

Exploring the use of Speculative Concept Films for Co-Speculation around Data Ethics

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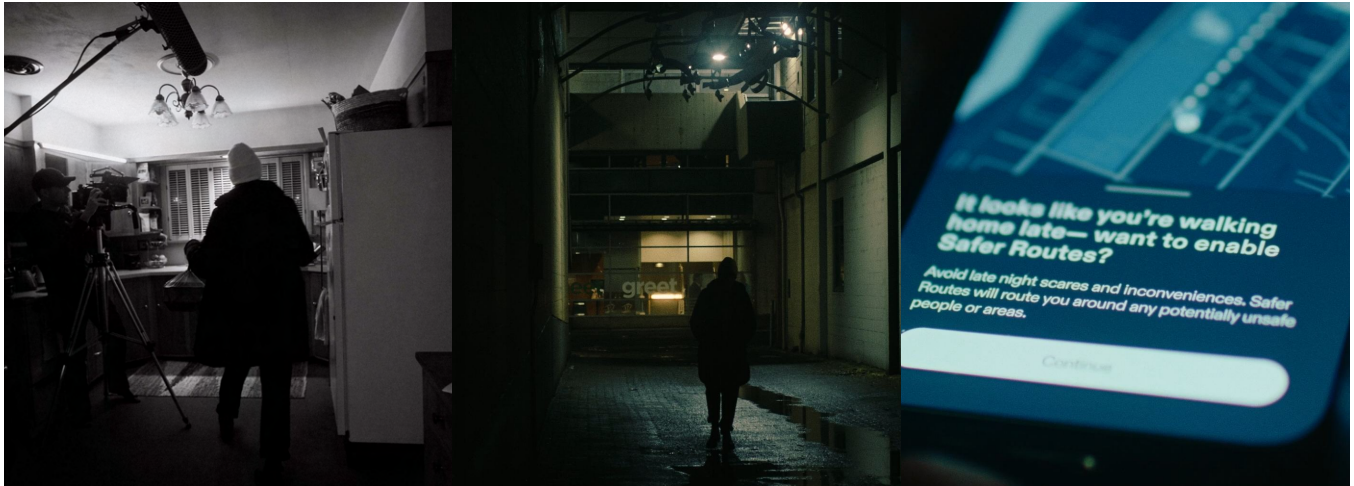


Figure 1: Left Image: A behind-the-scenes still from the making of *Avoidable Inconveniences*. Center & Right Images: Two stills from *Avoidable Inconveniences*, a critical design fiction film exploring safer route recommendation.

Abstract

Location-based recommendation systems are becoming increasingly ubiquitous in the march toward fully tailored user experiences. Applications like Google Maps, Strava, Uber, Hinge, and many others utilize location data as key material for providing contextual recommendations. Rising concerns about usage and misuse of location data have arisen in recent years. We situate this paper within design's future-oriented nature, critically speculating possible futures with location-based recommenders. We propose a refinement of current approaches and speculative design for engaging domain experts in co-speculation through the use of tailored, high-fidelity, critical design fiction films. In this case study, we lay preliminary insights, including a widespread sense of fatalism, self-described lack of agency, and underlying individualist ideologies driving development and deployment of these systems. We also reflect on the process of creating four critical design fiction videos, their use in 11 guided co-speculation sessions, and implications for their use in gathering rich qualitative data, creating space for reflection,

prompting stories and personal connection, and unpacking experts' views on complex wicked problems.

CCS Concepts

• Human-centered computing → Interaction design; Participatory design.

Keywords

Design Filmmaking, Design Fiction, Speculative Critical Design, Envisioning

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1 Introduction

Location-based recommendation systems are becoming increasingly ubiquitous in the march toward fully tailored user experiences. Examples of digital services that utilize sophisticated location data to provide custom recommendations include map and route-planning apps (e.g., Google Maps), consumer lifestyle and fitness apps (e.g., Strava), ride-sharing apps (e.g., Uber and Lyft),



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and dating apps (e.g., Hinge and Grindr). The benefits of these services to the user and society are quite clear. However, there is often less consideration of the near-term or long-term harms of location tracking and of digital surveillance more generally. This is changing as critiques of technology become more salient across public discourse. For example, many users are now aware that their personal data is sold to data brokers and used to target them with ads in ways that are impossible to trace [24, 31, 48].

