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Context Matters: Understanding, Assessing, and Addressing Algorithmic Bias

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The increasing integration of artificial intelligence (AI) systems into various aspects of our lives has raised concerns about algorithmic bias (Lambrecht & Tucker, 2019). Algorithmic bias is a sociotechnical phenomenon that occurs when “the outputs of an algorithm benefit or disadvantage certain individuals or groups more than others without a justified reason for such unequal impacts” (Kordzadeh & Ghasemaghaei, 2022, p. 388). This AI-enabled bias perpetuates social inequalities and replicates or reinforces existing biases in the workplace and society. Moreover, it results in a lack of transparency and accountability in decision-making processes, eroding trust in institutions and hindering access to equal opportunities.

Given the context-dependent nature of algorithmic bias, a comprehensive understanding of it requires considering the broader context in which the AI system operates. While prior studies have emphasized the multidimensional and sociotechnical nature of algorithmic bias (Dolata, Feuerriegel, & Schwabe, 2022), few have examined the implications of context in defining, measuring, and mitigating biases in algorithmic systems and AI-powered decision-making. This TREO talk aims to shed light on this phenomenon by elaborating on three highly context-dependent aspects of biases in algorithms:

1. **Conceptualization of Algorithmic Bias:** The definition and understanding of algorithmic bias vary across domains and contexts. Factors such as stakeholders, decision-making processes, and values influence bias definitions. This presentation will explore the nuances and dimensions of algorithmic bias, emphasizing the role of context in shaping bias conceptualizations.
2. **Measurement of Algorithmic Bias:** Context-specific factors and appropriate metrics are crucial for measuring algorithmic bias. Metrics such as statistical parity, equal opportunity, and equalized odds are commonly used but can vary in applicability and limitations across contexts. This presentation will examine the challenges and considerations involved in selecting and applying bias metrics in different domains.
3. **Mitigation of Algorithmic Bias:** Mitigating algorithmic bias requires context-specific approaches that account for the underlying factors contributing to bias. Sociotechnical strategies, such as fostering diverse AI development teams, establishing clear ethical guidelines, and promoting transparency and accountability, are essential. This presentation will explore existing sociotechnical approaches to mitigate algorithmic bias and discuss the challenges and opportunities for developing context-specific mitigation strategies.

By exploring these three context-dependent aspects—conceptualization, measurement, and mitigation—this TREO presentation aims to provide insights into the complex nature of algorithmic bias. It seeks to foster discussions on the development and deployment of unbiased AI systems across diverse domains, working towards the realization of more equitable and just AI solutions in the future.

References:

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- Lambrecht, A., & Tucker, C. 2019. "Algorithmic bias? An Empirical Study of Apparent Gender-based Discrimination in the Display of STEM Career Ads," *Management Science*, (65:7), pp. 2966-2981.