**DISSERTATION SUPERVISION LOGBOOK**

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| **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** |



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

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| **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/ | |
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| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
| 08/11/2022 |  |  |

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| **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 | |
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| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
| 01/11/2022 |  |  |

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| **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 | |
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| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
| 29/11/2022 |  |  |

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| **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 | |
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| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
| 07/02/2023 |  |  |

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| **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 | |
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| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
| 14/02/2023 |  |  |

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| **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 | |
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| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
| 21/02/2023 |  |  |

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| **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 | |
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| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
| 07/03/2023 |  |  |

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

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| **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) | |
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| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
| 18/04/2023 |  |  |

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| **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** | |
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| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
| 11/05/2023 |  |  |

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| **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** | |
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| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
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