

ECSE 557 Week 7 Student Guidelines

Tutorial 7: Fairness II

Background

In the last lecture, you had a brief introduction to fairness pre-processing techniques and saw the demo for AIF 360. We will elaborate on this lecture, re-iterate key concepts of two pre-processing techniques and get more familiar with the AIF 360 toolkit.

Overview

The tutorial will start with a coverage of key concepts behind reweighing and fair representations. We will then demonstrate how you can implement reweighing and fair representation using AIF 360. You will experiment and report on two code bases throughout this tutorial.

What to submit

You do not need to submit anything for this tutorial; however, you can use the ideas covered in this tutorial to inform your work in Assignment 2.

Task 1: Reweighting with AIF 360

1. Download the necessary files from myCourses. We will ask you to download `german.data`, the `tutorial7_reweighting.ipynb` file.
2. You will need to put `german.data` in the following folder:
`/usr/local/lib/python3.7/dist-packages/aif360/data/raw/german`
3. You should now be able to run through the colab file with no errors. Try this out.
4. Now that you have set up AIF 360 reweighting pre-processing method, answer the following questions:
 - a. Calculate a different metric than mean difference for the original and transformed dataset in Steps 3 and 5.
 - b. What is an optimal classification threshold in steps 6 and 7? Is there a difference between the transformed and original data?
 - c. How does changing the train/valid/test data split ratios effect the odds difference and disparate impact measures in steps 6 and 7?
 - d. How does changing the privileged group from sex to age shift the results in steps 3, 5, 6 and 7?

Task 2: Learning fair representations with AIF 360

1. Download the necessary files from myCourses. We will ask you to download `german.data`, the `tutorial7_lfr.ipynb` file.
2. You will need to put `german.data` in the following folder:
`/usr/local/lib/python3.7/dist-packages/aif360/data/raw/german`
3. You should now be able to run through the colab file with no errors. Try this out.
4. Now that you have set up AIF 360 learning fair representations pre-processing method, answer the following questions:
 - a. Calculate a different metric than mean difference for the original and transformed dataset in Steps 3 and 5.
 - b. Modify the number of prototypes, k , and hyperparameters A_x, A_y , and A_z in Step 4. Observe and record how these changes affect the fairness metrics (in steps 3 and 5) and the accuracy of the transformed data in Step 4.
 - c. Change the privileged group from sex to age. How does this shift the results in steps 3, 4, and 5.