

Dating App

"Safety vs. Justice: New Risks with New Features in the Dating Scene"

A dating app company is considering implementing a new criminal background check feature that would allow users to screen potential matches before meeting them. The proposed system would partner with a background check provider, whose founder argues that 'the biggest indicator of future abuse or violence is a history of these types of behaviors.' The company believes this feature could enhance user safety in an era where meeting strangers through digital platforms has become commonplace.

During initial consultations, experts have highlighted complex challenges. While past violent behavior can sometimes predict future acts, researchers note this relationship isn't straightforward. For instance, some individuals with violent charges are actually victims of domestic violence who acted in self-defense. Additionally, the criminal justice system contains inherent biases against Black and brown communities, suggesting such background checks could amplify existing discrimination. Statistics show that only 31% of sexual assaults are reported to police, questioning the tool's potential effectiveness in preventing harm.

1. Identify Direct and Indirect Stakeholders.
2. What are the social, cultural, economic and environmental contexts where the design will be used?
 - a. What assumptions about safety may be embedded in this solution?
 - b. How does this feature interact with existing social biases in the criminal justice system?
3. You are apart of the user design team which is considering the following:
 - a. Should the company continue, modify, or remove this feature based on user feedback and expert analysis.
 - b. Brainstorm alternative design concepts would achieve the goal of enhancing safety
4. What are key values at stake and value conflicts?
5. What are the gaps of knowledge that would need to be investigated to make a more informed decision ?

References:

Bhuiyan, J. (2022). "Tinder Now Offers Criminal Background Checks, but There's a Big Problem." *The Guardian*, Guardian News and Media,
www.theguardian.com/technology/2022/mar/11/tinder-criminal-background-checks-problems.

Kids and Technology

Designing Children's Health Technology

A fitness technology company is developing a new smartwatch designed specifically for children ages 7 and up. The proposed device aims to encourage physical activity through gamification and digital companionship. The core feature is a customizable virtual character whose emotional state is directly tied to whether the child meets their daily exercise goals. When activity goals are met, the virtual friend appears happy and the child unlocks new customization options. When goals are missed, the companion appears visibly sad and withdrawn.

The device also includes mini-games that children can play, but these are strategically locked and unlocked based on physical activity levels. Children must complete movement goals to continue playing their games. While early testing shows the features are effective at increasing physical activity, child psychology experts have raised questions about the impact of using digital rewards and emotional feedback to influence children's behavior patterns during crucial developmental years.

Additionally, the watch would include basic communication features allowing children to contact parent-approved contacts, and location tracking capabilities for safety monitoring.

The development team must now evaluate whether these behavioral design elements are appropriate for young users, and if so, how to implement them responsibly.

1. Identify Direct and Indirect Stakeholders.
2. What are the benefits and drawbacks for individual stakeholders?
3. What are the social, cultural, economic and environmental contexts where the design will be used?
4. What are key values at stake and value conflicts?
5. As a designer what additional information would be needed to evaluate whether these behavioral design elements are appropriate for young users and how to implement them responsibly

Case Study from: Santa Clara University, “Kids, Exercise, and Technology,” @SantaClaraUniv, (2022).

<https://www.scu.edu/ethics/focus-areas/internet-ethics/resources/kids-exercise-and-technology-a-n-ethics-case-study/>

References:

MacDonald C. (2024). “Fitbit Ace LTE review: A kids’ activity tracker that was fun for me, an adult,” *Engadget*,
<https://www.engadget.com/wearables/fitbit-ace-lte-review-a-kids-activity-tracker-that-was-fun-for-me-an-adult-140043586.html>

Ruiz R. (2024). “Fitbit Ace LTE for kids: What you should know,” *Mashable*,
<https://mashable.com/article/fitbit-ace-lte-kids>

Panayiotou, A. G., & Protopapadakis, E. D. (2022). Ethical issues concerning the use of commercially available wearables in children: Informed consent, living in the spotlight, and the right to an open future. *Jahr–European Journal of Bioethics*, 13(1), 9-22.

<https://hrcak.srce.hr/ojs/index.php/jahr/article/view/23100>

Vaccine Distribution

Algorithmic Healthcare Prioritization: Designing Fair Vaccine Distribution Systems

A hospital is developing an algorithm to prioritize COVID-19 vaccine distribution among its staff. The proposed system aims to create an automated ranking of eligible recipients based on risk factors and exposure levels. The hospital administration believes an algorithmic approach would provide a more objective and fair distribution method than manual allocation.

The development team has access to a hospital database containing staff information including age, job roles, and departmental assignments. They must design a system that considers both individual risk factors (such as age and health conditions) and occupational exposure levels. The algorithm needs to account for the complex nature of hospital staffing, including rotating residents, part-time workers, remote staff, and various specialized departments from emergency care to research.