As location data becomes increasingly accessible through technological advancements and the broader adoption of artificial intelligence and machine learning programs, the societal consequences and individual-level impacts extend beyond purely digital interactions [79]. Digital surveillance now influences how users interact with the world by, for example, increasing their reliance on GPS for directions and recommendations for where to stop for gas or get a bite to eat [50, 77, 78]. Digital surveillance also impacts our sense of self through quantifiable personal data, such as influencing our tastes by recommending media based on where we've been, what we've liked, and who we've spent time with [28, 39].

Recommendation systems, including those that incorporate granular location data, now directly influence how people navigate and interact within the physical world. Questions now emerge about how routes are determined, why specific routes are chosen, and how individuals' visited locations might be used against them, similar to existing surveillance paranoia [11]. Some have expressed concerns that digital surveillance is creating a large-scale system of control, as exemplified by large technology companies' collaboration with state and federal law enforcement agencies [51]. Within HCI, design-oriented researchers have engaged with many aspects of digital surveillance and interconnected issues of trust, control, transparency, and autonomy [1, 4, 9, 19, 42, 62, 69, 76, 84].

In this paper, we translate critiques of digital surveillance into fictional design films. We then use these films to engage domain experts within a semi-structured interview study to elicit reflection on the future of digital surveillance and our use of high-fidelity speculative design films. Professional experts working in design and related fields have an opportunity to play a key role in addressing surveillance concerns [12, 46, 82]. A notable example of this is the adoption of Privacy by Design principles [12]. Design is an inherently future-oriented discipline, and designers have many tools at their disposal for exploring alternate futures. However, in practice, professionals are highly constrained by their workplace environments [79]. To engage expert designers, engineers, artists, and researchers in a future-oriented discussion, this project employs speculative design approaches combined with high-fidelity film production.

There continues to be interest in speculative design from Human-Computer Interaction (HCI) and design research communities, particularly fictional design scenarios, as a design research approach. However, the utility and value of these approaches are not always immediately apparent, especially within the realms of academic research and professional design practice. Some argue that these approaches can be used to engage members of the public in reflection, debate, and critique [21, 23, 73]. Others suggest these approaches can actually inform decision-making and social change [56]. Researchers have shown that speculative scenarios can be used in expert contexts to explore the potential values of new designs [6, 81].

More recently, some in HCI and design have used these approaches within participatory design processes in needs-finding and other early-stage design activities or to more holistically understand or elicit values from stakeholders [10, 20, 22, 25, 83]. However, as Kerridge [40], Coulton et al. [13, 14], and others have pointed out, very little is known about how people actually respond to these uses. Aspirationally, these approaches hold compelling potential. Yet empirically, the uses of speculative design often remain quite speculative.

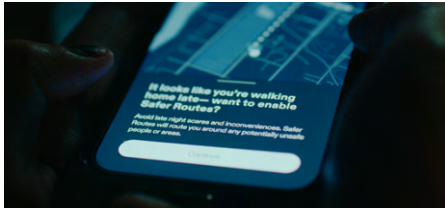
Motivated by these issues, we set out to investigate two research questions:

RQ1: How can we use design to anticipate future scenarios of location-based recommendations and digital surveillance— and, more generally, the future harms and unanticipated consequences of technology? In particular, we wanted to focus on concerning or contentious consequences of technology that may be overlooked within typical design and development contexts. Methodologically, we also wanted to investigate how we can use the engaging and immersive format of film to project future scenarios that extrapolate current trends and do so in ways that elicit meaningful and generative discussions with domain experts outside of our research team.

RQ2: What can we learn by showing these scenarios to various domain experts? In particular, we wanted to learn how domain experts think about the present *and future* of digital surveillance, location-tracking, and recommender systems prompted by our future-oriented speculative scenarios. In a reflexive manner, we also wanted to methodologically assess the uses of our high-fidelity fictional design films as tools for engaging stakeholders, eliciting reflection, and prompting creative and critical thinking.

