

Configuration Manual

MSc Research Project
MSc in Data Analytics

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MSc Project Submission Sheet
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Programme: MSc in Data Analytics **Year:** 2026
Module: MSc Research Project
Lecturer: Mohammed Hasanuzzaman
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Henry Egbulam
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Date: 27/01/2026

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1 Software Environment

Below are the Python version and the versions of libraries used to generate the reported results. Replicating these exact versions should prevent any unexpected compatibility issues from occurring.

- **Python:** 3.10.18
- **Pandas:** 2.3.2
- **Numpy:** 2.2.6
- **TensorFlow:** 2.20.0
- **Scikit-learn:** 1.7.2
- **Joblib:** 1.5.2
- **Matplotlib:** 3.10.7

2 Project Directory

The files below are submitted in the “Artefact (For Execution).zip”. All the files should be in the same folder for execution.

- *weather_data_train.csv*
- *weather_data_test.csv*
- *scaler.joblib*
- *model_development_next_hour.py*
- *model_next_hour_sagru.py*
- *plot_val_loss.py*
- *final_model_comparison.py*
- *visualise_model_predictions.py*

3 Execution Order

To replicate the modelling experiment described in the report, the Python scripts should be run in this order:

1. Run *model_development_next_hour.py*. It generates *best_stacked_gru_model.h5* and *stacked_gru_history.npy*.
2. Run *model_next_hour_sagru.py*. It generates *sagru_model_history.npy*.
3. Run *plot_val_loss.py*. It generates the “**Model Training Comparison: Validation Loss**” graph (Figure 3 in the report).

4. Run *final_model_comparison.py*. It prints the data “**Final Model Performance Comparison: IoT-Enhanced vs. OWM-Only (RMSE)**” (Table 2 in the report) and “**Performance Improvement: IoT-Enhanced Model vs. OWM-Only Model**” (Table 3 in the report) to the console.
5. Run *visualise_model_predictions.py*. It generates the “**60-Minute-Ahead Forecast vs. Actual Values**” graph (Figure 5 in the report).