

CSC373

Embedded EthiCS Module

Team



Nisarg Shah



Deepanshu Kush



Steven Coyne



Emma McClure



Diane Horton



David Liu



Sheila McIlraith

Goals

- The purpose of this module is **NOT** to:
 - Tell you what to think about ethical issues
 - Tell you what is right and what is wrong
- It is to help you:
 - Be more confident and comfortable in identifying and discussing ethical issues
 - Practice thinking about a problem from different perspectives

Reminders

- Feel free to use chat; we want to hear your thoughts!
- Be respectful, but don't hesitate to disagree with one another
- In the chat and breakout groups, address your comments to the person's views or arguments, rather than the person themselves

Let's dive in!

Breakout Activity 1

- Recall the vaccine distribution problem from the pre-module assignment:
 - You were an intern at an NGO distributing vaccines from suppliers to countries
 - m suppliers, each supplier r can supply up to s_r doses
 - n countries, each country i is willing to purchase up to c_i doses
 - You were given feasibility constraints dictating which suppliers can supply to which countries
 - You maximized the #doses delivered using network flow
- The goal of this breakout activity is to identify potential ethical issues with this
 - The issues may lie in your solution (maximize #doses delivered) or in the problem formulation itself
 - Interpret “ethical” in the broadest sense as you understand it

Breakout Activity 1

- **Logistics**

- We will create breakout rooms of ~6-8 students each
- A moderator will come to your breakout room and provide a link to a Google Jamboard

- **Jamboard**

- Frame 1 recalls the vaccine distribution problem
- Frame 2 asks you to identify potential issues with your solution
 - [7-8 minutes] Answer the question on this frame as a group using sticky notes
- Frame 3 asks you to identify potential issues with the problem formulation
 - [12-13 minutes] Answer the question on this frame as a group using sticky notes
- You have **20 minutes** to work on this exercise!

Breakout!

Synthesis of Activity 1

- Let's go through some of the answers!
- Food for thought
 - Various dimensions in which a flawed problem formulation can lead to ethical issues
 - Various ways in which a solution can be unethical
- Takeaways
 - Before solving a problem, we should make sure we're solving *the right problem*
 - For solving the problem, we should first ensure we are implementing an ethical solution, and then worry about *how* to implement it

Stakeholders

- We will use stakeholder theory to explore some of the ethical aspects of vaccine distribution between countries
- **Primary stakeholders:** people who are eligible to receive resources
 - It is important that any valid claims made by primary stakeholders be acknowledged when distributing resources
 - These claims will be framed in terms of “building blocks” (next slide)
- **Secondary stakeholders:** people related to the situation who have special knowledge or expertise regarding it
 - The special knowledge or expertise of stakeholders often reveals something important about how resources should be distributed

Building Blocks of a Theory of Fairness



Efficiency: making sure resources are allocated where they are used most effectively



Rights to a minimum: making sure that everyone has a bare minimum needed to survive, thrive, etc.



Desert: making sure people get what they deserve (e.g. because they have worked for it)



Equality: making sure that everyone gets the same amount of resources, or that no one receives more or less for arbitrary reasons

Breakout Activity 2

- **Logistics**

- We will create the same breakout rooms as in previous activities
- A moderator will come to your breakout room and provide a link to a new Google Jamboard

- **Jamboard**

- Frame 1 describes various stakeholders and tells you which stakeholder's perspective you are supposed to take
- Frames 2 and 3 ask you questions that you need to answer from your stakeholder's perspective
- You have **20 minutes** to work on this exercise!

Breakout!

Synthesis of Activity 2

- **Let's go through some of the answers!**
- **Food for thought**
 - How do you identify all possible stakeholders for a given problem?
 - How do you determine the needs and priorities of these stakeholders?
- **Takeaways**
 - Different individuals or groups can, in some contexts, have differing claims to a resource
 - An ethical solution must find a balance between the needs and priorities of all stakeholders
 - It should be justifiable to each stakeholder!

Time for some polls!

Poll 1

- Imagine two hypothetical countries requesting 10M vaccines each
- Which of the following two vaccine allocations is fairer in your opinion?



Requested Doses

10M

10M

Allocation A

6M

10M

Allocation B

7.5M

7.5M

Poll 2

- Now imagine two hypothetical countries requesting **different numbers of doses**
- Which of the following two vaccine allocations is fairer in your opinion?



Requested Doses

10M

5M

Allocation A

4M

2M

Allocation B

3M

3M

Poll 3

- Which of the following policies for vaccine distribution do you think is the fairest?
 - c_i = #doses requested by country i
 - a_i = #doses allocated to country i

Policy 1: Maximize the total number of doses allocated, $\sum_i a_i$

Policy 2: Maximize the minimum number of doses allocated, $\min_i a_i$

Policy 3: Maximize the total fractions of demands satisfied, $\sum_i a_i/c_i$

Policy 4: Maximize the minimum fraction of demands satisfied, $\min_i a_i/c_i$

Policy 5: For a reasonable threshold T , maximize the total number of doses allocated subject to each country receiving at least T doses (maximize $\sum_i a_i$ s.t. $a_i \geq T, \forall i$)

Concluding Remarks

Designing an Ethical Algorithm

1

IDENTIFY STAKEHOLDERS

Pay attention to primary vs secondary stakeholders

2

LEARN THEIR NEEDS

Elicit them directly (e.g., focus groups) or learn from data

3

SET THE SYSTEM GOALS

Find a good balance between the needs of different stakeholders

4

DESIGN THE ALGORITHM

Design an algorithm for optimizing your set system goals

5

EXPLAIN TO STAKEHOLDERS

Justify your algorithms and its outcomes to the stakeholders

6

FEEDBACK & ITERATE

Get feedback from the stakeholders to improve your algorithm

Ethics

- This module focused primarily on fairness in the form of distributive justice
- There are many, many other aspects to ethics
 - Privacy
 - Safety & reliability
 - Transparency
 - Consent
 - Rights
 - Data ownership
 - Agency
 - Environmental impact
 - ...



Thank you

Questions?

Feedback?