

JUDGMENT CALL THE GAME

USING VALUE SENSITIVE DESIGN AND DESIGN FICTION TO SURFACE ETHICAL CONCERNs RELATED TO TECHNOLOGY

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Abstract

Artificial intelligence (AI) technologies are complex socio-technical systems that, while holding much promise, have frequently caused societal harm. In response, corporations, non-profits, and academic researchers have mobilized to build responsible AI, yet how to do this is unclear. Toward this aim, we designed *Judgment Call*, a game for industry product teams to surface ethical concerns using value sensitive design and design fiction. Through two industry workshops, we found *Judgment Call* to be effective for considering technology from multiple perspectives and identifying ethical concerns. This work extends value sensitive design and design fiction to ethical AI and demonstrates the game's effective use in industry.

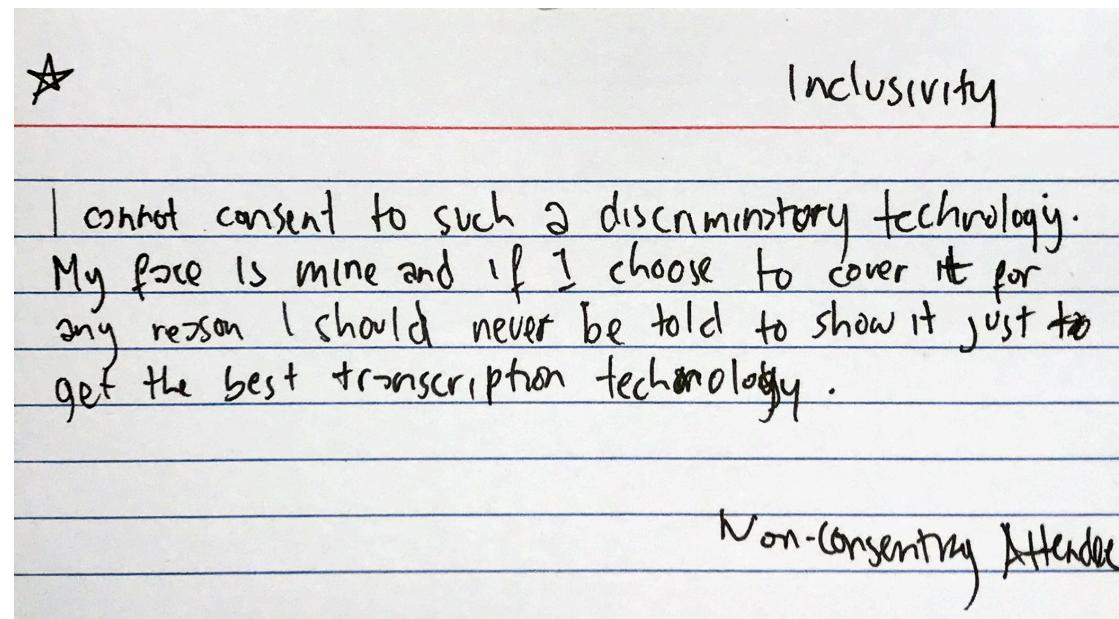
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Authors Keywords

Design Ethics, Design Fiction, Design Method, Design Tool, Ethical Artificial Intelligence, Product Teams, Responsible Artificial Intelligence, Responsible Innovation, Stakeholders, Value Sensitive Design

FIGURE 1.

(Above) *Judgment Call* user review written by a participant during industry workshop B. The one star review is written from the perspective of a *non-consenting attendee* related to the ethical principle *inclusivity* about a facial recognition system

Introduction and Motivation

As Artificial Intelligence (AI) technologies become more common so, too, do reports of algorithmic bias and harm. In 2015, Google's image labeling software classified an African American person as a "Gorilla" [4]. In 2016, Microsoft's twitter chatbot, Tay, sent racist and misogynist tweets after just 24 hours of interacting with twitter users [22]. In 2017, Amazon disbanded an initiative that used AI to review job applicants because of gender bias [6]. Alongside these public incidents, there is a growing body of academic research documenting the many ways that AI can do harm by encoding social bias and obscuring inequity behind unintelligible systems. For example, Sweeney discovered systemic bias in Google AdSense, an algorithmic advertising platform [21]. Buolamwini and Gebru identified gender and racial bias in several commercial facial analysis systems [5].

In the face of such societal harm, many organizations have made public commitments to building responsible AI. Microsoft published *The Future Computed: Artificial Intelligence and its role in society* [16] outlining six ethical principles to guide development of AI at its company. DeepMind formed Ethics & Society, a research unit, to study how technologists can apply ethics to AI [7]. Google released seven ethical principles to guide AI projects across its company [1]. All three, and over 70 other organizations, have joined the Partnership on AI, a multi-industry initiative that has an explicit commitment to understanding the social and ethical outcomes of AI [18].

Yet, just how to build responsible AI systems remains elusive as the problems that product teams face in trying to build responsible systems are complex. Holstein and colleagues [12] studied the challenges machine learning practitioners in industry face as they develop fairer commercial AI products. The researchers identified numerous challenges including the need for auditing, support in collecting representative data sets, tools for anticipating and overcoming blind spots, and methods for evaluating solutions. The academic research points to some glaring problems that exist in our AI systems and even proposes solutions, but there is no clear approach for product teams in industry to remedy existing problems or avoid them in the future.