To address these questions, we conducted a two-phase study involving the creation of four design fiction films (Figure 2) and a study with 11 domain experts. Each film depicted a near-future interaction with a location-based recommendation system. In the first phase, we reviewed academic literature and current events to develop a range of critiques. We then translated these into texted based-scenarios and later high-fidelity fictional films. In the second phase, we screened the films with 11 domain experts in the context of a research study and employed semi-structured interviews. During these sessions, participants engaged in *co-speculation*, a participatory approach engaging experts in collaborative speculation [75]. We employed this practice to capture reactions and feedback on the envisioned technologies depicted in our films. In an exploratory manner, our goal was to understand how domain experts perceived the scenarios and learn about their broader concerns, particularly around digital surveillance, location-based surveillance, and recommendation systems. We also wanted to gauge their reactions to the conceptual critiques embedded into the films. The films were crafted to translate such critiques into an accessible format to elicit expert feedback, allowing us to explore potential implications and areas for change. As previous research has highlighted, technology professionals often hold significant agency to drive change within their organizations [79]. We sought to make critiques of digital

AVOIDABLE INCONVENIENCES



Contextual Overview:

We explore a future where the ideals of individual safety have inspired new products that may erode privacy and negatively impact the wider community.

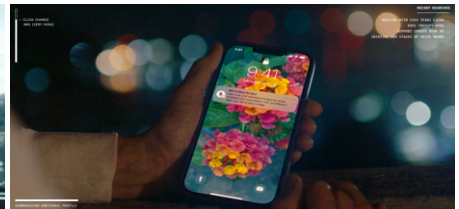
Concepts Examined in the Film:

[Reduced Agency, Surveillance for Convenience, Gentrification, Digital Redlining, Trade-offs/weaponized fears.]

Plot Summary:

In this video, a waitress leaves her shift at work and gets herself home using a GPS "Safe Route Option" which supposedly avoids any loitering or unhoused individuals.

DECEMBER 26TH, 4:36PM



Contextual Overview:

We explore a future where location data and emotional surveillance are combined with new forms of machine learning to increase click rates for online advertisements.

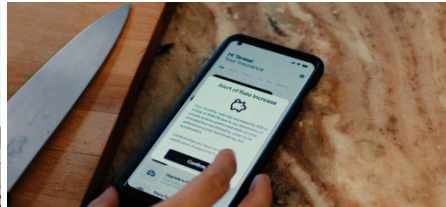
Concepts Examined in the Film:

[Psychometric Profiling, Further AI/ML Integrations in Advertising, Tender/Emotional Experiences with Recommender Systems]

Plot Summary:

In this video, a woman visits the site of her husband's suicide on the anniversary of his passing. Throughout the following week, she is consistently routed by it while being advertised to by E-Therapy Companies.

EVIDENCE OF INSURABILITY



Contextual Overview:

We explore a future where location and other collectible metrics are weaponized by insurance companies to maximize profit with enhanced surveillance and tracking strategies.

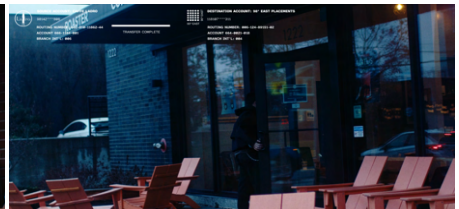
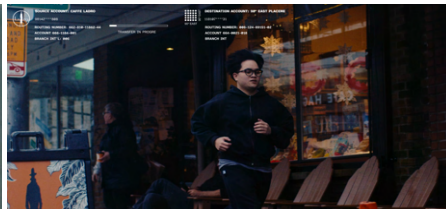
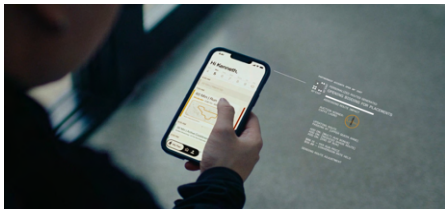
Concepts Examined in the Film:

[Intentionally Reduced Agency, Transparent Surveillance, Reduced Autonomy, Financial Incentive/Punishment.]

Plot Summary:

In this video, a woman is manipulated into signing up for a new program with her auto insurance. Her insurance company is providing a new GPS app—deviating its prescribed routes has financial consequences.

ROUTINE REPETITIONS



Contextual Overview:

We explore a future where GPS recommendations are co-opted by advertising agency's, allowing partnering businesses to pay for placements on users routes.

Concepts Examined in the Film:

[Priming/Behavioral Nudging, Manipulation, Surveillance Capitalism, Stable Interfaces/Changing Intents.]

Plot Summary:

A runner gets a new fitness training app that leverages biometric data and AI to create fitness plans. He notices that his runs take him by numerous coffee shops owned by the same chain.

