As data analytics and artificial intelligence (AI) tools become increasingly commoditized and adopted across a large swath of business processes, new opportunities but also commensurate challenges are starting to arise. On the positive side, such technologies enable dissecting vast datasets to reveal immediately actionable insights, with unparalleled opportunities for innovation, strategic planning, and increased operational efficiency. But their deployment is also fraught with risks related to privacy, transparency, bias and fairness, or dependency and job displacement. For senior managers and executives, it is critical to appreciate the nature of such opportunities and challenges and to develop a vocabulary, a mindset, and a set of processes for interacting with internal data-science teams or outside software vendors to ensure a responsible design and application of such tools.

Session #1 - Fairness and Bias in AI-Based Predictive Models

The learning objectives for this session will be threefold. First, we will discuss a class of AI algorithms widely used in various industry applications for risk-scoring. We will then engage participants in a hands-on exercise based on real data to showcase the power and versatility of these algorithms, and to underscore how racial or gender bias can creep into the systems. Lastly, we will develop a few simple rules of thumb for detecting and mitigating the bias, applicable both when managing an internal data science team and when working with a black-box/proprietary software. By the end of the session, the participants will grasp some of the key strengths and weaknesses of AI-based risk scoring tools and learn a few practical guidelines for responsible use-cases.

Materials & Preparation. Before the session, please do the following.

1. Make sure you can access the materials needed for the in-class exercise. Two options are available:

Option 1 (preferred). Use Google's Colab software, which will allow you to interact with the model in real time during class. This requires a Gmail account and a web browser. To test this:

- Click on this link: link to Colab for Session 1
  *(This will navigate to a webpage from the domain "colab.research.google.com", where you should see a notebook entitled **"Fairness and Bias in AI-Based Predictive Models"**.)*
- From the menus at the top, navigate to "**Runtime**" and select "**Run All**".
- You will be asked to "**Sign in**" with a Google account. You can use the Stanford-provided email address or use your personal Gmail account if you have one.
  (The browser will navigate away from the Colab webpage but will return after you sign in.)
- Once you are signed in and the browser returns to the *Colab* page, navigate to "**Runtime**" and select "**Run All**" again. You will see a warning that **"This notebook was not authored by Google"**, but please select **"Run anyway"** to let it run. If everything works, you should see various plots appearing later in the document.

Option 2. Download a PDF with all the relevant outputs from this link: PDF file for Session 1

2. Watch some of the following short videos, depending on interest, documenting bias in criminal justice, lending, hiring, medical software, or facial recognition.

Session #2 - Prescriptive Analytics for Pricing Bottlenecks, Flexibility, and Information

Our second session will shift focus to prescriptive analytics, a class of AI models aimed for directly informing business decisions in complex, constrained problems. Through a hands-on exercise, we will explore uses cases related to navigating difficult tradeoffs, identifying and pricing operational bottlenecks, quantifying the impact of uncertainty, and pricing information and operational flexibility. Each example will showcase how AI tools can generate useful information but will also underscore shortcomings and reveal the importance of ongoing

dialogues between executives and data scientists. By highlighting best practices, the session will demonstrate how prescriptive analytics can be leveraged to identify opportunities for innovation and make informed, strategic decisions that align with organizational goals, while also emphasizing the importance of ethical considerations and stakeholder engagement in the design and implementation of such solutions.

Materials & Preparation. Before the session, please do the following.

1. Make sure you can access the materials for the exercise. The same options as for Session #1 are available:

Option 1 (preferred). Access a Google Colab file from this link: link to Colab for Session 2

Option 2. Download a PDF with all the relevant outputs from this link: PDF file for Session 2

2. If you have a bit of time, please read the **Description** section of the mini-case for some context.