One critical step is to raise product teams' awareness about the ethical considerations related to the technologies they are designing and building. To support product teams' exploration of these ethical concerns, engaging, high impact methods that facilitate envisioning around specific ethical principles are needed. Toward that aim, in this work, our goal was to create an experience for product teams in which thinking about ethics and technology was accessible and productive. Specifically, we designed a game that draws on value sensitive design (VSD) and design fiction to surface ethical concerns: *Judgment Call*. Designed for product teams in industry to use in relation to their current work, players write product reviews from different stakeholder perspectives to highlight features that support or hinder ethical principles. Through discussion, players identify specific ethical concerns related to the technologies they are designing and building.

We begin this pictorial by discussing value sensitive design and design fiction, followed by instructions for playing *Judgment Call* to surface ethical considerations. Alongside the instructions, we illustrate gameplay with a fictional facial recognition scenario. We then report briefly on using the game in two industry workshops, describe *Judgment Call*'s uptake and use at Microsoft, and conclude with our reflections, future work, and contributions. This work extends value sensitive design and design fiction to a game for responsible innovation and demonstrates the game's effective use with industry product teams.

Researcher stance

At the time of this work, all of the authors were members of Ethics & Society, a team at Microsoft, where we developed *Judgment Call*. Ethics & Society's charter is to guide technical and experience innovation toward ethical, responsible, and sustainable outcomes. Ethics & Society works with Microsoft product teams to collaboratively develop responsible solutions through research, design, and engineering.

Envisioning Ethical Computing: Value Sensitive Design & Design Fiction

Given our goals to support product teams' exploration of ethical considerations related to technology, we grounded our approach in value sensitive design (VSD) and sought an appropriate tool for product teams to operationalize VSD. Within the human-computer interaction, participatory design, and futures studies literatures we identified several potentially useful methods, among them design fiction [2, 3, 8, 15, 19, 20, 25], futures workshops [14], scenario planning [23, 24], stakeholder identification [10, 11, 26], and value scenarios [10, 11, 17]. Here we make the case for bringing together value sensitive design and design fiction to create a tool for exploring ethical considerations in an industry setting.

VSD is an approach that rigorously accounts for human values in the technical design and engineering process and has been applied in a variety of contexts including implantable medical devices and information systems to support transitional justice [10, 11]. In this work, a significant departure from many previously published VSD projects is the separation of stakeholder identification and the surfacing of values. A typical VSD project begins with the identification of stakeholders and surfacing of their values through conceptual and empirical investigations. In designing *Judgment Call*, we leveraged the values of the organization (Ethical Principles for AI, right) and stakeholder identification is done by product teams as part of gameplay.

Design fiction was well aligned with our goals for several reasons. First, design fictions present a partial vision of a possible future, allowing the reader to imagine the specific details. Different readers imagine different details [2]. This leaves room for creative expression in both generating and interpreting design fiction. Second, design fictions can be created about the same topic endlessly, and each new fiction extends the narrative. Individually, the design fictions provide

a glimpse of a larger ecosystem. Together, they create a more holistic view by offering multiple perspectives on an imagined future. Finally, one of the commitments of design fiction is to create discursive space [15]. It is in this discursive space that product teams are able to explore ethical concerns related to technology.

Design fiction is...

According to sci-fi author Bruce Sterling, design fiction is "the deliberate use of diegetic prototypes to suspend disbelief about change" [15: 210]. In essence, it is an approach that situates a prototype in a fictional world to explore and interrogate possible futures [15, 25]. Design fiction doesn't attempt to predict the future, but instead builds a fictional world in which we can consider the subject of the design fiction "in relation to the sociocultural contexts in which it is presumed to exist" [25:1360].

Design fiction has recently been used to directly explore social and ethical concerns [2, 20]. Baumer and colleagues [2] used design fiction as part of an undergraduate course on the ethical aspects of computing. One piece in Baumer's curated set, "User Reviews of Know Yourself", inspired *Judgment Call* and leverages user reviews to describe a fictional app that uses personal data to generate a personality report.

In designing *Judgment Call*, we extended the concept of user reviews written from different perspectives to a game that incorporates VSD stakeholder identification and the Ethical Principles for AI (right) to explore ethical considerations related to technology.

E TH I C A L P R I N C I P L E S F O R A I

The Future Computed: Artificial Intelligence and its role in society [16] outlined six ethical principles for responsible AI (shown below) which we incorporated in *Judgment Call*. In the second iteration of the game, we added a seventh ethical principle of "User Control" to reflect considerations of agency, which our team felt was implied by the original six principles though not made explicit. Each of the seven principles is represented on a card in the game (see "The Cards" below). While these ethical principles were created with Artificial Intelligence in mind, both *Judgment Call* and the ethical principles can be used to guide the development of other types of technology.



FAIRNESS

Treat all stakeholders equitably and prevent undesirable stereotypes and biases.



RELIABILITY

Build systems to perform safely even in the worst-case scenario.



PRIVACY & SECURITY

Protect data from misuse and unintentional access to ensure privacy rights.



INCLUSION

Empower everyone, regardless of ability, and engage people by providing channels for feedback.



TRANSPARENCY

Create systems and outputs that are understandable to relevant stakeholders.



ACCOUNTABILITY

Take responsibility for how systems operate and their impact on society.