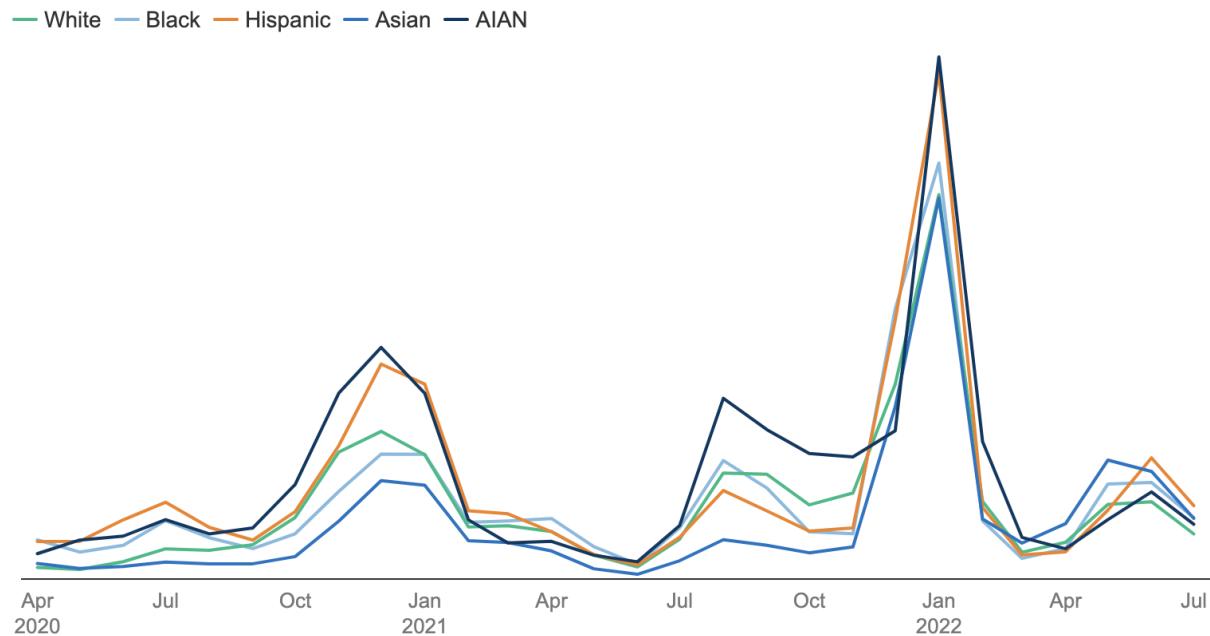
The technical team must now determine different factors, how they would be weighted, and handle edge cases. While the hospital aims to create an equitable distribution system, early testing of similar algorithms at other institutions has shown unexpected biases - such as inadvertently deprioritizing frontline residents. The team must also consider how the algorithm will handle changing information about vaccine availability and risk factors.

1. Identify Direct and Indirect Stakeholders.
2. What are the social, cultural, economic and environmental contexts where the design will be used?
 - a. Consider the following:
 - i. Identify List of Factors that would be used for algorithm
 - ii. Discuss Prioritization of Factors
 1. Discuss statistics given*
 - iii. As a designer what additional information would be needed to implement an algorithm. What questions do you have and who would you ask?
 3. What are key values at stake and value conflicts?

*Some statistics to consider:

Figure 1 [1]:

COVID-19 Monthly Age-Adjusted Cases in the United States per 100,000 by Race/Ethnicity, April 2020 to July 2022



NOTE: Persons of Hispanic origin may be of any race but are categorized as Hispanic for this analysis; other groups are non-Hispanic. AIAN refers to American Indian/Alaska Native. Age-adjusted rates standardized to 2019 U.S. Census Bureau population estimates.

SOURCE: KFF analysis of Centers for Disease Control and Prevention, COVID-19 Response. COVID-19 Case Surveillance Restricted Data Access, Summary, and Limitations, released on August 4, 2022. The CDC does not take responsibility for the scientific validity or accuracy of methodology, results, statistical analyses, or conclusions presented. • [PNG](#)

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- “Indeed, in an initial cross-sectional study of vaccine distribution disparities, the CDC COVID-19 response team reported that only 5.4 % of the first 12 million doses went to individuals identifying as Black, with 11.5 % going to people identifying as Hispanic [2].

- When examining transmission rates, “We estimate that as of October 2020, individuals aged 20-49 are the only age groups sustaining resurgent SARS-CoV-2 transmission with reproduction numbers well above one, and that at least 65 of 100 COVID-19 infections originate from individuals aged 20-49 in the US”[3].

