

Fairness in Case

Jens Ulrik Hansen

Roskilde University

2019-08-29

Purpose of the case

- For you to do some practical work and try out various fairness definitions of fairness
- For you to think about fairness in a concrete case

Comments on the exercises

- It does not have to be advanced machine learning
- There is not only one right answer – this is on purpose
- Even worse, the questions can be interpreted in several different ways – this is on purpose too!
- The exercises are not only technical, they are also to make you think about fairness and discuss in groups
 - For instance, what notion of fairness would you use and why?
- Think about the choices you make and be ready to argue for them

Case: “Empty Eyes”

- Set-up: You are all data scientist at the Danish health authorities
- Consider the (made-up) disease “empty eyes”.
 - It leaves people with empty eyes, which makes it hard for them to follow lectures, navigate traffic, follow the news and keeping a meaningful relationship with their loved ones.
 - An epidemic seems to have hit Denmark as more and more cases are reported every week
 - Little is known about the disease. However, we have a detailed dataset about the reported cases as well as some healthy people. The dataset is called `diseaseData.csv`.

Case: “Empty Eyes”

- **Exercise 1:**

- By coincidence, a doctor have discovered that an existing type of medicine, called A, can have a preventive effect on empty eyes. However, this existing medicine is very expensive and short in demand
- Build a fair model that can decide whether a person should be offered the preventive medicine.

Case: “Empty Eyes”

- **Exercise 2:**

- The government have decided to issue a travel ban on certain people to stop the disease from spreading further
- Build a fair model that can decide whether a person should be issued a travel ban.

Case: “Empty Eyes”

- **Exercise 3:**

- 10 doctors with equipment to treat Empty Eyes are ready to be deployed around the country.
- In a fair way decide where to distribute the 10 doctors

Case: “Empty Eyes”

- **Exercise 4:**

- The Danish prime minister calls you an early morning in the middle of the department breakfast.
- She tells you delighted that she haven gotten some drug to treat Empty Eyes from her good friend Donald.
- However, there is only enough of the drug to treat 10% of the population.
- The prime minister wants your help to decide which 10% of the population to administer the drug in a way the serves the country best
- Develop an algorithm to select the 10% to which to administer the drug.

Case: “Empty Eyes”

- **Exercise 5:**

- A Facebook employee has found a funny cat video that seemingly can cure Empty Eyes.
- Facebook offers to show the video in people newsfeeds, but do not want to spam everybody
- Thus, build an algorithm that Facebook can use to target potential Empty Eyes infected people

Case: “Empty Eyes”

- **Exercise 6:**

- Facebook has found out that people with Empty Eyes are bad at clicking adds (as they can't see them).
- Facebook has heard about your ML skills and want to hire you to develop algorithm that can better target users that are likely to click an add.
- However, Facebook is also concerned with their image, so you need to convince them that the algorithm is fair.
- Can you develop such a fair algorithm for Facebook?