In *Judgment Call*, product teams identify their stakeholders, then write fictional product reviews from those stakeholders' perspectives related to ethical principles. The reviews scaffold discussion in which specific ethical concerns are highlighted and solutions are considered.

In this section, we introduce the game (see figures below, right) through instructions, tips, and an illustrated fictional round of gameplay using facial recognition as the technology of focus. The scenarios, stakeholders, images, and reviews in this section were generated by the authors for this pictorial.



To play

1-10 players
60-90 minutes

You'll need

- white board
 - dry erase markers
 - index cards
 - pens/pencils

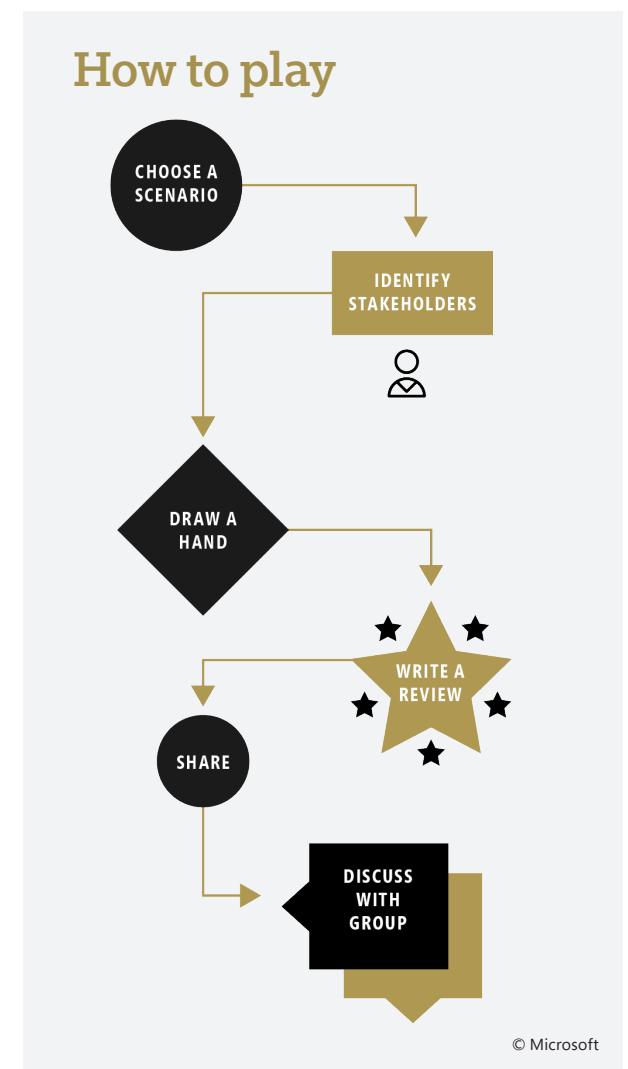


FIG 2.

(Above) A visual guide to playing *Judgment Call*. Each of the steps are explored in depth in this section.

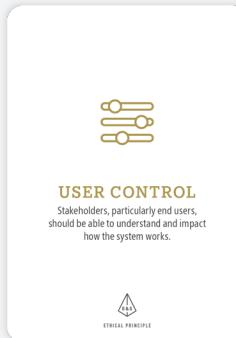
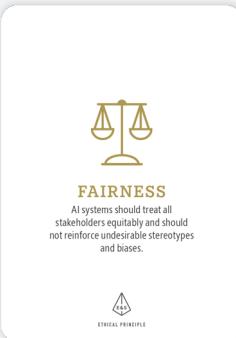
FIG 3.

(Left) Players write reviews during a game of *Judgment Call*.

The Cards

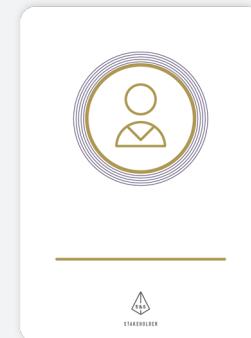
Ethical Principle

Consider which features of the technology support (or don't support) these ethical principles



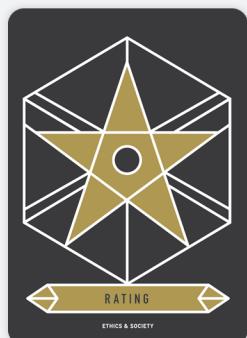
Stakeholder

Write in the stakeholders you identify in step 2



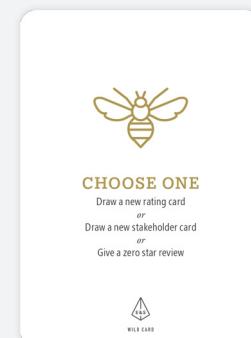
Rating

The number of stars you give the user review



Wild card

Do one of these 3 actions to mix up your hand



1. Choose a scenario

Step one

The first step in playing *Judgment Call* is to choose the scenario that will be the focus of the game. There are two types of scenarios, a product scenario and a fictional scenario. The game was designed to be used by product teams with real products, but using either type of scenario for gameplay can lead to excellent discussion about ethics and technology.

Product Scenarios

To have the most impact, product teams should use their product as the scenario for gameplay. Through *Judgment Call*, product teams use design fiction to explore the real-world implications of the technology they're building and surface potential ethical concerns from a variety of stakeholder perspectives. The game allows the product team to take a step back from the technical details and look at the larger context of their work. By playing the game during an active product cycle, the product team still has the opportunity to address the ethical concerns before the product is released.

