User Manual

AI Model Fairness Testing

Project Structure

- `dataset/` – Folder containing CSV datasets
- `DNN/` – Folder containing pre-trained model files
- `report_tools/` – Scripts for generating visualisations and running statistical tests used in the report
- `config.py` – Configuration file with dataset and model paths, sensitive feature indices, and target labels
- `genetic.py` – Genetic Algorithm-based fairness testing tool
- `rand.py` – Random Search baseline fairness testing tool
- `main.py` – Shared functions used by `genetic.py` and `rand.py`
- `runner.py` – Script to automate multiple runs used for experiment

How to Run

Random Search Baseline

1. Open `rand.py`.
2. Modify the dataset argument at the bottom of the script: `run_fairness_testing("ADULT")`
   Replace `"ADULT"` with any dataset listed in `config.py`, e.g. `"CRIME"`.
3. Run the script: `python rand.py`

Genetic Algorithm

1. Open `genetic.py`.
2. Modify the dataset argument at the bottom of the script: `run_fairness_testing("ADULT")`
   Replace `"ADULT"` with any dataset listed in `config.py`, e.g. `"CRIME"`.
3. Run the script: `python genetic.py`

Experiment Method

1. Open `runner.py`.
2. Change which tool to run by editing:
   `result = subprocess.run(["python", "rand.py"], capture_output=True, text=True)`
   Replace `rand.py` with `genetic.py` to run the Genetic Algorithm.
3. Run the script: `python rand.py`
4. Results will be saved in `results.csv`.

Datasets and Models

The datasets and pre-trained models are configured in `config.py` with the following options:

- `ADULT`
- `COMPAS`
- `LAW_SCHOOL`
- `KDD`
- `DUTCH`
- `CREDIT`
- `CRIME`
- `GERMAN`

Report Tools

- `report_tools/` can be used to generate the plots and run the statistical tests that were used in the report.