DISSERTATION SUPERVISION LOGBOOK

Institute	Institute of ICT
Programme	Bachelor of Science in Software Development
Dissertation Title	**Black and White Image Colourisation using Deep Learning Techniques**
Supervisor	**Mr Thomas Gatt**
Student	**Mr Fabian Muscat**
Student ID No	**446102L**

Note

It is the **student's responsibility** to ensure that this logbook is correctly documented and maintained, and that Supervisor recommendations and signatures are acquired after each and every meeting.

This logbook is to be submitted together with the dissertation.

The institute reserves the right **to not accept** the student's dissertation for evaluation if this logbook is **not filled in correctly** and **duly signed** by the student and supervisor as indicated.

Meeting Number : 1	**Date of meeting : 18/10/22**

Issues discussed at the meeting (*to be filled in by Student*)

- Dataset
  - How will the dataset be built?
  - What kind of images will be in the dataset?
    - Landscapes, portraits, war images, etc.
- Literature Review
  - Starting the literature review
  - Summarising

Supervisor recommendations (*to be filled in by Supervisor*)

- Approaches you can take:
  - Build your custom dataset by downloading images of landscapes (as an example) and add a black and white filter to them.
  - For war images, you can evaluate by using a questionnaire
  - You can also use the images from the Netflix series
- Literature Review:
  - Start looking into other literature that focuses on the same goal
  - Start with the Abstract, then Intro, Conclusion
  - Take short notes
  - Look into Matthew's dissertation as well
- Look into datasets as well as creating your own scraper (see first point)
  - Check what others used and if possible use the same dataset so that in the results section you will be able to compare with theirs as well

Date of Next Meeting	**Student Signature**	**Supervisor Signature**
25/10/2022		

Meeting Number : 2	**Date of meeting : 25/10/22**

Issues discussed at the meeting (*to be filled in by Student*)

- Format and structuring the dissertation
- Word count (estimate)

Supervisor recommendations (*to be filled in by Supervisor*)

- Consider using LaTeX to write your dissertation
- You can use Overleaf if you prefer. Find the template here: https://vle.mcast.edu.mt/course/view.php?id=2892
- Abstract - one paragraph
- Introduction 1000 words
- Literature review around 2.5 - 3k
- Methodology 2.5k
- Discussion & Results 2.5k
- Conclusion 1000 words
- Focus on Literature Review and start taking some points
- Look for conference or journal papers (Google Scholar is a good start)
- https://datasetsearch.research.google.com/

Date of Next Meeting	**Student Signature**	**Supervisor Signature**
08/11/2022	F. Muscat	

Meeting Number : 3	**Date of meeting : 8/11/22**

Issues discussed at the meeting (*to be filled in by Student*)

- Choosing the dataset
- Implementing a prototype/tutorial
- Comparing ground truths with predicted images

Supervisor recommendations (*to be filled in by Supervisor*)

- Ideally use the same datasets used by other papers
- You need to find colour images, then convert to greyscale
- Input to the model is the greyscale image
- Output of the model should be the coloured image
- During training you need to train the model
- Find a measure being used (ideally in recent papers) to compare the output (coloured image) with the ground truth (actual coloured image)
- For tutorials consider looking into:
    - https://pyimagesearch.com/
    - https://towardsdatascience.com/
    - Articles posted on medium.com

Date of Next Meeting	**Student Signature**	**Supervisor Signature**
01/11/2022	F. Muscat	

Meeting Number : 4	**Date of meeting : 22/11/22**

Issues discussed at the meeting (*to be filled in by Student*)

- Literature review difficulties
  - Structure
  - Sections

Supervisor recommendations (*to be filled in by Supervisor*)

- Literature review structure: refer to the points mentioned during the meeting and the dissertaion structure sent to you
- Every chapter should have an introduction and a conclusion (check my structure for a reference)
- Focus on the literature review and its structure

Date of Next Meeting	**Student Signature**	**Supervisor Signature**
29/11/2022	F. Muscat	

Meeting Number : 5	**Date of meeting : 20/12/22**

Issues discussed at the meeting (*to be filled in by Student*)

- Feedback on literature review

Supervisor recommendations (*to be filled in by Supervisor*)

- Literature review: In the machine learning section include a brief overview of machine learning. CNN should be explained after the brief overview and then you can say that over time new architectures led to improved outputs.
- Otherwise the structure seems fine
- Finalise first draft of the LR by end of December and please send for review

Date of Next Meeting	**Student Signature**	**Supervisor Signature**
07/02/2023	F. Muscat	

Meeting Number : 6	**Date of meeting : 07/02/23**

Issues discussed at the meeting (*to be filled in by Student*)

- What algorithms should be implemented?
- Limited war images found, not enough to build a dataset.