Fictional Scenarios

A fictional scenario is a scenario that a group selects for gameplay that is not related to their current work. Using a fictional scenario works well for ad hoc groups learning about ethics and design or exploring design spaces. The scenario can be selected ahead of time by a facilitator or developed together as part of gameplay.

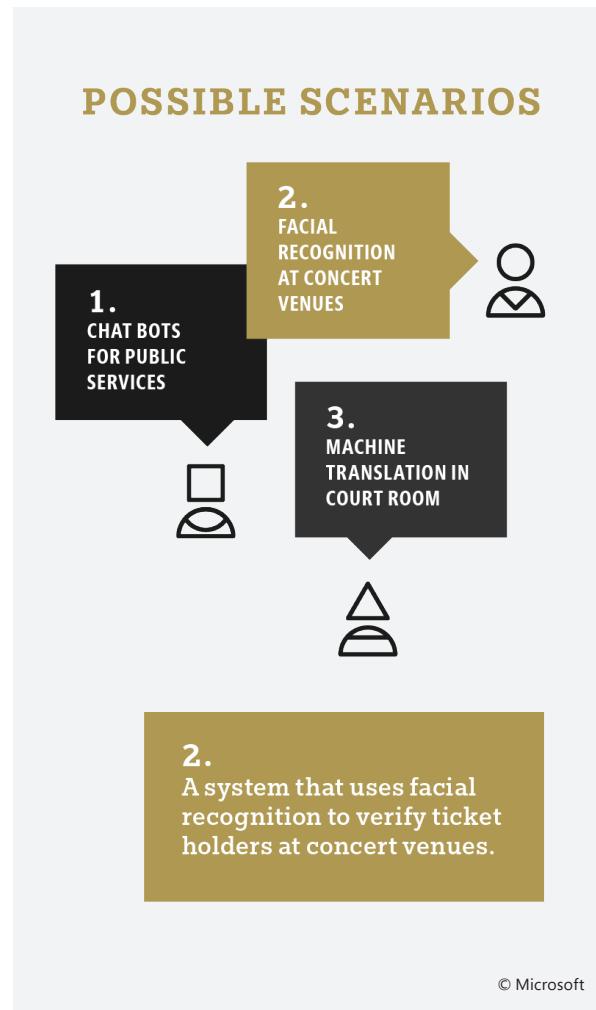


FIG 4.

(Above) An illustration demonstrating the selection of a fictional scenario for a game of *Judgment Call*. We brainstormed three scenarios then chose scenario #2.

Tips for clarifying a product scenario

Take a moment to review the current design of the technology. What elements of the design have recently changed? What features still need to be resolved?

If the product is a platform technology, specify an application area. "Facial recognition technology used in an airport" is better than "facial recognition technology".

Tips for choosing a fictional scenario

A good fictional scenario will include both a specific technology and application area. "Autonomous drones for commercial package delivery" is better than "autonomous drones".

After you've decided on the scenario, spend a few minutes discussing the technology's features and the social context.

Fictional scenarios are typically less detailed than product scenarios and the technology at hand may be unfamiliar to many players. Players just need a high-level understanding of the technology and where it is being used.

2. Identify stakeholders

Step two

Drawing on value sensitive design [10, 11, 26] and inclusive design at Microsoft [13], we define three categories of stakeholders: direct stakeholders, indirect stakeholders, and excluded stakeholders. Stakeholder can refer to individuals (e.g., end user, teenage user, parent of teenage user) or groups (e.g., watchdog organizations, elders, legislators).

Direct Stakeholders are those who interact directly with the technology and can include end users, designers, engineers, hackers, and administrators.

Indirect Stakeholders do not interact with the technology but are affected by its use. This group of stakeholders can include advocacy groups, families of end users, regulators, and society at large.

Excluded Stakeholders are those who cannot or do not use the technology. Reasons for exclusion can include physical, cognitive, social, or situational constraints. For example, a technology that relies heavily on visual elements will exclude stakeholders with low-vision.

Consider the scenario and identify stakeholders for each category: direct, indirect, and excluded. List the stakeholders on a white board as another player writes the stakeholders on the stakeholder cards.

