CODECHECK certificate for: CY-Bench A comprehensive benchmark dataset for sub-national crop yield forecasting

Item	Value
Title	CY-Bench: A comprehensive benchmark dataset for sub-national crop yield forecasting
Authors	Dilli Paudel et al.
Ref. paper	https://www.overleaf.com/read/znytpcwfjrrf#a4ca1f
Codechecker	Adhitya Bhawiyuga, Nadia Shafaeipour, Nestor de la Paz Ruiz, Patrick Eneche, Frank O. Ostermann
Date of Check	2024-09-26
Summary	Full reproduction of sample data
Repository	https://osf.io/spxt5/
Ref. certificate	https://doi.org/10.17605/OSF.IO/SPXT5

Table 1: CODECHECK summary

Output	Comment
Table included in this report	See results section

Table 2: Summary of output files generated

Summary

The CODECHECK used a smaller sample dataset, since the original data set is quite large and would require several days of computation on the available hardware. However, the produced output matches that of the reported output (with one exception, see below).

CODECHECKER notes

Installation and data preparation

The repository lists hardware configuration and software requirements but provides little to no information how to create the computational environment.

On request, the authors provided a sample data set and some more instructions which were followed for this CODECHECK using a Ubuntu 22.04 virtual machine with 16 GB RAM running on a Windows 11 host.

First, the necessary code:

```
git clone https://github.com/BigDataWUR/AgML-CY-Bench

cd AgML-CY-Bench
```

Then, the sample dataset was installed:

```
git clone -q https://github.com/BigDataWUR/sample_data.git
cybench/data
```

Next, the computational environment was created:

```
conda create -n cybench python=3.12

conda activate cybench

pip install poetry

poetry install
```

Note that depending on the existing Python installation, the poetry install command may download many libraries of significant size and take a while.

Running the code

From within the cybench directory, the following command executes the benchmark for the sample dataset:

```
poetry run python cybench/runs/run_benchmark.py -d maize_NL
```

On the Ubuntu VM, the *fastai* library throws an error (*"syntax warning invalid escape sequence \R"*) but continues with execution. A quick check on a native Windows machine led to a crash of the script after this error.

Outputs

The produced output is a table that compares the different ML models:

Model	Normalized RMSE	Mape	R2
AverageYieldModel	15.315272	0.138884	-2.030467
LSTM	100.342422	0.993958	-243.831294
LSTMRes	16.195991	0.146065	-2.721487
LinearTrend	16.000073	0.145394	-2.473489
RidgeRes	18.258028	0.168041	-3.422917
SklearnRidge	17.919597	0.167856	-4.228888

Table 3: produced outputs from the benchmark

These match those reported at https://github.com/BigDataWUR/AgML-CY-Bench/blob/main/results_baselines/tables/tables_aug2024.md except for LSTM, which are roughly inflated by the factor of 2.

Acknowledgements

We would like to thank the listed author for the support in providing helpful information and participation in the workshop.