Figure 2: Overviews of the four critical design fiction films. Selected stills are chosen to communicate important beats and the chosen visual aesthetic style. Each film includes a contextual overview of the future and a plot summary summarizing each narrative arc and critique we aim to make.

technology concrete and vivid so that professional designers, engineers, researchers, and other domain experts could engage in a grounded discussion of the future, their values, viewpoints, and feelings of responsibility and agency.

This paper makes two contributions. First, **we present a reflective case study that assesses the value of combining film and speculative design within HCI/design research.** We demonstrate the uses of high-fidelity design fiction films within qualitative user studies and co-speculative engagements. We provide practical guidance and critical reflection on these approaches. We find that our high-fidelity speculative films provoked meaningful reflection, mediated sustained and interested engagement, and elicited thoughtful responses from all participants. In particular, we found that our films excelled at (1) encouraging participants to consider pros and cons, (2) seeing situations from others' perspectives, and (3) surfacing behind-the-scenes technologies such as algorithmic data processing. These findings highlight general-purpose uses of high-fidelity film-based design scenarios for HCI/design research and for co-speculation and participatory engagement in particular. While some of these findings may appear expected, our study nonetheless offers empirical qualitative evidence in support of these uses, along with details for how to practically apply them within research. At the same time, we also surfaced potential limitations of high-fidelity films that must be considered in future work, such as the power to overly prime participants toward a certain emotional reaction or persuasive message.

Second, through a co-speculative approach, we offer insight into how experts think about the present and future of digital surveillance, location tracking, and recommender systems. Participants said that the films projected futures they believed were plausible or likely. They also said the films described current situations that were, in part or through analogy, already occurring. We refer to this belief that our films both anticipated plausible futures and described actual presents as **concept realism**. We also found that participants tended to express a lack of agency to address the realistic problems they saw in the films—both present and future. We refer to this as **future fatalism**. Participants felt this way despite holding relatively privileged positions of power, expertise, and decision-making through their professional roles and experiences.

On the one hand, we interpret these findings as a positive indication that high-fidelity speculative films can successfully elicit existing perspectives or even prompt new critical reflections. For example, some participants described how the films caused them to step outside their personal experience, consider others' perspectives, and at times "argue the other side" by finding positive uses of what initially appeared as troubling use cases. The vividness and specificity of our scenarios effectively prompted all participants to articulate general insights about digital surveillance, such as identifying broader trends, problems, and critiques. On the other hand, our participants' tendency toward fatalism, while not altogether surprising, does raise questions for both our approaches (fictional design films, co-speculation, and critically-oriented design) and our topical domain (digital surveillance, location-based tracking, and recommendation systems).

We conclude with a discussion of the multiple uses of our high-fidelity speculative films, and pragmatic recommendations for other HCI/Design researchers who wish to apply these methods. We also

reflect on the fatalism expressed by participants, and the limitations and opportunities for film, critical speculations, and co-speculation to address the lack of agency that participants felt.

1.1 The Importance of Reflexivity and Relevant Positionality

project was conducted by two HCI researchers from a large U.S. research university. One author has a background in film and video production, interaction design, and media arts. The second author has a background in design and human-computer interaction research, particularly in research through design and speculative design. Both authors share a personal and professional interest in speculative design, film, and criticism.

With regards to speculative and critical design research, Authors 1 and 2 both held conflicting views about the role and value of co-speculation, speculative design, and critical design research. On the one hand, both authors were practitioners and advocates of (co-)speculative and critical design approaches. We deeply believed in the value of these approaches and wanted to advance these techniques. On the other hand, both authors were aware of and agreed with many of the critiques of these approaches.

Across all stages of our project, we reflexively discussed and revised our research protocols to address what we saw as three different and potentially divergent aims of our project. **Critically**, we at times adopted a perspective that drew on critical scholarship (e.g., Zuboff's concept of "surveillance capitalism" [87]), critical sentiments expressed in public and popular discourse (e.g., news, social media, film, and television), and the personal political views of the authors. On the other hand, we were committed to interpretive social scientific and HCI/design research traditions that seek to deeply understand the perspectives of participants—regardless of whether their views or interpretations align with those of the researcher or their expectations. **Empirically**, our aim was to qualitatively understand how our speculative films were used by participants and, in turn, how we, as HCI/design researchers, may then **pragmatically** use the findings and techniques generated through this project.