Supervisor recommendations (*to be filled in by Supervisor*)

- Look into the following architectures
  - https://www.kaggle.com/code/theblackmamba31/autoencoder-grayscale-to-color-image
  - https://www.geeksforgeeks.org/colorization-autoencoders-using-keras/
- Consider building a dataset for war images using the following reddit group
  - https://www.reddit.com/r/CombatFootage/comments/2w8l3c/album_of_high_quality_photos_from_ukraine/
  - https://www.google.com/search?q=ukraine+russia+war+images&sxsrf=AJOqlzXQODHCKmmINYoKIemysBHSZzLsjQ:1675787467880&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjExPfl6oP9AhV_RPEDHUdAC7AQ_AUoAXoECAEQAw&biw=1920&bih=933&dpr=1
- You can use ready made APIs to download Google Image Search results
- Look into different architectures and test them and then continue working on the Lit Review

Date of Next Meeting	**Student Signature**	**Supervisor Signature**
14/02/2023	F. Muscat	

Meeting Number : 7	**Date of meeting : 14/02/23**

Issues discussed at the meeting (*to be filled in by Student*)

- Autoencoder training is too slow on macbook.
- What machine to use to train algorithms.

Supervisor recommendations (*to be filled in by Supervisor*)

- Make sure you mac is using the GPU to train: Solved after the meeting
- Compare the performance on your Mac with Colab
- Continue working on the prototype and then finalise your literature review

Date of Next Meeting	**Student Signature**	**Supervisor Signature**
21/02/2023	F. Muscat	

Meeting Number : 8	**Date of meeting : 28/02/23**

Issues discussed at the meeting (*to be filled in by Student*)

- Evaluating the algorithms
- Questions regarding neural networks and how they work

Supervisor recommendations (*to be filled in by Supervisor*)

- Algorithm that calculates the colour differences so that you can report a metric to show the 'accuracy' of the colourisation
- Check the comments written during the meeting

Date of Next Meeting	**Student Signature**	**Supervisor Signature**
07/03/2023	F. Muscat	

Meeting Number : 9	**Date of meeting : 09/03/23**

Issues discussed at the meeting (*to be filled in by Student*)

- Increased images in dataset but some images might cause problems during training

Supervisor recommendations (*to be filled in by Supervisor*)

- Dataset: Delete images from ukraine that are not related
- **See if you can find and use the same datasets to compare your results like with like**
- Go through the survey paper and cite it in your Literature Review. Focus on the algorithm that gives promising results and implement that
- Then finalise your LR, continue working on the prototype, and start documenting your methodology chapter.
- In the meantime you can also run a number of experiments and document them because you'll find these handy when writing the results chapter.

Date of Next Meeting	**Student Signature**	**Supervisor Signature**
14/03/2023	F. Muscat	

Meeting Number : 10	Date of meeting : 05/04/23

Issues discussed at the meeting (*to be filled in by Student*)

- Which loss functions to use for auto-encoder/GAN.
- Comparing and evaluating results

Supervisor recommendations (*to be filled in by Supervisor*)

- **See if you can find and use the same datasets to compare your results like with like**
- Continue working on the GAN implementation
- Look into the SSIM algorithm to compare the groundtruth with the predicted image
- Look into other algoirhtms that can compare the groundtruth with the predicted image (that respects the colour aspect)

Date of Next Meeting	Student Signature	Supervisor Signature
18/04/2023	F. Muscat	

Meeting Number : 11	**Date of meeting : 18/04/23**

Issues discussed at the meeting (*to be filled in by Student*)

- Discuss lit review (feedback)
- What to include in methodology
- What to include in surveys
- Problems running GAN

Supervisor recommendations (*to be filled in by Supervisor*)

- **Good progress on the Lit Rev.**
- **LR Draft was reviewed and comments were sent**
- **Try to finalise draft of Methodology by end of the month**
- **Finalise code to start conducting the experiments**
- **Start working on the survey**

Date of Next Meeting	**Student Signature**	**Supervisor Signature**
11/05/2023	F. Muscat	

Meeting Number : 12	**Date of meeting : 11/5/23**

Issues discussed at the meeting (*to be filled in by Student*)

- GAN requires further training (using too many resources on local machine)
- Plotting and discussing results

Supervisor recommendations (*to be filled in by Supervisor*)

- **GAN code was ran on ICTAR server and results were sent to Fabian.**
- **Good progress on the Methodology chapter. Focus on finalising it and start working on your Results chapter.**
- **Finalise the code for GAN and send it to me so that I can run it on the server**
- **Start working on the survey**

Date of Next Meeting	**Student Signature**	**Supervisor Signature**
--	F. Muscat	