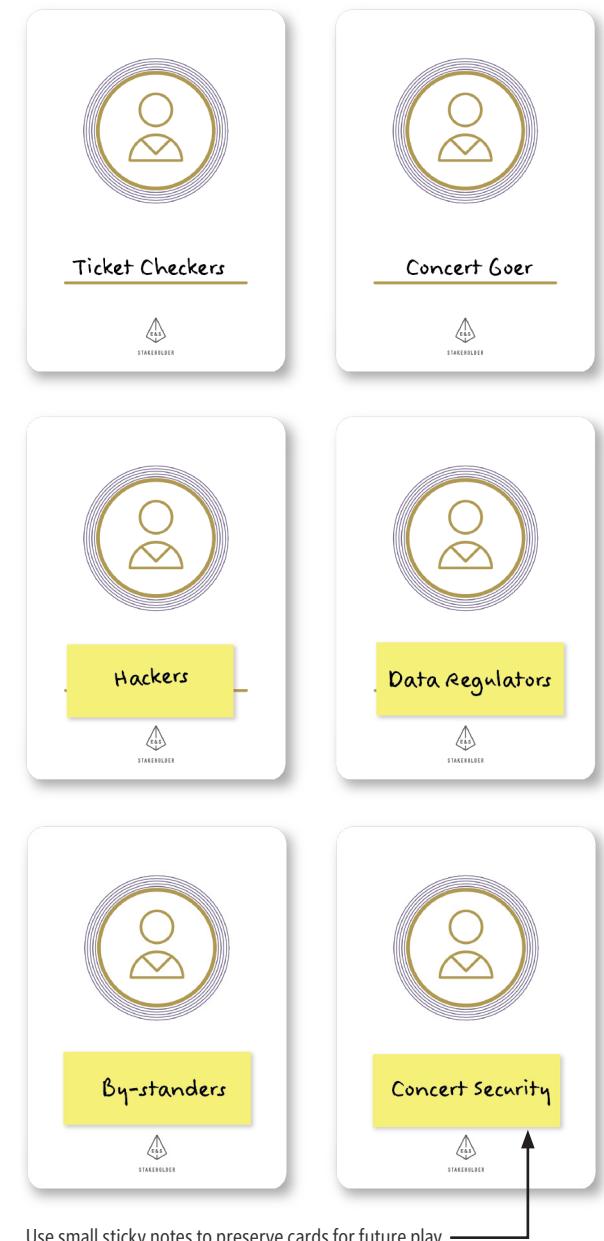


FIG 5.

(Above) The results of our stakeholder identification for the scenario: facial recognition in a concert venue.

FIG 6.

(Right) A selection of the stakeholders identified in Fig. 5 written on stakeholder cards.



3. Draw a hand

Step three

Each player receives one wild card per game to play during any round.

For each round, each player draws one rating card, one stakeholder card, and one ethical principle card and uses these three cards to write a product review.

Using a wild card

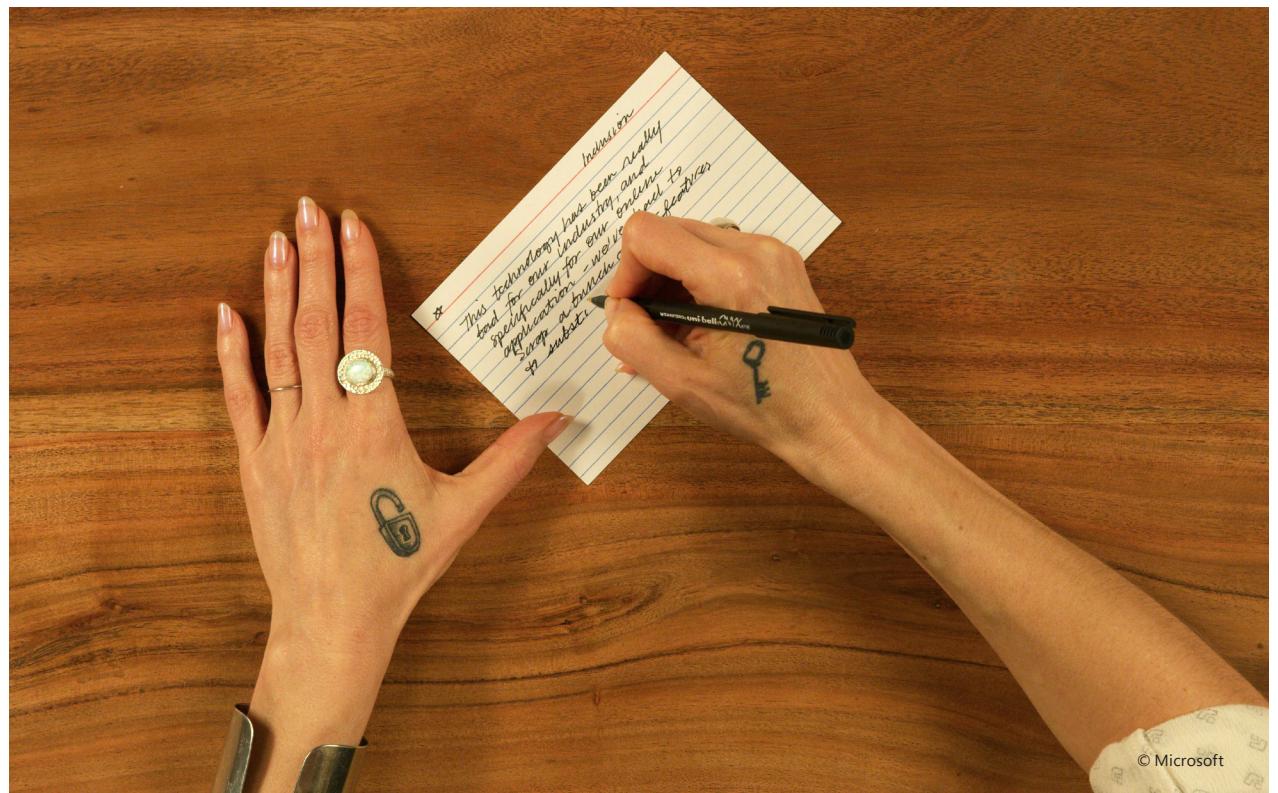
Draw a new rating card. For when you'd like to try the review with a different number of stars.

Draw a new stakeholder card. For when you are unfamiliar with the stakeholder or uncomfortable representing their views.

Give a zero star review. For when the technology failed the stakeholder completely and even one star is too many.