As a team, we reflected on our critical, empirical, and pragmatic aims throughout our project. For example, we decided early on that we would utilize critical scholarship to help us frame the content and "artistic direction" of our films. However, once we entered the empirical and participatory co-speculative portion of our study, we shifted to a more neutral and open-ended mode of facilitation.

2 Background

2.1 Co-Speculation in Context

This work sits at the intersection of three areas of HCI: **participatory design, design fiction, and speculative and critical design.** Participatory design has been widely adopted in HCI practices in recent years [63, 64], with works often citing participatory design's two specific values: the moral and pragmatic effort. Participatory design embodies the idea that those affected by a design should be able to participate in the design process. This idea has since been adopted into a wide number of frameworks, of which the most relevant version to our work is **co-speculation**. In asking the question, "who gets to speculate?" co-speculation responds by bridging the

gap between speculative design and participatory design practices. Wakkary et al. define co-speculation as “the recruiting and participation of study participants who are well positioned to actively and knowingly speculate with us in our inquiry in ways that we cannot alone” [75].

Co-speculation builds on participatory design ethics to consider how those impacted by design might participate in the design process. In its current iteration, co-speculation posits a response to design’s tendency to cannibalize related disciplines—focusing on the well-positioned study participant (in our case, expert) to provide knowledge and experience from their individual live experience. Situating co-speculation in futures-oriented design, we aim to broaden the voices included in these discussions about “Who gets to speculate?” in part to understand who gets to determine the steps taken. Futures, by their nature, impact all of our lives, making it easy to assign relevance to speculations regarding the use and implementation of rising technologies. **This work leverages these frameworks to enable experts and impacted communities opportunities to engage in mediated co-speculation through the use of short, high-fidelity, design-fiction films [29, 34, 35, 60].**

2.2 Planes of Speculation

Speculative design sits adjacent to the product-oriented spheres of contemporary design. As Dunne and Raby note in their 2013 manifesto [23], speculative design is about problem-finding, asking questions, designing for debate, and, most importantly, designing in the service of society. Speculative design is inherently a critical design practice. Critical Design was a prior concept defined by Dunne and Raby in the early to mid-1990s, gaining prominence with their influential 1999 publication *Hertzian Tales Electronic Products, Aesthetic Experience, and Critical Design*. Per the ‘Critical Design FAQ,’ Dunne and Raby write, “Critical Design uses speculative design proposals to challenge narrow assumptions, preconceptions and givens about the role products play in everyday life. It is more of an attitude than anything else, a position rather than a method” [23].

Critical and speculative design sit within the broader definition of Discursive Design, as described by Sharp and Sharp in their book *Discursive Design* [73]. Both work to drive public discourse. Speculative critical design (SCD) approaches are fundamentally scenario-driven within the discursive design category. Scenarios do not need to be the primary driver in the case of artifact-led inquiries; however, the role of world-building is critical to the act of reflecting on our current point in time.

2.2.1 Design Fiction and World-Building. Design fiction is a design-futuring practice that has garnered wide popularity from both design and HCI practitioners. Design fiction is an embodiment of speculative, critical, and discursive practices. Its goal is to imagine future or alternate realities through world-building or “making things that tell stories.” [5, 23, 73]. As described by Julian Bleeker, design fiction “imagines into” possible futures through material culture, including tangible artifacts that represent the symptoms and implications of change [5]. The artifacts of this practice exist within an imagined speculative world or narrative. Narrative elements are fundamental to the process of world-building in design fiction

[13]. Shifting the focus away from creating a singular, representational artifact but rather embedding the speculative artifact into a world, story, or fictional reality. These worlds are often critical, raising awareness and putting contemporary (or future) issues at the forefront of social or HCI discourses.

There are several recent examples of HCI projects that combine speculative/critical design approaches with design fiction methods [3, 7, 18, 20, 60]. The intended outcome of these projects often falls outside of commercially viable products—and thus simultaneously separates themselves from traditional outcomes of participatory design activities. Design itself is utilized as a method and as a material for generating reactions, speculations, and critiques to prompt reflection and imagination from broader audiences.

