Reproducibility Report for ACM SIGMOD 2023 Paper: “iFlipper: Label Flipping for Individual Fairness”

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The repository furnished by the authors largely enables replication of the paper’s primary results. Although there are some environmental setup issues not detailed in the readme file and a discrepancy in the axis scale of the generated figures, the provided code facilitates straightforward experimentation and automatic generation of result figures. These figures are consistent with those presented in the paper.

1 INTRODUCTION

The paper "iFlipper: Label Flipping for Individual Fairness"[1] proposes an approximate linear programming algorithm to solve the minimal label flipping problem and guarantee individual fairness efficiently. For reproducibility review, the authors, Zhang et al., submitted a complete set of code and experiment scripts, along with clear documents on how to set up the environment to execute the code. By following the instructions, experiment environment is smoothly configured though a few steps require extra attention, such as choosing CPLEX academic version instead of community version. After executing the provided script `run.sh`, several plots are automatically generated, showing that the major results of the paper can be successfully reproduced with satisfying accordance.

2 SUBMISSION

In the reproducibility submission, the authors have provided codes and links for data acquisition, along with a readme file containing instructions for reproduction. The datasets used include `Adult`, `German`, and `COMPAS`. The submission consists of:

- A GitHub repository with code and scripts at: https://github.com/khtae8250/iflipper
- A detailed readme file at: https://github.com/khtae8250/iFlipper/blob/main/README.md
- Links to the datasets at: https://github.com/Trusted-AI/AIF360/blob/master/aif360/data/README.md

3 HARDWARE AND SOFTWARE ENVIRONMENT

The detailed environments utilized in the paper and for reproducibility tests are listed in Table 1.

Table 1. Hardware & Software environment

	Paper	**Reprocibility Review**
CPU	Intel Xeon Gold 5115	Intel Xeon Gold 6226R
Sockets	2	2
Cores per Socket	10	16
RAM	377GB	377GB
Storage	SSD	SSD

4 REPRODUCIBILITY EVALUATION

4.1 Process

The main process for reproducibility is detailed in the readme file, though there are some obstacles encountered during environment setup.

Environment Configuration. The setup begins with installing Miniconda and creating a Conda virtual environment. In this environment, executing `setup.sh` typically completes the setup process. However, issues may arise, such as an exception in plotting figures: '*qt.qpa.plugin: Could not load the Qt platform plugin "xcb" in ""*', the solution of which has also been added to the readme file. The most challenging part is installing MOSEK and CPLEX. MOSEK can be installed using `pip install`, but for CPLEX, one cannot simply install the community version, as it imposes a limit on the number of operations and may lead to errors in certain experiments. Users should follow the CPLEX registration guide in the readme file to obtain an academic free version.

Results Reproduction. The authors provide an all-encompassing script `run.sh` for conducting core experiments and generating figures. The resulting figures are stored in the `results` folder.

4.2 Results

The key results presented in the paper can be reproduced smoothly and effortlessly. The results presented in Section 4.3 of Zhang et al. [1], specifically those depicted in their Figure 8, are closely replicated in our Fig. 1. Similarly, the outcomes shown in Figure 9 of Zhang et al.'s paper [1] are almost identically reproduced in our Fig. 2. Additionally, the results corresponding to their Figure 11 are faithfully reproduced in our Fig. 4. The replication of results from Zhang et al.'s Figure 10, as displayed in our Fig. 3, also demonstrates a high degree of fidelity.

REFERENCES

[1] Hantian Zhang, Ki Hyun Tae, Jaeyoung Park, Xu Chu, and Steven Euijong Whang. 2023. iFlipper: Label Flipping for Individual Fairness. *Proceedings of the ACM on Management of Data* 1, 1 (2023), 1–26.