Case Study from:

<https://ethicsinsociety.stanford.edu/tech-ethics/education-programs/case-studies>

References:

- [1] Hill L., & Artiga S. (2022). Covid-19 cases and deaths by Race/ethnicity: Current data and changes over time. Retrieved from
<https://www.kff.org/racial-equity-and-health-policy/issue-brief/covid-19-cases-and-deaths-by-race-ethnicity-current-data-and-changes-over-time/>
- [2].Painter EM, Ussery EN, Patel A, Hughes MM, Zell ER, Moulia DL, et al. Demographic characteristics of persons vaccinated during the first month of the COVID-19 vaccination program - United States, December 14, 2020-January 14, 2021. *MMWR Morb Mortal Wkly Rep* 2021;70:174–7. [\[DOI\]](#) [\[PMC free article\]](#) [\[PubMed\]](#) [\[Google Scholar\]](#)
- [3] Monod, M., Blenkinsop, A., Xi, X., Hebert, D., Bershan, S., Tietze, S., Baguelin, M., Bradley, V. C., Chen, Y., Coupland, H., Filippi, S., Ish-Horowicz, J., McManus, M., Mellan, T., Gandy, A., Hutchinson, M., Unwin, H. J. T., van Elsland, S. L., Vollmer, M. A. C., Weber, S., ... Imperial College COVID-19 Response Team (2021). Age groups that sustain resurging COVID-19 epidemics in the United States. *Science (New York, N.Y.)*, 371(6536), eabe8372.
<https://doi.org/10.1126/science.abe8372>

Wearable Tech for Dementia Residents

Name of Case Study: Wearable Assistive Technology for dementia residents in institutional care

Case Description: The number of people with dementia is increasing worldwide, while the resources of family and professional caregivers are limited. In nursing homes and other institutional care facilities, people with dementia often face challenges due to unfamiliar environments, resulting in disorientation and confusion. This results in a high burden for patients and caregivers and increased demands on caregiving time. Assistive technology offers an approach to relieve caregivers' burdens and assist people with dementia. To be useful and accepted, such technologies should respect the values and needs of the relevant stakeholders. The task is to apply the value-sensitive design approach to identify the values and needs of stakeholders regarding wearable assistive technologies for people with dementia in institutionalized care.

Value Sensitive Design Discussion Questions

1. Who/what are the direct and indirect stakeholders of this product? Brainstorm as many as possible.
 - a. A stakeholder of a product is an entity that can either affect or be affected by the product.
 - b. Direct stakeholders: Users (who directly interact with the product).
 - c. Indirect stakeholders: Non-users who have a stake in the product.
2. What are the values and needs of these stakeholders? Brainstorm as many as possible.
 - a. Values are what are considered important or beneficial by individuals or groups.
 - b. Certain values can be abstract and need to be translated into more concrete and specific needs in a context.
3. Are there any conflicting values or needs among the stakeholders? How can these conflicts be addressed?

4. What initial design concepts can you develop, taking into consideration the identified stakeholders and their values?

5. What are some potential scenarios for the design's use, and how well does the design align with different stakeholder's values and needs in these situations?

Design Task:

Design a wearable technology, such as a smart watch, for dementia residents in institutional care facilities (e.g., nursing homes). Consider the following sample use cases or scenarios (pp. 9-11), and feel free to generate additional use cases:

1. Sleep disturbances at night: A resident wakes up in the middle of the night disoriented and unsure whether to continue sleeping or go to the bathroom, depending on their daily routine. Going to the bathroom may require the nightlight to be turned on, some navigation guidance, and notification of caregivers.
2. Wandering behavior: A resident leaves their living area to attend a group activity but forgets their destination and starts wandering.
3. Impair planning: A resident intends to go to the bathroom in the morning but mistakenly opens the exit door instead of the bathroom door, or they may go to the bathroom but forget to flush the toilet or wash their hands.
4. Medication: A resident needs to take medication at specific times throughout the day but sometimes forgets or gets confused about the dosage.
5. Emergency assistance: A resident experiences a sudden medical emergency, such as chest pain or a fall, and is unable to call for help.

Not all the problems and needs mentioned in these use cases need to be addressed by the smartwatch design. When developing initial design concepts, you can choose to identify the problems and issues that you believe can be effectively solved by the design and focus on those instead.

Additional Comment:

Please avoid perceiving dementia patients as individuals without agency or personal preferences. It is important to research and understand what they, as well as other stakeholders, value and care about.