2.3 Realizing Critical Speculative Futures for Broader Engagement

Critical designers’ ability to communicate their work to larger audiences is a frequent point of critique [16]. Many have raised questions about the impact and level of participation that speculative and critical design projects actually achieve. In this project, we did not concern ourselves with quantifiable impact metrics; rather, we reflexively questioned and understood how participants engaged with the content through qualitative interviews. Engagements with expert participants have historically resulted in beneficial outcomes for design researchers. As Tobie Kerridge writes in *Designing Debate: The Entanglement of Speculative Design and Upstream Engagement*:

“In this way while researchers might be expected to act as technical consultants, or as experts who can verify and authenticate the biotechnology which is seem to be extended by the design, they in fact contributed to discursive and imaginary treatments of research that supported design speculation.” [40]

Refining speculative and critical design works for expert audiences catalyzes further speculation and probing questions that garner a technical understanding from participants’ professional or lived experiences. In parallel, this outreach functions as a mode of evaluation (helping to determine if the SCD artifacts are functional in eliciting the category of response intended) and determining the artifact’s plausibility, accuracy, or feasibility. Yet, in our anecdotal experience, when tailored for more expert audiences, these artifacts often reject broader appeal or openings for understanding.

2.4 Critiques of Critical and Speculative Design

Several critiques of critical and speculative design have been raised, alongside its use and adoption within the HCI and design research community. Here, we focus on one notable strand of critique regarding the impacts of speculative design in relation to the positionalities and intentions of critical and speculative design practitioners. We find this vein of critique particularly important as our work may rightfully be subject to these lines of criticism. Scholars have raised concerns that critical and speculative designers often appear unaware of their social positionalities [58]—such as the tendency for these groups to work at prestigious institutions, live in colonialist countries, or otherwise come from “privileged” backgrounds. Luiza Prado de O. Martins has foregrounded these critiques in an influential online article, *Questioning the “critical” in Speculative*

& *Critical Design* [58], and thematic successor, *Privilege and Oppression: Towards a Feminist Speculative Design* [47]. In this article, Oliveira calls for a feminist speculative design that "would focus on using artefacts to provoke reflection on the privileges that give undue advantage to one part of the population while oppressing another."

A related issue is the question of "who gets to speculate?" That is, who does and does not have the opportunity to initiate, frame, deliver, and use speculative and critical design works? Unsurprisingly, the answers often point toward people occupying positions of power: entrepreneurs, policymakers, research labs, design studios, and scholars at universities. This unnoticed privilege, as noted by Martins [47], often results in ignorance toward real-life, lived experiences. These critiques have resulted in the exploration of the application and histories of feminist theory in participatory design [2]. Søndergaard et al. extend this work to explore fabulation as an approach for design futuring—combining critical feminist theory and participatory approaches to create new forms of situated, plural, and collective forms of design futuring [68]. Tran O’Leary et al. discuss how design re-encodes legacies of oppression and exclusion while operating under "participatory practices." They conclude by outlining positive possibilities for more participatory futuring with diverse communities [74].

We approach this speculative project with a deep awareness and sensitivity to these issues. For example, the authors had extended discussions about scenes involving "suspicious characters" in *Avoidable Inconveniences* (fig 2), and iteratively worked through details such as the characters’ race, gender, and physical appearance. Ultimately, we justified our decision to tell this story, and with the details we selected, because we believed it might prompt reflection and conversation from stakeholders who have some significant level of power and privilege to make decisions or informed decisions based on their professions, education, and background. We knowingly targeted our designs toward this "privileged" audience of professional engineers, designers, policymakers, and academics and understood the strengths, limitations, and trade-offs of this approach. Ultimately, we agree with the questions raised by the critiques above; our "solution" in this project was to reflect upon the decisions we make and articulate a reasonable rationale for these choices from a research perspective while also acknowledging trade-offs.

2.4.1 Design, Fiction, and Critique on Screen. The moving image has long held a recognized role in interaction design [41]. From eager technologists appropriating once speculative designs and concepts created by artists and designers working on film and television shows (often science fiction, see *Star Trek*) to early demos showcasing the power of networked computers and collaboration, future realities were demonstrated and depicted via film and video [37]. It continues to be used in design fiction applications.

