Appendix B

Experiment reproduction guide

This appendix provides a detailed guide outlining the step-by-step procedure for reproducing the conducted experiment. By following the delineated instructions, readers can ensure the reproducibility and reliability of the results.

B.1 Software and resources download

First, we need the software to perform Machine Learning operations.
Install Weka at: https://waikato.github.io/weka-wiki/downloading_weka/.

After installing Weka, the necessary feature sets (defined in Chapter 3.3) are needed to perform the experiment.
To download them: https://github.com/andrea-gariboldi/Facebook-Fake-News-Dataset/tree/main/dataset/arff.

B.2 Experiment setup

After the installation and downloading step, the experiment needs to be set up.
First open Weka, then select the Experimenter application (Figure B.1):

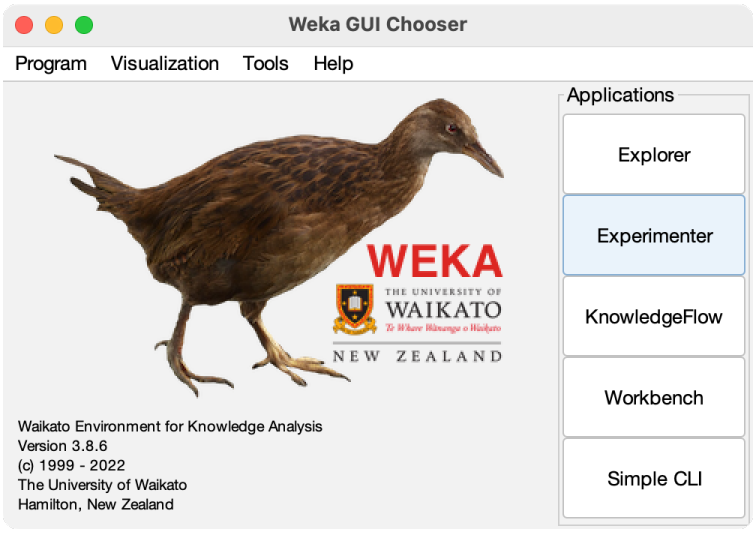

Figure B.1: Weka GUI Chooser.

After selecting the Experimenter, the Experiment screen (Figure B.2) pops up:

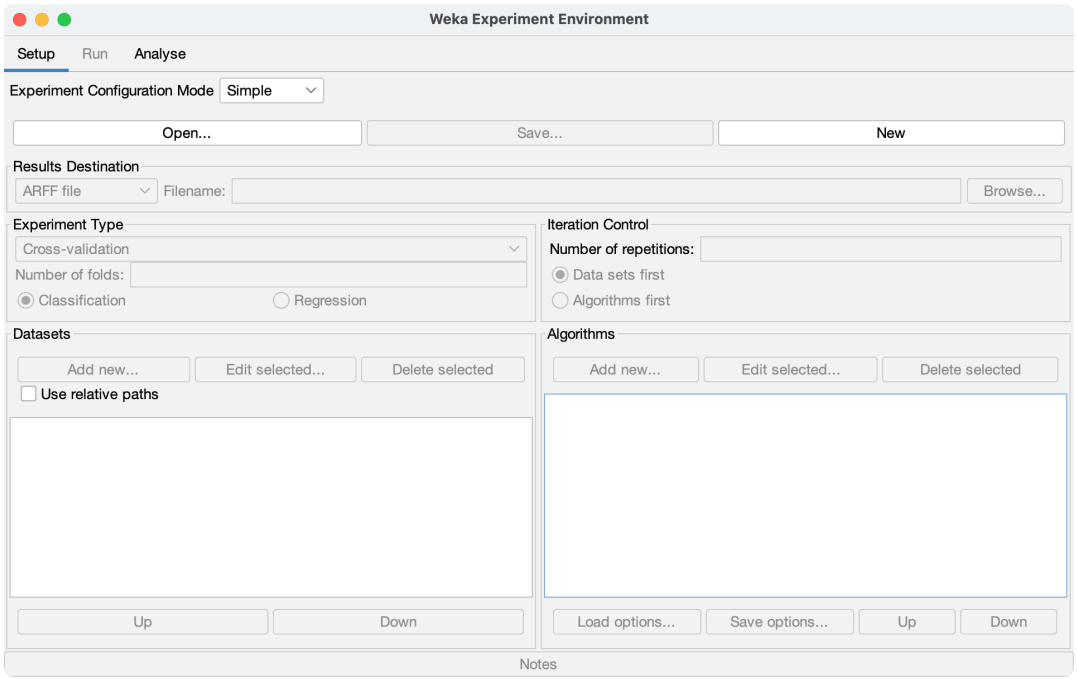

Figure B.2: Weka Experiment Environment, *Setup* panel selected.