FIG 7.

(Right) A player writes a review for the hand below, a *one-star review* from the perspective of the *ticket seller* related to the ethical principle *inclusion*.



4. Write a review

Step four

The combination of the rating card, stakeholder card, and ethical principle card frame the product reviews you write in each round. The rating card indicates the number of stars you give the review. For example, if you draw a 1 star rating card, you would write a negative review, focusing on features the stakeholder would dislike about the technology. The stakeholder card indicates the stakeholder perspective from which you write the review. For example, if you draw a "hackers" stakeholder card, you would write a review from the perspective of someone trying to exploit the system. The ethical principle card indicates the ethical principle you should consider in your review. For example, if you draw a "Fairness" card, consider how a fair or unfair system would affect your stakeholder's feelings toward the technology.

When you have written your review, discard your hand and draw another one. Each player should write 2-3 reviews depending on time.

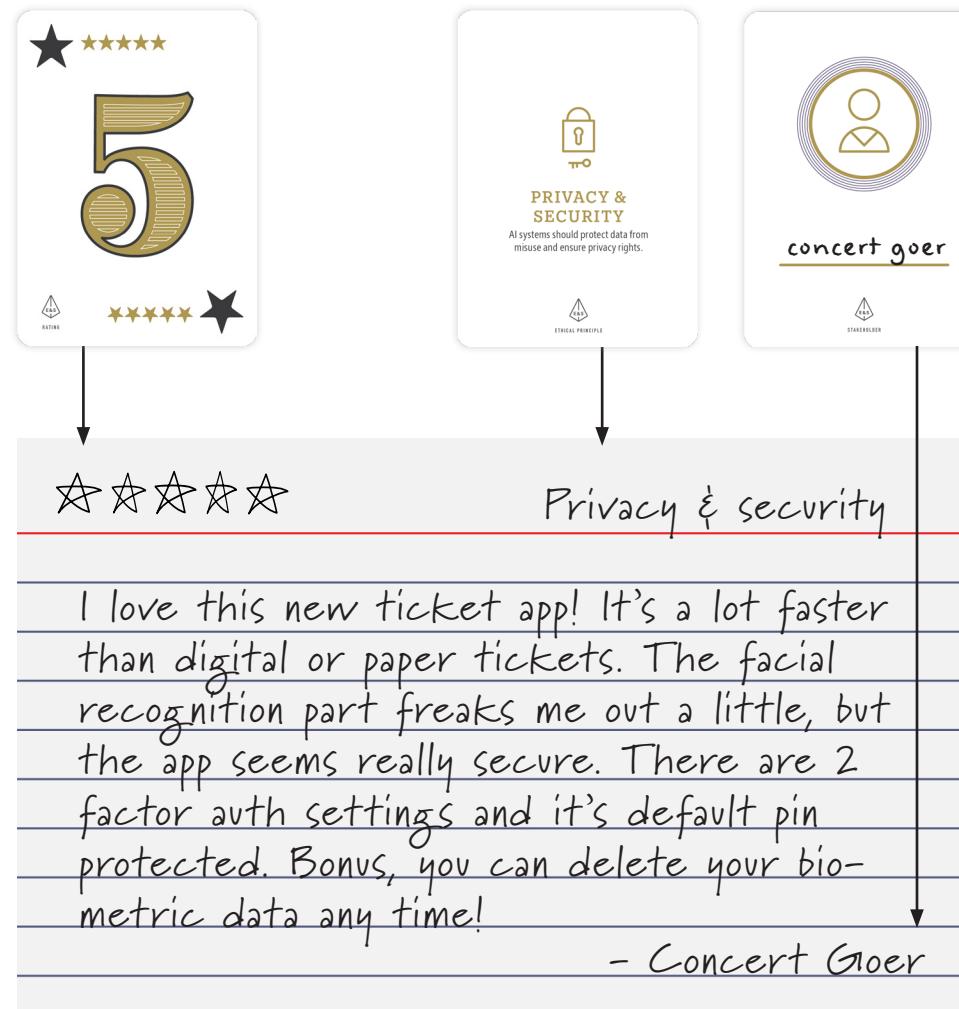
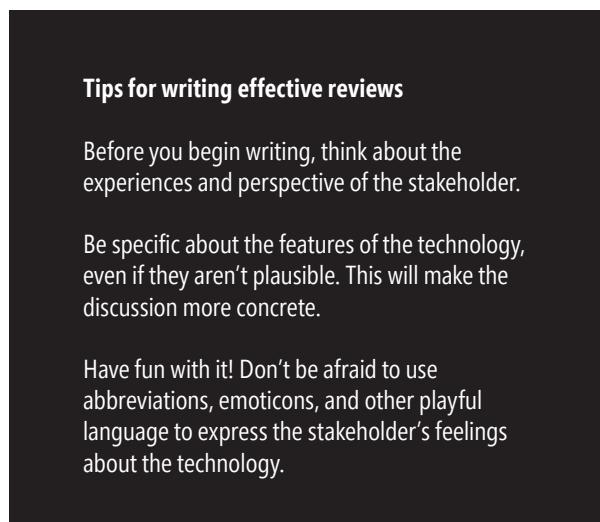


FIG 8.

(Above) A user review and the corresponding hand.