Speculative design practitioners have been moving in parallel with current social and technological trends. From design fiction to critical and adversarial design applications, designers leverage video-based tools to engage the public and raise awareness about critiques of current industry and societal norms [21, 59]. These tools push beyond social or traditional media industries. The design agency SuperFlux, in collaboration with researchers Jon Marshall

and the University of Dundee, provides two notable examples with *Our Friends Electric, 2025: A Better Care Future*, and the agency’s follow-up, *Uninvited Guests*, which embody this modern approach of utilizing a grounded documentary style, filming futuristic realities [60, 70, 71]. Working in a similar area, the Everyday Design Studio crafts more object-oriented videos, reinterpreting our relationships with objects [36, 43]. Building on prior HCI practices, these two studios bridge a unique gap between contemporary trends in film production and disseminating HCI discourse and research.

Current and past work continues to leverage text and image-based workbooks and written design fiction narratives as elicitation devices and tools to understand participants’ critical reflections about possible futures [72]. As Schulte et al. write, "design fiction probes’ critical narratives to elicit open-ended responses from potential future users of proposed technologies" [65]. As earlier defined, researchers have leapt beyond text-based fictions, today utilizing speculative artifacts in public installations, short films, concept videos, and other forms of experience prototypes. Hauser et al. have utilized design fiction to envision a sustainable university campus in the future through five short documentary films aiming to "unlock people’s imagination, encourage reflection, and inspire action toward a more sustainable reality" [35]. Gilardi et al. call for design fiction videos used in the early stages of a technology life cycle, calling out video’s ability to illustrate the context and "emphasizes the relevance of experiences created by the technology in the user’s everyday life" [29]. Design fiction has already been repeatedly used in participatory or co-speculation to understand the values and ethics of professionals. Researchers have used design fiction to elicit value reflections, understand and interrogate sensing technologies, and analyze UX professionals’ values and work practices [44, 79, 80]. We extend these existing methods by situating our design fiction films within participatory co-speculation sessions.

3 Design and Production Process

We describe our process of designing, producing, and deploying design fiction films as research tools. Our process involves two primary phases: 1) developing our conceptual composition and 2) creating our production pipeline. We include details of our process to provide practical know-how for other HCI and design researchers who wish to utilize film. These details offer insight into how we were able to create an engaging set of videos on a condensed timeline.

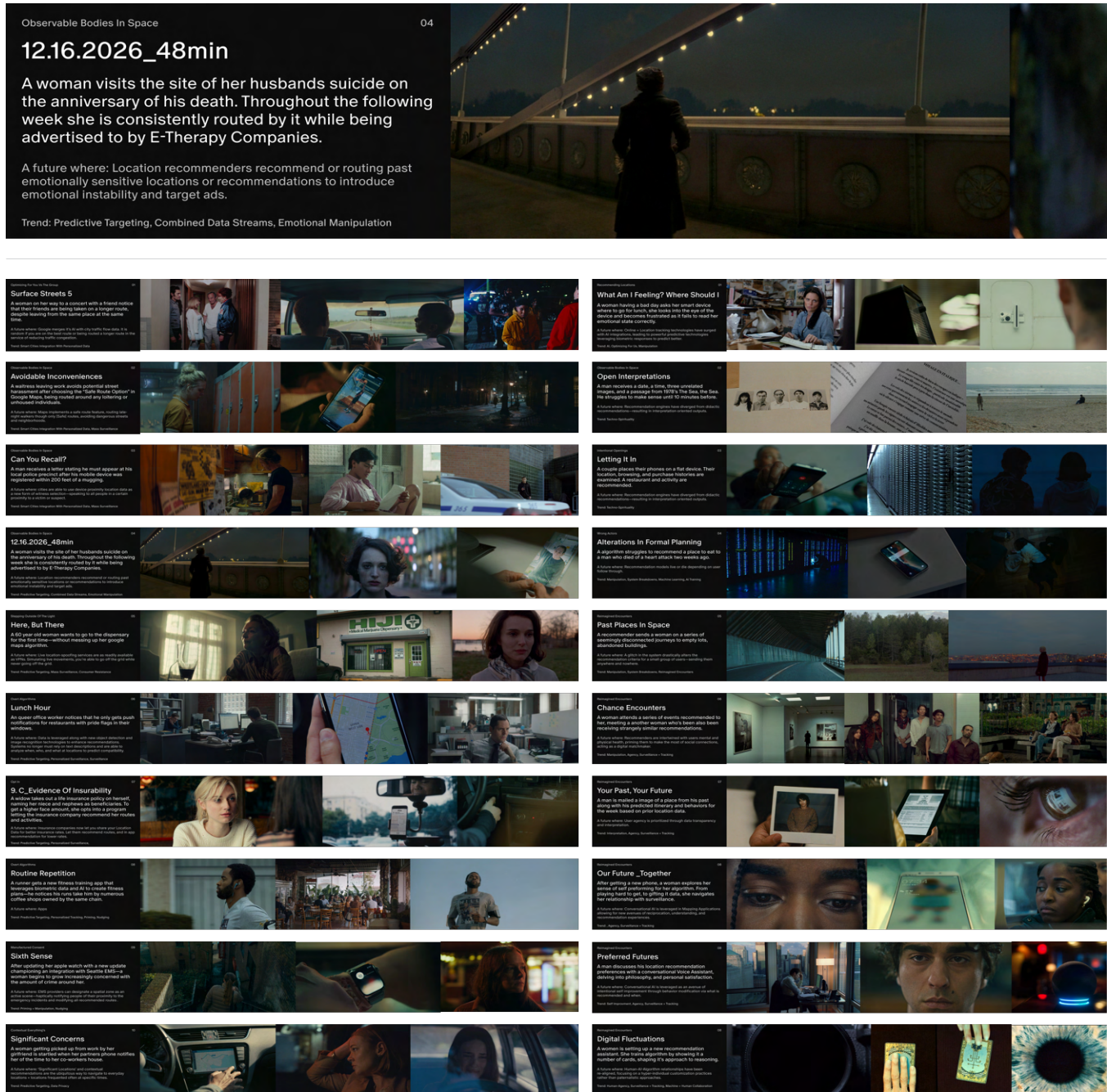
3.1 Developing an Overarching Conceptual Composition of Critiques