To create a new experiment click on *New* button. Then:

1. Choose where to save the experiment results in the *Results Destination* section;
2. Select in the *Experiment Type* section the parameters for the experiment: select Cross-validation and insert 10 in the *Number of folds* field. Then select Classification.
3. In the *Iteration Control* section set the Number of repetitions to 10 and select *Data sets first* option;
4. In the *Datasets* section add the feature sets downloaded in Chapter B.1;
5. In the *Algorithms* section select the algorithms needed for the experiment. Please note that *BLR* and *LibLinear* are not available by default but they need to be installed through the Weka *package manager*.
   In this study we used (see Chapter 4.5):
   - ZeroR (*weka* ▷ *classifiers* ▷ *rules* ▷ *ZeroR*);
   - OneR (*weka* ▷ *classifiers* ▷ *rules* ▷ *OneR*);
   - JRip (*weka* ▷ *classifiers* ▷ *rules* ▷ *JRip*);
   - DecisionStump (*weka* ▷ *classifiers* ▷ *trees* ▷ *DecisionStump*);
   - J48 (*weka* ▷ *classifiers* ▷ *trees* ▷ *J48*);
   - RandomTree (*weka* ▷ *classifiers* ▷ *trees* ▷ *RandomTree*);
   - RandomForest (*weka* ▷ *classifiers* ▷ *trees* ▷ *RandomForest*);
   - REPTree (*weka* ▷ *classifiers* ▷ *trees* ▷ *REPTree*);
   - IBk (*weka* ▷ *classifiers* ▷ *lazy* ▷ *IBk*);
   - KStar (*weka* ▷ *classifiers* ▷ *lazy* ▷ *KStar*);
   - LWL (*weka* ▷ *classifiers* ▷ *lazy* ▷ *LWL*);
   - BLR (*weka* ▷ *classifiers* ▷ *bayes* ▷ *BayesianLogisticRegression*);
   - LibLinear (*weka* ▷ *classifiers* ▷ *functions* ▷ *LibLinear*);
   - MLP (*weka* ▷ *classifiers* ▷ *functions* ▷ *MultilayerPerceptron*).

B.3 Experiment execution

After the experiment setup is complete, open the *Run* panel (Figure B.3).

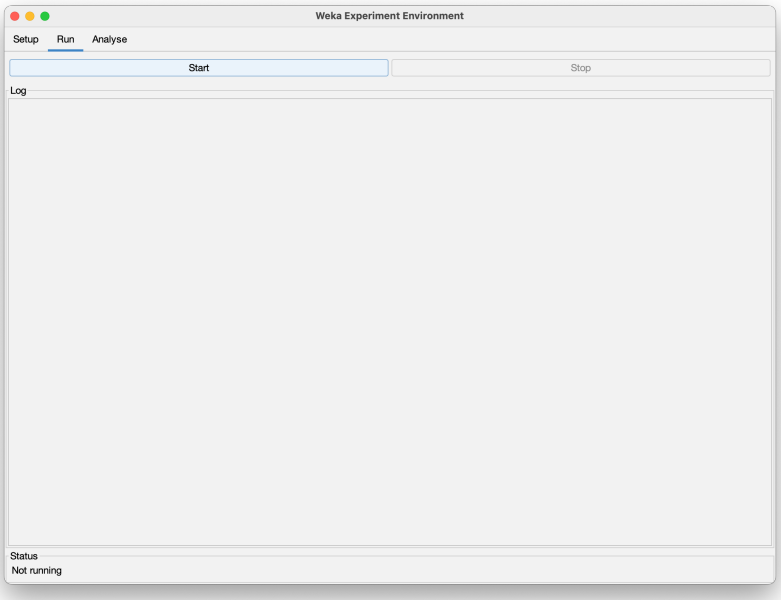

Figure B.3: Weka Experiment Environment, *Run* panel selected.

To begin the execution click on *Start* button. In the *Log* section the updates about the execution are shown; in particular, it shows the starting time, the ending time, and if any errors occurred. At the bottom, the *Status* section, shows the progress of the experiment, displaying which algorithms are applied and which dataset is in use.

