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## Plan Overview

*A Data Management Plan created using UCT DMP*

**Title:** Deep Reinforcement Learning with Spatio-Temporal Graph Neural Network Encoders for Stock Trading on the Johannesburg Stock Exchange

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**Project Administrator:** Kabelo Lungile I. Mbayi

**Affiliation:** University of Cape Town

**Template:** UCT Student Generic DMP

### Project abstract:

This research investigates the use of Deep Reinforcement Learning (DRL) for automated stock trading on the Johannesburg Stock Exchange (JSE) Top 40. It examines how the choice of neural network encoder, the size of the input window, and the use of prediction-task pre-training affect trading performance. The study compares end-to-end and pre-trained DRL agents against standard portfolio benchmarks, evaluating performance using risk-adjusted metrics. The dissertation extends prior work on DRL trading in emerging markets and contributes empirical evidence on whether better predictive representations translate into better trading outcomes.

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**Start date:** 09-02-2026

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### Copyright information:

The above plan creator(s) have agreed that others may use as much of the text of this plan as they would like in their own plans, and customise it as necessary. You do not need to credit the creator(s) as the source of the language used, but using any of the plan's text does not imply that the creator(s) endorse, or have any relationship to, your project or proposal

# Deep Reinforcement Learning with Spatio-Temporal Graph Neural Network Encoders for Stock Trading on the Johannesburg Stock Exchange - Student Outline DMP

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## 1. General guidelines

### PURPOSE OF THIS TEMPLATE

The purpose of the Outline DMP is to indicate your initial plans for how your data will be collected, shared and stored, and to give you a chance to think about these data-focused aspects of the research process. As you begin doing your research, your data process may change, and it is perfectly acceptable to change your data management plan to accommodate the changes in your research process.

Indicate below that you understand the purpose of completing this Outline DMP template.

Question not answered.

## 2. Authors and supervisors

### PROJECT NAME

Replicate the title of your project, dissertation or thesis exactly as it appears in your proposal document.

Question not answered.

### PERSONAL DETAILS

Indicate the name(s) and student number(s) of the student(s) who will be involved in this project, dissertation or thesis.

Question not answered.

### SUPERVISOR(S) DETAILS

Indicate who will supervise this project, dissertation or thesis. If you do not yet have a supervisor, leave this section blank.

Question not answered.

## 3. Data Collection/Generation

### ORIGINAL DATA

Indicate whether you will collect or produce original data for your study. If yes, briefly describe the type of data and how you plan to manage it.

If you are unsure at this time, indicate what you think you are most likely to collect. If you are not intending to gather or collect your own data, declare that here.

Question not answered.

### DATA RE-USE

Indicate if you intend to re-use existing data, either from online searches or from datasets provided by your supervisor, lab, or funder.

If you are not intending to re-use existing data, declare that here. Also note any restrictions that apply to the re-use of data.

Question not answered.

### DATA SENSITIVITY & SECURITY

Indicate whether your research data may contain sensitive, personal, disclosive, or otherwise at-risk information.

If yes, briefly describe the type of sensitivity involved and the steps you will take to secure and control access to your data.

If you are unsure at this stage, indicate what you think is most likely. If your data is not sensitive, declare that here and state how you will still ensure responsible storage.

Question not answered.

## 4. Data Storage

### DATA SIZE ESTIMATE

Indicate the estimated size of your completed dataset, and indicate whether or not you will need to access additional data storage facilities. If such storage is not provided by your unit or department, you may need to factor in the cost of purchasing additional storage space.

Question not answered.

### DATA BACKUPS

Indicate how you plan to ensure your data is secure and retrievable in case of errors or hardware failure. Describe what procedures you will put in place to back-up copies of your data and where they will be stored.

Question not answered.

## 5. Data Sharing/Publication

### DATA SHARING

According to UCT's [Research Data Management policy](#), research data should be made open by default, with provisions for making it closed in specific cases (such as ethical considerations or potential commercialisation).

Indicate whether you plan to publish your research data.

- If yes: say where you will publish it and what licence (e.g., Creative Commons) you will use.
- If no: explain why, and refer to any ethical issues, commercial or patent intentions, or data-use agreements that prevent publication.

Question not answered.

### DATA DESCRIPTION

What information will you include to help others understand and use your dataset?

(For example: a short description of your study, explanations of variables, survey questions, or keywords. These are known as metadata.)

Question not answered.

## 6. Budget

### BUDGET

Indicate any costs specifically relating to the management and curation of your data, such as purchasing additional storage space, digitisation of physical media, data storage or curation charges, and data audits. Most student research will be able to make use of free options provided by UCT and will not have to budget for data costs.

Question not answered.

## Planned Research Outputs

### Software - "DRL JSE Stock Trading Pipeline"

Python source code implementing the experimental pipeline for training and evaluating Deep Reinforcement Learning agents on JSE Top 40 historical price data. Includes the simulated trading environment, encoder architectures, training scripts, evaluation routines, and configuration files.

### Text - "MSc Dissertation and Associated Research Papers"

Written research outputs from the project, comprising the MSc dissertation and associated research papers. The dissertation will be deposited in the OpenUCT institutional repository under the standard institutional terms. Research papers reporting baseline replication results and the novel contributions of the project are intended for submission to peer-reviewed venues, with self-archived copies deposited in the appropriate repository at acceptance.

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#### Planned research output details

Title	Type	Anticipated release date	Initial access level	Intended repository(ies)	Anticipated file size	License	Metadata standard(s)	May contain sensitive data?	May contain PII?
DRL JSE Stock Trading Pipeline	Software	2027-02-15	Open	None specified		None specified	None specified	No	No
MSc Dissertation and Associated Research Papers	Text	2027-02-15	Open	None specified		None specified	None specified	No	No