5. Share reviews and discuss

Step five

Once all reviews are completed, have one player collect, shuffle, and redistribute them. Take turns reading the reviews aloud. Listen for themes to emerge. After all the reviews have been read, discuss them as a group. Individually, the reviews highlight aspects of the technology from the perspective of a specific stakeholder. Together, they paint a more holistic picture by providing multiple perspectives of the same technology.

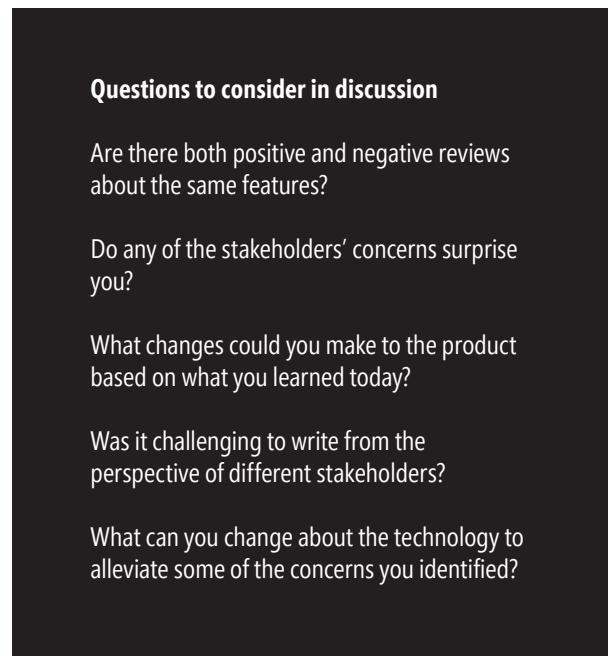


FIG 9-11.

(Right) A collection of user reviews. Together, they offer three perspectives on the same scenario.

☆☆☆☆☆	<u>Reliability</u>
	<p>This ticket checking system is pretty easy to hack if you know what you're doing. There are tons of ways to hide from the infrared sensors they use and if there aren't ticket checkers standing at the gate you can walk right past them. I've seen at least 6 concerts this way in the past year. Every time</p> <p style="text-align: right;">- Hackers</p>
0 stars!	<u>Inclusion</u>
	<p>This system put me out of a job :(Concert venues adopted it way too quickly, laid off all their event staff, and it turns out the tech doesn't work very well. I know for a fact people can get around the sensors and get in without a ticket. Oh well. Not my job to care</p> <p style="text-align: right;">- ticket checkers</p>
☆☆☆	<u>Transparency</u>
	<p>I've never actually used this system, but I work near a popular concert venue. I really appreciate that they've put signs around so I know they're using facial recognition in the area, but I don't know what happens if I'm caught on camera. Where is the active camera zone? How do I know if I'm caught on camera? How long do they keep the photos?</p> <p style="text-align: right;">- By-standers</p>

Two Industry Workshops

We conducted two *Judgment Call* workshops with two different Microsoft product teams (N=12). Workshop A had eight participants, six of whom were members of the product team, two of whom were members of Ethics & Society. Workshop B had four participants, three of whom were members of the product team, one of whom was a member of Ethics & Society. The Ethics & Society team members who participated in the workshops were not the developers of *Judgment Call*. All workshop attendees provided informed consent. The first author facilitated both workshops, which consisted of a pre-test survey, playing *Judgment Call*, and a post-test survey. Both workshops used the team's respective product as the scenario for gameplay, though we are not able to discuss the specific technology in order to protect intellectual property.

EVALUATION. Based on the workshop surveys and our observations, we found *Judgment Call* to be an engaging and accessible way to surface new ethical concerns and consider the problem space from multiple stakeholder perspectives.

Surfacing New Ethical Issues. *Judgment Call* was an effective method for surfacing new ethical considerations a product team had not previously identified. Across the two workshops, nine participants indicated that more than half of the ethical considerations surfaced while playing the game were new to them. Participant B2 stated, "Stakeholders and scenario role play helped me uncover concern #4 [Being inclusive of non-users]. Never thought [of that] otherwise." Participant A8 stated, "It's fun and brought to light issues I didn't originally consider."

Perspective Taking. The act of identifying stakeholders, and then considering their perspectives in relation to the technology, encourages players to consider the product from different viewpoints. Participant B3 stated, "Love how it forced us to consider players in the scenario." Participant A7 stated, "VERY easy to step into a different mindset. Provoked great conversation and impacted my point of view."

Initial Uptake and Use

Since the release of *Judgment Call*, the game has seen widespread uptake around Microsoft. Ethics & Society continues to conduct *Judgment Call* workshops with partner teams, various working groups around the company and at conferences. Further, the umbrella organization in which Ethics & Society sits uses *Judgment Call* as part of its diversity and inclusion orientation program for new employees.

We suspect there are several reasons why *Judgment Call* was positioned for successful appropriation in this industry context. First, there was multi-level organizational desire for solutions related to ethics. Senior leadership had committed to developing ethical AI and employees across the company were similarly calling for a stronger ethical stance [9]. Second, we maintained the ethical principles that Microsoft had previously defined while expanding upon them. This facilitated consistency across the large organization with regard to ethics and enabled cross-organizational education. Lastly, we designed *Judgment Call* to fit with the current practices of product teams. We took great care to draw on the insights of our team's institutional knowledge, feedback from our partner teams, and feedback from others across the organization. In designing carefully for our organizational context, we were successful in creating a lightweight tool to support our goals which also leverages the direction and momentum of Microsoft's commitment to ethical development of technology.