References:

What it is like to live with dementia:

- [What to expect as the person's dementia progresses | Alzheimer Society of Canada](#)
- [Alzheimer's Stages - Early, Middle, Late Dementia Symptoms | alz.org](#)
- [Living with dementia](#)

Existing wearable devices for seniors:

- [9 Wearable Devices for Seniors to Improve Health and Safety](#)

Older adult's experience with wearable technology:

- Brickwood, K. J., Williams, A. D., Watson, G., & O'Brien, J. (2020). [Older adults' experiences of using a wearable activity tracker with health professional feedback over a 12-month randomised controlled trial](#)
- Garcia Reyes, E. P., Kelly, R., Buchanan, G., & Waycott, J. (2023). [Understanding Older Adults' Experiences With Technologies for Health Self-management: Interview Study - PMC](#)

Developers' perspectives and ethical concerns:

- Howes, J., Denier, Y., Vandemeulebroucke, T., & Gastmans, C. (2024). [The Ethics of Electronic Tracking Devices in Dementia Care: An Interview Study with Developers | Science and Engineering Ethics](#)

Informal carers' perspectives:

- Sriram, V., Jenkinson, C., & Peters, M. (2020). [Carers' experience of using assistive technology for dementia care at home: a qualitative study | BMJ Open](#)

Additional academic resources:

- Köhler, S., Görß, D., Kowe, A., & Teipel, S. J. (2022). [Matching values to technology: a value sensitive design approach to identify values and use cases of an assistive system for people with dementia in institutional care](#)
- Wangmo, T., Lipps, M., Kressig, R. W., & Ienca, M. (2019). [Ethical concerns with the use of intelligent assistive technology: findings from a qualitative study with professional stakeholders](#)
- Mahoney, E. L., & Mahoney, D. F. (2010). [Acceptance of Wearable Technology by People With Alzheimer's Disease: Issues and Accommodations - PMC](#)

Medical Stem Toys for Children

Name of Case Study: (Medically Themed) Stem Toys for Children

Case Description: STEM toys are great for early childhood development because they introduce children to science, technology, engineering, and math in a fun and accessible way. Medical STEM toys can get children interested in medicine by letting them role-play as doctors. These toys help kids learn basic medical concepts and procedures, making them curious and eager to learn more about medicine. They are also intended to help children develop empathy and social skills by thinking about others' well-being, as well as improving their motor skills, hand-eye coordination, and problem-solving skills.

Value Sensitive Design Discussion Questions

1. Who/what are the direct and indirect stakeholders of this product? Brainstorm as many as possible.
 - a. A stakeholder of a product is an entity that can either affect or be affected by the product.
 - b. Direct stakeholders: Users (who directly interact with the product).
 - c. Indirect stakeholders: Non-users who have a stake in the product.
2. What are the values and needs of these stakeholders? Brainstorm as many as possible.
 - a. Values are what are considered important or beneficial by individuals or groups.
 - b. Certain values can be abstract and need to be translated into more concrete and specific needs in a context.
3. Are there any conflicting values or needs among the stakeholders? How can these conflicts be addressed?
4. What initial design concepts can you develop, taking into consideration the identified stakeholders and their values?

5. What are some potential scenarios for the design's use, and how well does the design align with different stakeholder's values and needs in these situations?

Design Task:

Design a doctor kit for toddlers aged 3-5 or 4-8 years old to role-play as doctors or a specific type of doctors, such as dentists. The kit should include a variety of tools commonly seen in medical settings, although the exact tools included in the kit are up to you. The goal is to create a fun and educational tool that helps children learn about medicine and develop relevant skills.

There are at least two types of this doctor kit, both of which can be found on Amazon:

1. Non-smart versions: These are purely physical toys that require more imagination from children, focusing on tactile and hands-in play.
2. Smart version: They can interact with a free app that can be downloaded on a tablet. Children can use the tools to interact with the app, such as taking the temperature of a virtual patient or using X-ray and ultrasound tools (toys) to visualize bones and organs in the app.

When developing initial design concepts, compare the costs and benefits of each option. Consider whether your design should be a smart version or not and provide reasons for your choice. Then, propose design concepts that realize your choice. If you wish, you can look at existing products on Amazon and seek to improve on them or address the reviewers' criticisms of these concepts.

References:

Here are some examples of non-medically themed stem toys designed by northeastern students:

- [Buttons, pizza trucks and robot cars. Northeastern engineering students design and build toys that teach STEM to school children in Oakland](#)

Some medically themed stem toys for toddlers (age 3-5 or 4-8) on Amazon:

- [Amazon.com: 3233091011 - STEM Toys: Toys & Games](#)

Some value and ethical considerations about toy design in general:

- [When it comes to toy design, simpler may be better | Waterloo News](#)
- [The Responsibility Of Toy Manufacturers - FasterCapital](#)
- [Sustainable Toys: What Every Parent Needs To Know About Choosing An Eco-Friendly Toy](#)
- <https://www.thegoodboutique.com/inspiration/the-importance-of-ethical-toy-brands-for-your-2-year-old?srsltid=AfmBOoql6HLBUtemFjwHS8tXgUqlI5ULgM2d1G63ddrQcatkI1xJINzU>