Project Title: Eliciting Fairness Opinions from Diverse Stakeholders in Kidney Placement

Project Description: Modern kidney allocation relies on machine learning (ML) systems that could display biases stemming from the training data, potentially leading to unfairness. Due to the existence of multiple fairness notions in the literature, the challenge lies in selecting the most appropriate notion. Thus, the goal of this is to gather fairness preferences from a wide range of stakeholders, including both experts (such as surgeons) and non-experts (such as patients), involved in kidney placement. We aim to carry out experiments with each group of stakeholders to collect their perceptions on fairness on two different ML-based systems. We intend to gather fairness opinions from experts through gamification of in-person interviews. Conversely, we will collect opinions from non-experts via online focus group sessions which are also designed as a game to improve participant engagement. Given the distinct technical knowledge levels of these two stakeholder groups, the designs of their respective experiments will differ significantly.

Following are the list of tasks for this project:

Task 1: Literature Review
- Read research papers on well-known fairness notions and trade-offs/limitations for these notions.
- Understanding the kidney placement pipeline in the US and various stakeholders involved in it.
- Get familiar with biases present in kidney placement pipeline
- Study technical details of the different ML-based systems used in kidney placement.

Task 2: Experiment Design for Surgeons/Doctors
- Participate in discussions with domain experts to figure out the experiment design.
- What data should be presented to the surgeons? What questions need to be asked in the experiment?
- Determine the number of data points required to learn surgeons' fairness perception.
- Develop interactive visualizations to help the surgeons understand different fairness concepts

Task 3: Experiment Design for Patients and Organ Procurement Organizations (OPOs)
- What data should be presented to the patients/OPOs? What questions need to be asked in the experiment?
- Determine the number of data points required to learn patient's/OPO's fairness perception.

Task 4: Documentation
- Document the progress regularly as well as any other results from simulations.

Required Skills:
- Object oriented programming
- Proficient in Python and other packages such as pandas, numpy.
- Knowledge of web development scripting languages such as JavaScript, HTML
- Basic probability and statistics

- Any background in machine learning helps

Our pilot study for public stakeholders:
Telukunta, Mukund, et al., "*Learning Social Fairness Preferences from Non-Expert Stakeholder Opinions in Kidney Placement*". In Conference on Health, Inference, and Learning (CHIL) 2024. Preprint: https://arxiv.org/pdf/2404.03800.pdf