# DISSERTATION SUPERVISION LOGBOOK

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| **Institute** | Information & Communication Technology |
| **Programme** | B.Sc. (Hons.) Software Development |
| **Dissertation Title** | Recognizing the sequential state of knots for educational purposes. |
| **Supervisor** | Mr Frankie Inguanez |
| **Student** | Mr Alvin Cassar |
| **Student ID No** | 76402L |

**Note**

I. 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.

II. This logbook is to be submitted together with the dissertation.

III. 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 : 01** | **Date of meeting : 07/10/2022** |
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**Issues discussed at the meeting (*to be filled in by Student*)**

- Git repository
- Logbook
- Dissertation Template
- Plan

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

- Create a git repository and share with me (Frankie Inguanez). Upload all papers in a folder called lit. Upload this logbook in a folder called doc. Upload all code in a folder called src.
- Shared an overleaf template of dissertation write-up. Fill-in accordingly periodically.
- Fixed weekly meeting schedule.
- Start gathering papers to identify existing datasets, methodologies and algorithms. Ideally up to 10 years. Yolo v7 has been released and might be of interest.
- Deadline for literature review is mid November. This should include the following sections:
    - Domain Overview (education on knot tying)
    - Current state of the art (what researchers are publishing, use-cases)
    - Existing datasets
    - Existing algorithms, metrics.

| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
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| **14/10/2022** | Alvin Cassar | |

| **Meeting Number : 02** | **Date of meeting : 14/10/2022** |
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**Issues discussed at the meeting (*to be filled in by Student*)**

- Literature Review
- SOI
- Official Documents
- Way forward

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

- There is no need to resubmit your SOI since your June submission was accepted.
- Shared with you DOC 100 which is the dissertation guidelines. Use for reference purposes. Shared with you the IEEE Referencing guidelines, use for reference together with Overleaf template.
- Start drafting the literature review whereby you identify academic papers to:
    - Determine if any datasets on your subject matter already exist and if they need to be modified/increased.
    - Determine key characteristics of similar dataset, in case you need to create your own dataset (resolution, camera angle, distance, background, lighting).
    - Current algorithms that are relevant and available.
    - What other researchers are doing and achieving. Also how to compare one algorithm to another (metrics)
- Attempt to have a first draft of the literature review by mid November for review.
- It is recommended to enumerate (encode) each paper, then write notes for each. Go through the paper and document any important aspects and contributions. When writing a literature review you have to go through an iterative process:
    - Search for paper
    - Research strength of paper (release year, citation count, publisher)
    - Briefly read paper and determine the gist and contribution.
    - Go through the paper and identify key contributions and note them down.
    - Identify any other papers cited within the current paper that are worthwhile tracking down.
    - Write a summary about the paper.

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

| **Meeting Number : 03** | **Date of meeting : 01/11/2022** |
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**Issues discussed at the meeting (*to be filled in by Student*)**

- Progress update

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

- Discussed papers and found requested paper.
- Start drafting literature review.
- To consider having two approaches, training by providing images per step per class. Second method by identifying building blocks of a knot and annotating different knots. Then creating a model trained on annotations.

| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
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| **18/11/2022** | Alvin Cassar | |

| **Meeting Number : 04** | **Date of meeting : 18/11/2022** |
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**Issues discussed at the meeting (*to be filled in by Student*)**

**Literature Review**

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

Good start. Consider more than just 2 papers for a topic. If there are other comparisons consider adding a table with the year of publication, authors, technique/algorithm and results for a better comparison. Attempt to have first draft of literature review ready by December.

| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
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| **09/12/2022** | Alvin Cassar | |

| **Meeting Number : 05** | **Date of meeting : 09/12/2022** |
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**Issues discussed at the meeting (*to be filled in by Student*)**
Next meeting
Literature Review

**Supervisor recommendations (*to be filled in by Supervisor*)**
Go beyond just stating algorithm, dataset and results. See what researchers are identifying as limitations and recommendations.
After identifying which are the prominent algorithms explain them, such as Yolo and RCNN. Draft also the

