Fairness in Case

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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 on GitHub: https://github.com/JensUH/fairML-phdcourse called "EmptyEyesData.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 seem them).
  - Facebook has head 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?

Data

- Data on GitHub: https://github.com/JensUH/fairML-phdcourse