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ENGR 101 Worksheet

Class Activity: Bias in Design

To explore how bias manifests in various technologies, understand its impact on different populations, and consider ways to promote more ethical and socially responsible design practices.

Structure

This activity uses the jigsaw method:

1. Home Groups: Students are assigned numbers 1-6 and given a topic to review.
2. Expert Groups: Students with the same number meet to discuss their topic.
3. Home Groups: Students return to share insights from their expert discussions.

Topics and Resources – live links in agenda on canvas

The provided resources are just a starting point, feel free to explore beyond what is given.

1. **Crash Test Dummies** The Crash Test Bias: How Male-Focused Testing Puts Female Drivers at Risk Women are 47 percent more likely to be seriously injured in a crash	2. **Facial & Speech Recognition Technology** Racial Discrimination in Face Recognition Technology - Science in the News Algorithmic Accountability Act Speech Recognition Tech is Yet Another Example of Bias Racial disparities in automated speech recognition	**3. Wearable Technology** Does a Fitness Smartwatch Work Well for Wheelchair Users? | NewsCenter | SDSU How Apple Made The Watch Work For Wheelchair Users
4. AI Bias in Hiring AI hiring tools may be filtering out the best job applicants Good AI, Bad AI, and how to avoid hiring bias in machine learning	**5. Airport Body Scanners** How airport scanners discriminate against passengers of color When Transgender Travelers Walk Into Scanners, Invasive Searches Sometimes Wait on the Other Side TSA Agents Say They're Not Discriminating Against Black Women, But Their Body Scanners Might Be	**6. Autonomous vehicles** Self Diving Cars May be Biased Against Skin Color, Children Researchers see bias in self-driving software Many challenges remain for autonomous navigation Autonomous Vehicles and Weather: What you need to know

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Expert Groups – learning

Notes:

In your expert groups, answer the following questions

Technology Overview:

- Briefly describe the technology and its intended purpose.
- Who are the primary intended users of this technology?

Bias Identification:

- What types of bias are present in this technology? (e.g., gender bias, racial bias, ability bias)
- Which populations are most affected by this bias?

Impact Analysis:

- What are the specific negative impacts on affected populations? (e.g., physical harm, exclusion, discrimination)
- Are there any broader societal implications of this bias?

Ethical Considerations:

- How does this example demonstrate a failure in ethical design or social responsibility?

Solutions and Prevention:

- What steps could designers/engineers have taken to prevent or mitigate this bias?
- Are there any current efforts or proposed solutions to address this issue?

Home Groups – sharing

After you return to your home groups, structure the discussion as follows:

1. **Round-Robin Sharing (8-10 minutes)**

Each student takes 1-2 minutes to summarize their topic, focusing on: a) The type of bias identified b) Who is most affected c) One key negative impact d) One proposed solution

2. **Comparative Analysis (5-7 minutes)**

As a group, discuss: a) What common themes or patterns do you see across different technologies? b) Are certain types of bias more prevalent or impactful than others? c) Which solutions seem most promising or widely applicable?

Rank each technology from least to most biased.

Class Discussion to follow