B.4 Experiment results

Once the experiment is executed, the results can be displayed. First, open the *Analyse* panel, then:

1. click the *Experiment* button in the top section *Source* to open the experiment executed in Chapter B.3;
2. set the results parameter in the *Configure test* section, in particular:
   - select Paired T-Tester (corrected);
   - click on *Swap* button to switch between rows and columns in the results table;
   - set the *Significance* to 0.05;

- select the *Comparison field* you choose to display (e.g., Percent_correct);
- click on *Test base* and select *reaction_vector* or whatever baseline you want to use;

3. Click on *Perform test* button in the *Actions* section;
4. Save the output by clicking *Save output*.

Figure B.4 shows the screenshot of Weka once the test is performed.

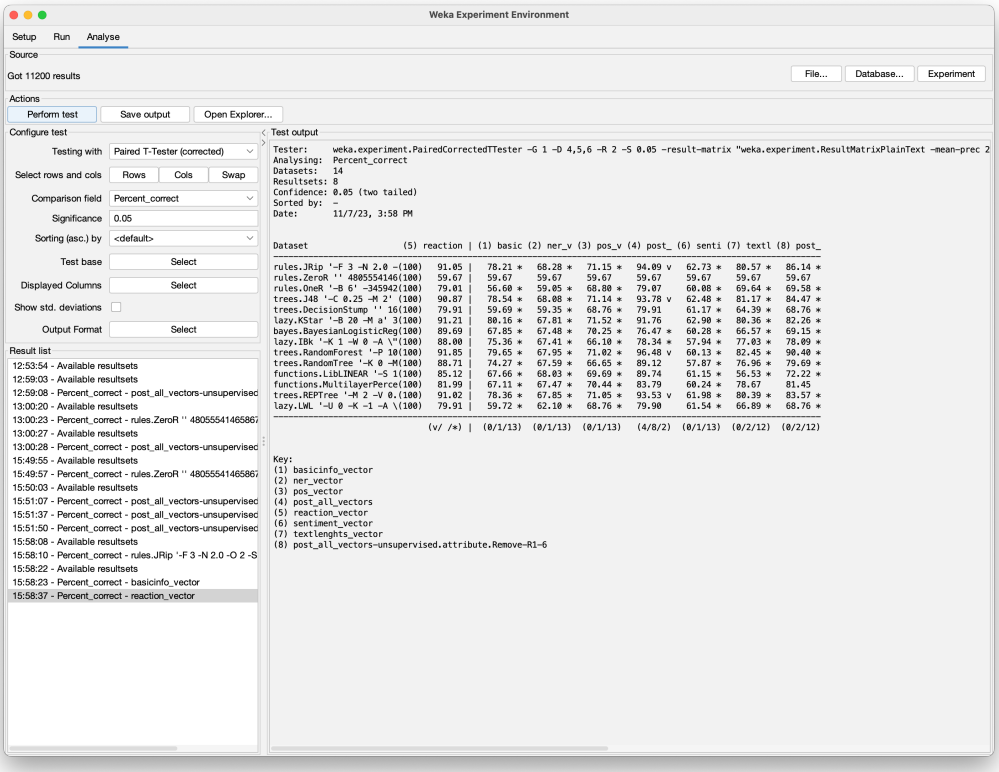

Figure B.4: Weka Experiment Environment, *Analyse* panel selected.

B.5 Tuning the Hyperparameters

The last phase involves the Hyperparameter tuning process (see Chapter 5.6). In this study, this procedure is only applied to the *reaction* dataset, but it can be employed also for the other datasets.

This operation could be achieved by using the Weka *Experimenter* application, but instead, the *Explorer* is used since it provides more detailed results (e.g., the Confusion Matrix). The only downside of using the *Explorer* is that it allows tuning the hyperparameters of only one algorithm at a time.

First of all open the Explorer application from the starting screen of Weka (Figure B.1). Once it's opened, in the *Preprocess* panel click *Open file...* button and select the *reaction_vector.arff* feature set downloaded (among the others) in Chapter B.1 (Figure B.5).

