. Do not change anything in notebook after the final submission date. A notebook that has been ran/changed after the submission date will be **automatically disqualified**.

Due Date:
Final Project submission is due **February 20th at 23:59**.

Kaggle Submission:
Registration for the Kaggle competition will be according to the instructions you will find on the Kaggle website. The name with which you register for the competition (and it is the one that will be displayed on the scoreboard) will be taken from the following registration file:
https://docs.google.com/spreadsheets/d/1qAFcR0gGp4rRJgz86389i9b62_NZufhpbhC7NNgjnHA/edit?usp=sharing

I note that registering for the Kaggle competition and using the names given in the registration file is mandatory.

Course Submission:
Detailed report including graphs, source code links (to Google Colab), relevant images and a README file containing relevant explanations for running the notebook.
Your report should be in the style of a conference paper, including introduction, motivation, related work, etc.
Each part of the project must have experiments, if you failed in a particular experiment, explain why you think you failed and what you have done to improve from there.
You are expected to use very elaborate explanations and use visual means to show your results (plots, graphs, etc.). Your grade would be greatly affected by the report you write so write the report thoroughly!

The report will be written using an online collaborative LaTeX editor called overleaf (link below).

An example: https://www.overleaf.com/read/ktjddrrdbnpr

Everything in the report should be in your own words - all quotes must be clearly attributed.

The report will be submitted to the submission box. The file name of the report will contained your IDs as following: **report_ID1_ID2.pdf**

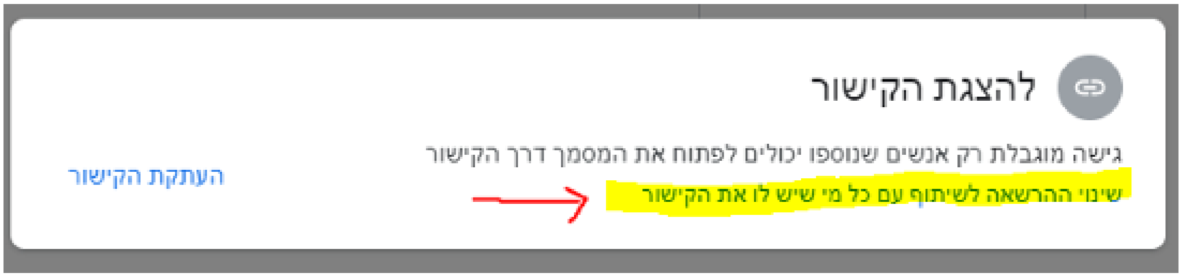
Be very clear about what code you've used from other sources, if any. Clear citations are essential. Failure to credit ideas and code from external sources is cheating and will result in immediate disqualification.
Make sure you evaluate both the good and bad points of your approach.
Even if you didn't accomplish your goal, evaluate what you did.

Do not forget to include the project title, your name and ID in this file.
Max number of pages: 10 (but you don't have to use them all !!).

The notebook will be presented in an orderly and clean manner, it will contain separate code cells and text cells that explain the actions performed.
** **Very important** ** - when submitting, the notebooks will contain **all the outputs** relevant to the training results.

To the submission box you will also submit an **explainer.md** file that contains instructions and explanations on how to operate your notebook and other relevant details that need to be known to those who want to use your notebooks.

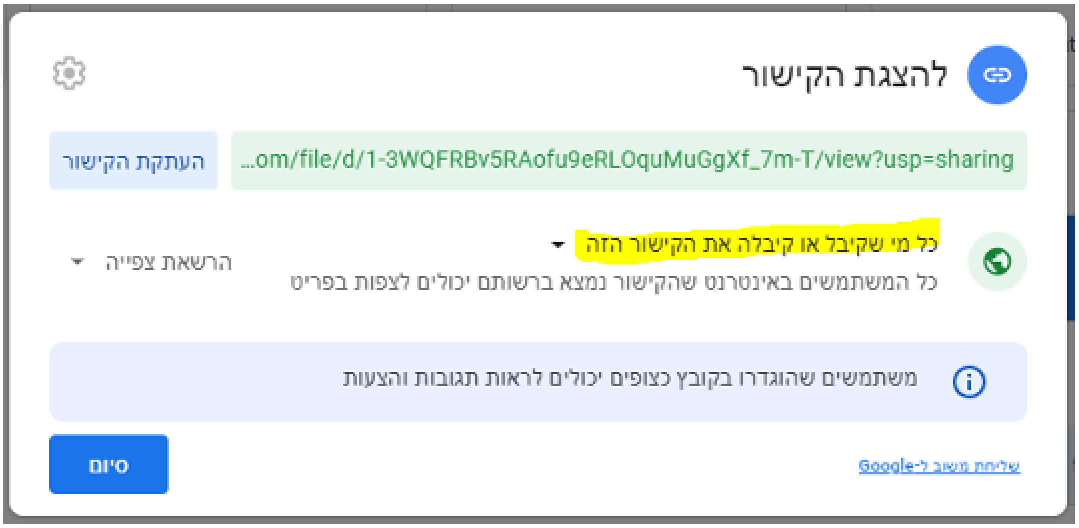
You will share the notebook from your "Google Drive" account, it can be shared with anyone who holds the link as follows:



להצגת הקישור

גישה מוגבלת רק אנשים שנוספו יכולים לפתוח את המסמך דרך הקישור

שינוי ההרשאה לשיתוף עם כל מי שיש לו את הקישור



להצגת הקישור

...om/file/d/1-3WQFRBv5RAofu9eRLOquMuGgXf_7m-T/view?usp=sharing

כל מי שקיבל או קיבלה את הקישור הזה

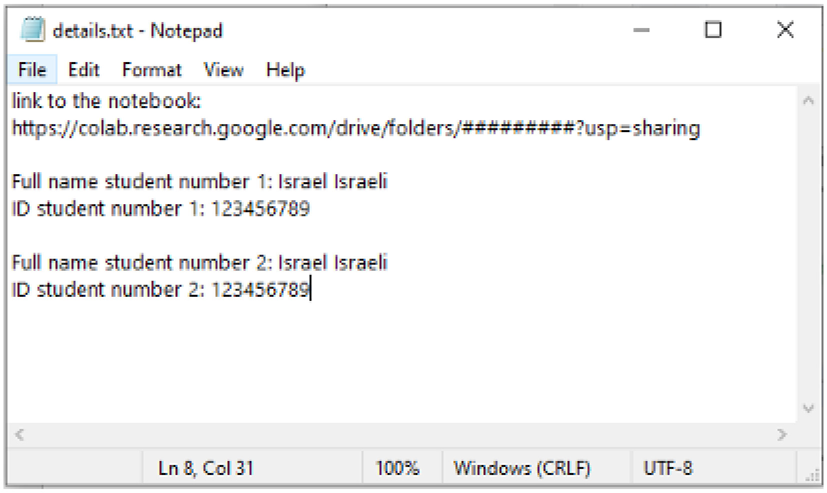
כל המשתמשים באינטרנט שהקישור נמצא ברשותם יכולים לצפות בפריט

הרשאת צפייה

משתמשים שהוגדרו בקובץ כצופים יכולים לראות תגובות והצעות

Submission will be done in pairs when only one of the partners submits the assignment to the submission box.

Enter your details in the text file named **submit.txt**, the address of your notebooks (train and test), the names and ID of the two partners, as follows:



details.txt - Notepad

```
link to the notebook:
https://colab.research.google.com/drive/folders/#########?usp=sharing

Full name student number 1: Israel Israeli
ID student number 1: 123456789

Full name student number 2: Israel Israeli
ID student number 2: 123456789
```

In addition to the links to the notebooks you submitted in submit.txt, you will also submit the notebooks themselves to the submission box. You can download the notebook from the Colab interface in the following way: File → Download → Download ipynb

To sum up, in the submission box, submit the following files:

1. submit.txt
2. report_ID1_ID2.pdf
3. train.ipynb
4. test.ipynb

Team size
The project will be performed in groups of 2 students.

Academic Integrity
Team/Student may not copy code from other teams/students. Copying answers or code from other students for a project is a violation of the university's honor code and will be treated as such. All suspicious activity will be reported to the head of the department and the university authorities.

Giving code to another student is also considered a violation. Students are responsible for protecting their own work from copying.

If you build some of your code on existing work and utilize existing code (your own or code found on the web), you must give proper attribution to all existing work that you used and make it clear what you changed and contributed. Any unattributed or uncited work that you use will be considered a breach of academic honesty and dealt with according to the course policy in the syllabus.

In any matter related to the project, even administrative, you can contact Aviv German at:
Germana2@biu.ac.il