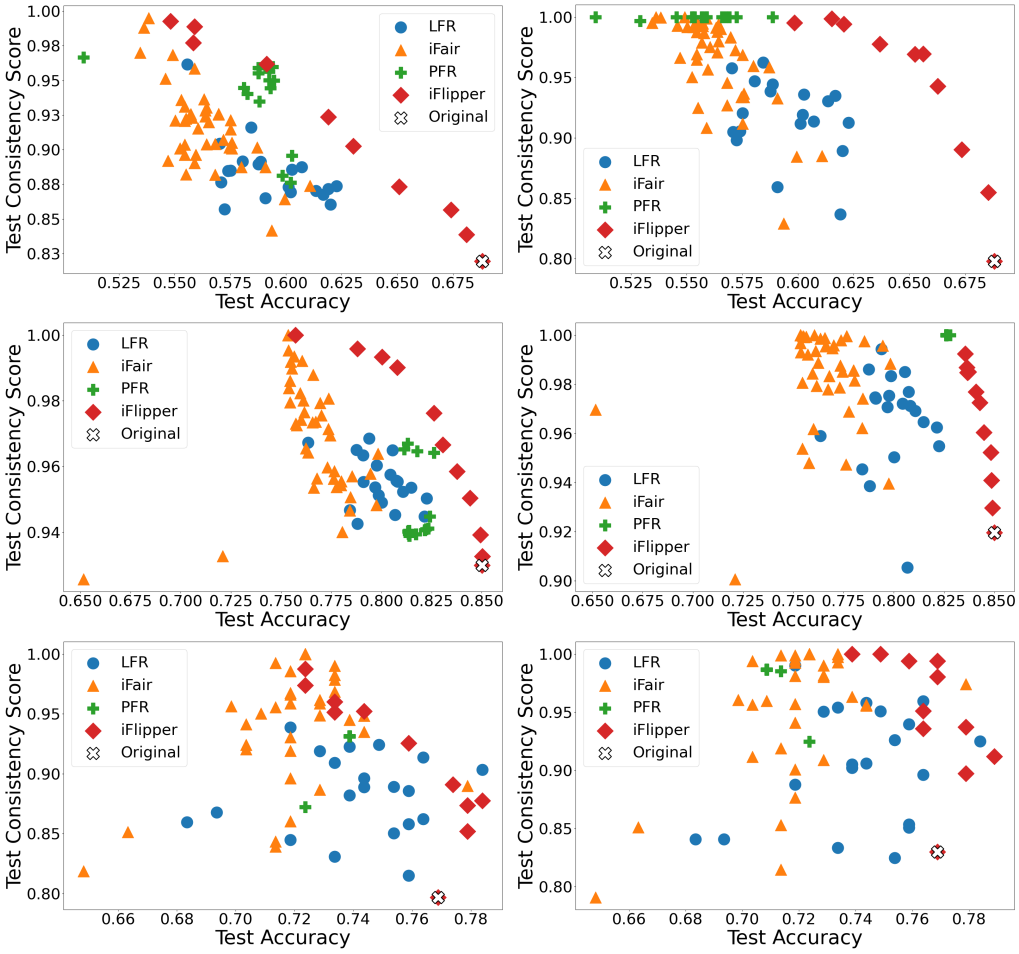

Fig. 1. Reproduce Figure 8 in [1]

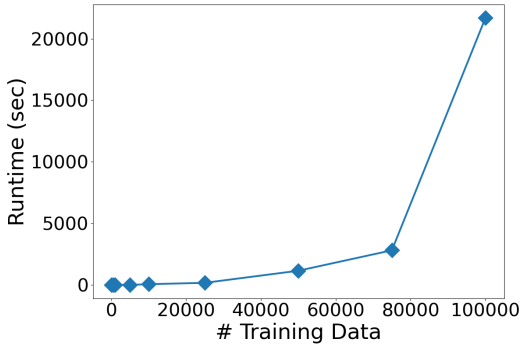

Fig. 2. Reproduce Figure 9 in [1]