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| research methodology. |

| Date of Next Meeting | Student Signature | Supervisor Signature |
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| **20/12/2022** | Alvin Cassar | |

| **Meeting Number : 06** | **Date of meeting : 20/12/2022** |
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| **Issues discussed at the meeting (*to be filled in by Student*)**<br><br>**Literature Review**<br>**Prototype** | |
| **Supervisor recommendations (*to be filled in by Supervisor*)**<br><br>Do not give personal opinion in literature review. Omit the problematic paper, or just limit to results from their experiment. Split large table in two.<br><br>Do a sample video and send it to me for feedback. | |

| Date of Next Meeting | Student Signature | Supervisor Signature |
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| **17/02/2023** | Alvin Cassar | |

| **Meeting Number : 07** | **Date of meeting : 17/02/2023** |
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| **Issues discussed at the meeting (*to be filled in by Student*)**<br><br>**Progress update** | |
| **Supervisor recommendations (*to be filled in by Supervisor*)**<br><br>You need to catch up on low progress. Finalise literature review, start drafting research methodology, and set a plan of research experiment. Train model. | |

| Date of Next Meeting | Student Signature | Supervisor Signature |
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| **28/02/2023** | Alvin Cassar | |

| **Meeting Number : 08** | **Date of meeting : 28/02/2023** |
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**Issues discussed at the meeting (*to be filled in by Student*)**

Research experiments.

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

Need to progress on write-up as per previous meeting suggestions.

Knots to consider

Reef knot

Granny Knot

Figure of eight

Double figure of eight

Bowline Knot

prototype 01:

A series of videos showing the steps needed to tie the knots

Experiment 01

Training of a model(s) to recognize the steps for each knot. Start with 1 knots, once you get a working prototype replicate for other knots.

Try 2 different viewpoints (top view, front facing view or a different view of your choice).

Research Question: what camera position is ideal for the correct recognition of steps in tieing a knot?

Research Question: What different model configurations are ideal for recognition of steps in tieing a knot?

Experiment 02

Use the trained model(s) and the gathered dataset from 3rd parties to test and evaluate the prototype.

Research Question: How does the prototype perform when utilized by 3rd parties?

Experiment 03

Meet with an individual or more, where they attempt to tie a knot or more, then using your prototype for feedback. Interview to gather feedback from participant.

Research Question: What are the end user opinon about this prototype?

| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
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| **21/03/2023** | Alvin Cassar | |

| **Meeting Number : 09** | **Date of meeting : 21/03/2023** |
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**Issues discussed at the meeting (*to be filled in by Student*)**

**Experiments and Results**

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

Make sure to have a balanced dataset.

You need to undertake experiments with incremental changes and not too many changes at one go. So the val/test dataset has to have the same camera angle, same background, same rope, same person first. Then subsequent tests change 1 variable of the mentioned at a time. Should the performance go down, then you might want to consider revising the train dataset. Such as different backgrounds.

| **Date of Next Meeting** | **Student Signature** | **Supervisor Signature** |
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| **28/03/2023** | Alvin Cassar | |

| **Meeting Number : 10** | **Date of meeting : 28/03/2023** |
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| **Issues discussed at the meeting (*to be filled in by Student*)**<br><br>**Experiments and Results** | |
| **Supervisor recommendations (*to be filled in by Supervisor*)**<br><br>Dataset is more balanced per class. Distribution of val and test needs to be justified. Ideally have same ratio such as 20% for both val and test.<br><br>Use test.py to get prediction metrices on test dataset.<br><br>Diversify aspects of the dataset such as background, lighting, angle. | |

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

| **Meeting Number : 11** | **Date of meeting : 18/04/2023** |
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| **Issues discussed at the meeting (*to be filled in by Student*)**<br><br>Experiments | |
| **Supervisor recommendations (*to be filled in by Supervisor*)**<br><br>Consider having a prototype that displays the detected knot stage, and indicates if a step has been missed or if knot is complete.<br><br>Consider showing a video to a number of participants and interview to gather opinion.<br><br>Consider training for another knot and identify what is different (number of stages, number of images per stage).<br><br>Consider experiments where you change a number of variables, such as background, lighting, person, rope, camera angle, camera distance. | |

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