XAI HW6 Task 1

Krzysztof Tomala

December 8, 2022

1 Demographic parity

$P(\text{is enrolled}|\text{blue}) = \frac{65}{100}$
$P(\text{is enrolled}|\text{red}) = \frac{50}{100}$
So the demographic parity rate is $\frac{P(\text{is enrolled}|\text{blue})}{P(\text{is enrolled}|\text{red})} = \frac{65}{50} = 130\%$

2 Equal opportunity

$P(\text{is enrolled}|\text{blue and will use XAI}) = \frac{60}{80}$
$P(\text{is enrolled}|\text{red and will use XAI}) = \frac{50}{100}$

So the equal opportunity rate is $\frac{P(\text{is enrolled}|\text{blue and will use XAI})}{P(\text{is enrolled}|\text{red and will use XAI})} = 150\%$

3 Predictive rate parity

3.1 Positive Predictive Parity

$P(\text{will use XAI}|\text{blue and is enrolled}) = \frac{60}{65}$
$P(\text{will use XAI}|\text{red and is enrolled}) = \frac{50}{100}$

So the equal opportunity rate is $\frac{P(\text{will use XAI}|\text{blue and is enrolled})}{P(\text{will use XAI}|\text{red and is enrolled})} = 184.615384615\%$

3.2 Negative Predictive Parity

$P(\text{will use XAI}|\text{blue and is not enrolled}) = \frac{20}{35}$
$P(\text{will use XAI}|\text{red and is not enrolled}) = \frac{50}{100}$

So the equal opportunity rate is $\frac{P(\text{will use XAI}|\text{blue and is not enrolled})}{P(\text{will use XAI}|\text{red and is not enrolled})} = 114.285714286\%$