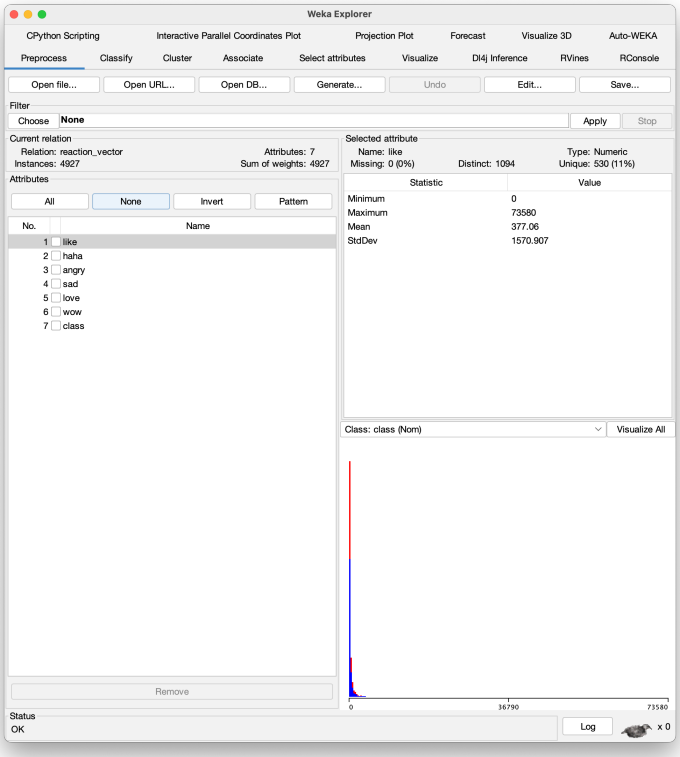

Figure B.5: Weka Explorer Environment, *Preprocess* panel selected.

After opening the dataset, open the *Classify* panel. Then:

1. in the *Classifier* section click on *Choose*;
2. select the wanted algorithm to tune the hyperparameters, in our study we opted for CVParameter selection (*weka* ▷ *classifiers* ▷ *meta* ▷ *CVParameterSelection*) and GridSearch (*weka* ▷ *classifiers* ▷ *meta* ▷ *GridSearch*);

3. select the classifier to which apply the tuning by clicking on the algorithm configuration in the *Classifier* section;

4. click on *Start* for starting the execution;

5. when the execution is over, the results are shown in the *Classifier output* section (Figure B.6).

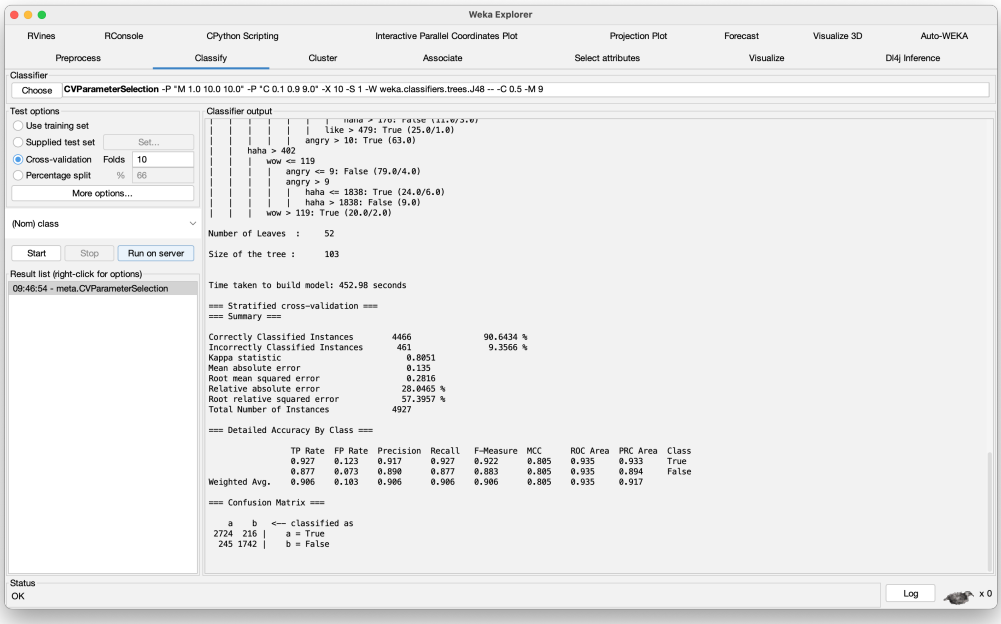

Figure B.6: Weka Explorer Environment, *Classify* panel selected.