

## Research Data Scientist - Technical Exercise

March 2022

### Background

Deploying models that impact people requires careful ethical decision making. At AdeptID, our Ethical AI Framework contains three components (see [blog post](#)):

- At a base level, we need to address **Algorithmic Bias**.
- Once we've accomplished this, we move onto our second phase, which is **Addressing Systematicity**, or systematic and arbitrary errors.
- Lastly, this framework needs to be responsibly governed, and requires a democratic **Governance Model**.

This technical exercise is focused on **Systematicity**. The systematic and arbitrary exclusion of individuals based on algorithmic decisions represents a moral harm. When deploying talent models at scale, it is important to design systems that have some degree of randomness in order to ensure that individuals are not arbitrarily blocked from economic opportunities. There are several ways to accomplish this, some of which are described in [The Algorithmic Leviathan](#) (in particular see: *Section 4 Technical Solutions*). In this paper, the authors outline two primary ways of addressing systematicity:

- Training a set of models (with similar accuracy) and randomly drawing from the set of models at prediction time
- Directly introducing (bounded) randomness to scores at prediction time

### Problem Statement

In this exercise, you will use the data provided to construct a prediction system that addresses systematicity. Please feel free to implement the proposed solution(s) described above and/or construct alternative mechanisms for mitigating systematicity. Your implementation should include two primary components:

- A **predict()** function or method that implements one or more mechanisms for addressing systematicity
- A set of metrics and associated charts that allow you to measure and evaluate the effectiveness of your systematicity mitigation.

Along with your code, please put together **either** a memo or presentation describing your approach and the reasoning behind the metrics you selected. We're primarily interested in understanding the logic behind your metric construction and model evaluation so please emphasize this in your deliverable.

Please note, the overall accuracy of these models is not of particular importance to this exercise so please don't spend too much time optimizing for model accuracy. The goal is to evaluate your ability to think critically about system design and associated metrics for measurement.

I hope that you find this take-home interesting! Best of luck!

### Data Provided

1. **data.csv** - This file contains sample features and associated binary outcomes for training simple logistic regression classifiers.
2. **readme.csv** - This file contains relevant descriptions and contextual information for each of the variables in data.csv

**Deliverables**

1. Code - Github repository containing the code you wrote to complete the assignment.
2. Memo or Presentation - Describe your approach, key assumptions, metrics and conclusions. Importantly, describe how you would expand this analysis were it a complete project with a larger timeline.

**What this tests**

1. Can you take an abstract idea and implement it in code?
2. Can you construct metrics to evaluate the performance of novel models?
3. Can you identify, reason through and address constraints from real world problems?
4. Can you communicate findings clearly?