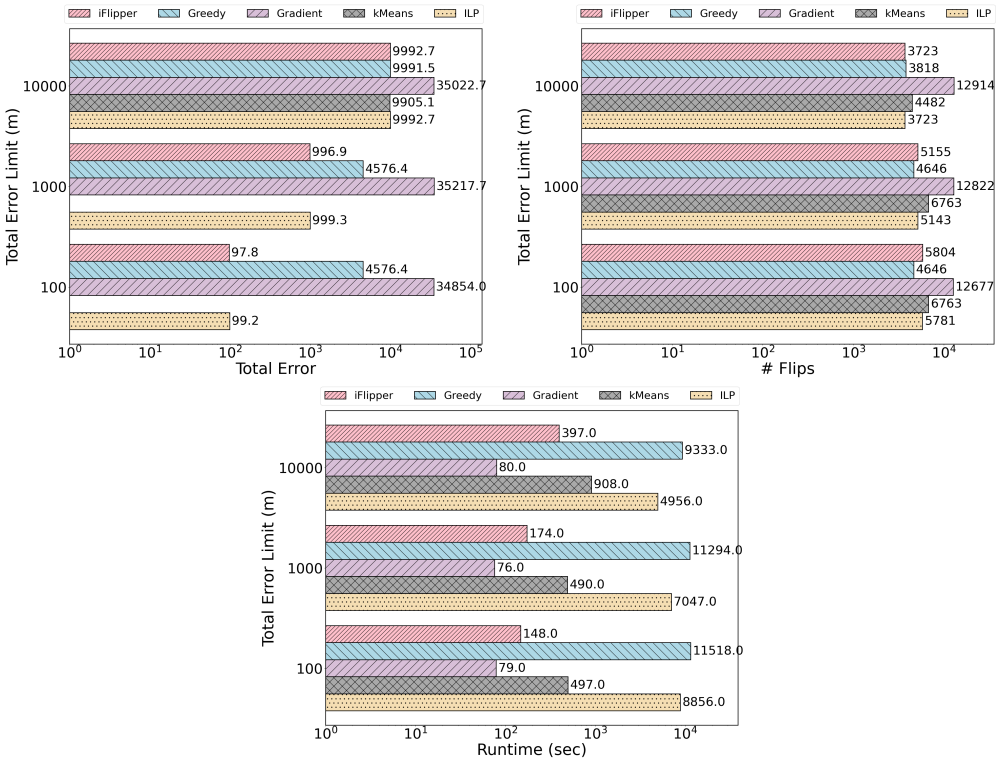

Fig. 3. Reproduce Figure 10 in [1]

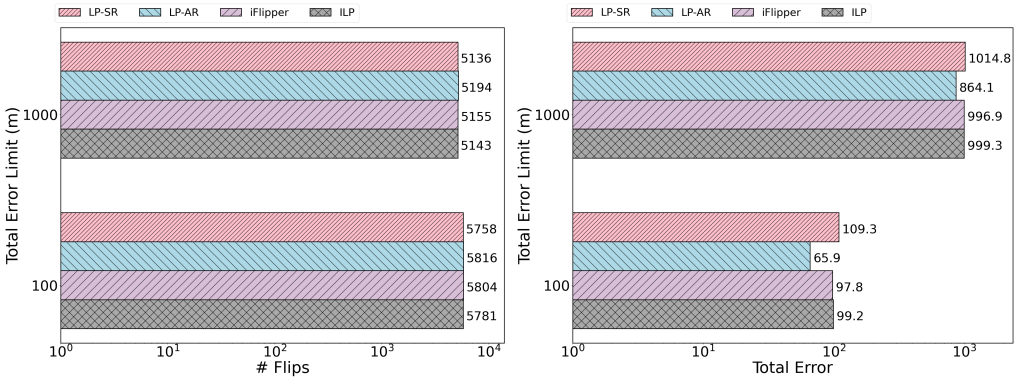

Fig. 4. Reproduce Figure 11 in [1]