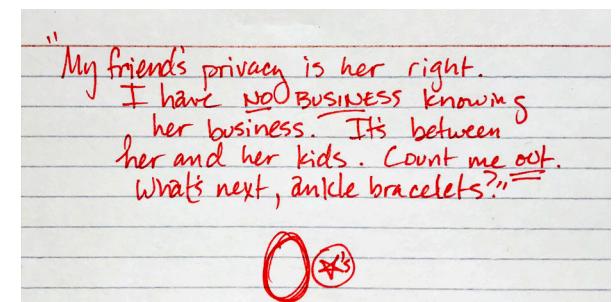


FIG 12.

A user review written during industry workshop A. The review is a zero star review written from the perspective of the end user's friend related to the ethical principle *privacy*.

Reflections

In the following sections we offer reflections on *Judgment Call*'s broader societal impact, limitations, and future work.

BROADER SOCIETAL IMPACT. In the field of human-computer interaction, and indeed at Microsoft where this work took place, we are well accustomed to thinking about the direct stakeholders of technology. We less routinely expand the scope of stakeholders to include indirect stakeholders or society at large in a rigorous way. *Judgment Call*'s broader societal impact stems from its effectiveness as a tool to support the exploration of ethical considerations from the perspectives of a wide variety of stakeholders. Several features of *Judgment Call* enable this type of exploration. We highlight three here.

First, having a serious conversation about ethics and technology in the context of a game creates space for difficult or uncomfortable conversations. Within this conversation, the use of design fiction to create discursive space and the anonymization of review authorship deflects blame or charges of irresponsibility in actual settings with actual harms. This allows team members to focus on the issues at hand and how best to solve them. Second, taking on the role of various stakeholders allows team members to see through others' eyes, empathize, and call attention to potential harms. The concerns are contextualized from the stakeholder's perspective and this concretizes how potential harms might be experienced by stakeholders. Lastly, the game can be played within 1-2 hours and yield meaningful outcomes. Product teams are constantly working against multiple deadlines. For interventions of this sort to take root, they need to be efficient and effective. *Judgment Call* is effective in a short period of time in part for two reasons. First, the format of the game's design fiction – the user review – makes use of a ubiquitous artifact, so little time is dedicated to explaining how to craft the fiction. Second, the game does not need to be comprehensive. Each player should write at least two reviews, but every card combination does not need to be explored in order to have a meaningful discussion.

LIMITATIONS. We identified four main limitations of *Judgment Call*. First, it was designed as a tool for surfacing ethical concerns, but it does not propose solutions. The work of addressing these concerns still lies with the product team, and other methods would be more effective for that task. Second, as with all workshop methods, the range of perspectives presented are limited by the experiences of the people in the room. This includes the types of stakeholders who will be identified, the types of reviews that will be written, and the ethical concerns that will be surfaced during the discussion. Third, stakeholder identification – a practice adapted from value sensitive design – has its own well-identified limitations [10, 11]. In this application of stakeholder identification, it can be difficult to represent the perspective of a stakeholder very far outside of one's lived experience. The purpose of writing reviews in *Judgment Call* is not to speak for these stakeholders, but to consider the technology from different imagined perspectives. Ideally, product teams are using other, more well-suited methods alongside *Judgment Call* to directly include the actual perspectives of their stakeholders. Lastly, the values we foreground in *Judgment Call* are those of Microsoft and are not necessarily the values of the stakeholders. Using the ethical principles of the organization was important for organizational uptake and use, but may introduce tension when considering those principles from the perspective of different stakeholders.

FUTURE WORK. First, *Judgment Call* was developed in summer 2018, so questions related to long-term use and effectiveness present a range of open questions. How could *Judgment Call* be integrated into the product development life cycle in a sustained way? One could imagine that user reviews might work as boundary objects that team members can point to and resurface throughout the design process. Overtime the user reviews could become a shared language or shorthand for certain types of considerations. Second, *Judgment Call* was designed to support product teams working in industry as they explore ethical considerations, but it can be applied in other settings. Another direction for future work is to evaluate the game in different contexts, such as an undergraduate course about ethics and technology.

Contributions & Conclusion

In this pictorial, we report on using value sensitive design and design fiction to create a tool for industry product teams to explore ethical considerations related to technology, introduced *Judgment Call* and provided instructions for gameplay alongside an illustrative example, reported briefly on using the game in industry workshops and the game's use and uptake around Microsoft, and concluded with our reflections.

This work makes the following contributions. First, *Judgment Call* adds to the value sensitive design and design fiction literatures within the field of human-computer interaction. Specifically, it extends these two approaches to a game for product teams in industry to surface ethical concerns related to AI technology. Second, this work demonstrates effective use of *Judgment Call* with industry product teams. It shows that product teams without extensive prior experience in creative writing or in moral philosophy can use value sensitive design and design fiction to highlight ethical considerations that are directly relevant to their work. Lastly, with organizational support, alignment with the organization's aims, and careful consideration of the industry context, design interventions drawing on existing methods can be effective tools for encouraging product teams in industry to consider the broader societal impact of technology. Toward the aim of responsible AI, we have demonstrated that lightweight interventions like *Judgment Call* can deliver meaningful outcomes that nudge us toward responsible innovation.

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