We designed our speculative films as tools with two primary functions: (1) to anticipate plausible yet likely contentious future scenarios and (2) screen these films with expert technologists to elicit their reactions and gauge their uses of the films. We began by ideating use case scenarios for location-tracking recommender systems. These scenarios were inspired by controversial location tracking examples depicted in journalistic reporting and academic research publications.

Because our goal was to elicit thoughtful responses from participants and portray a space of possibilities for future location-tracking technologies, we decided early on to create a composition



[A] The Original *December 26th, 4:36 pm* Tone Board. The board includes a title, logline, an overview of the speculative future, and key trends we aimed to critique.



[B] The 20 original scenarios we developed. These scenarios examined all aspects and forms of relationships with location-based recommendation systems.

Figure 3: [A] An overview of our tone boards, our primary method of communicating and developing scenarios. We used stills from existing media to communicate story beats and tone. [B] Our 20 initial scenarios (we show the full scenario list for process, not content).

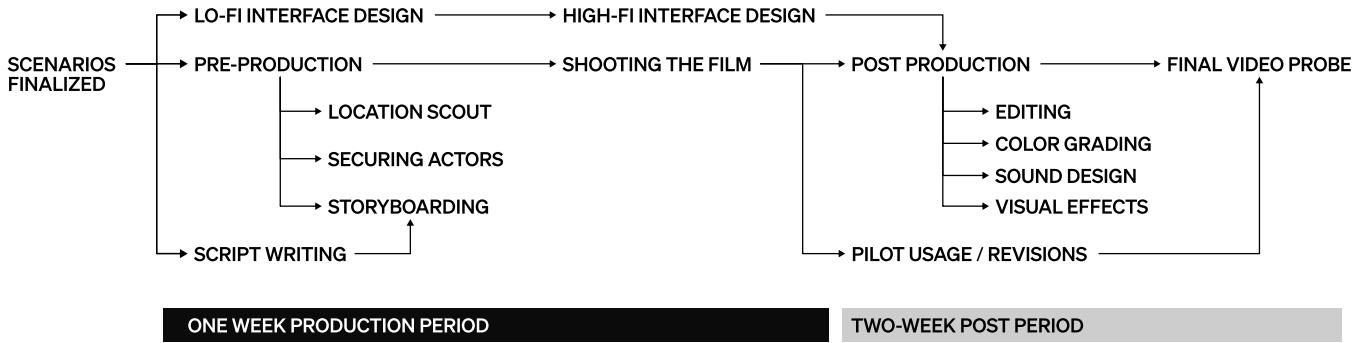


Figure 4: An overview of our production pipeline and timeline for creating the videos for their use in interviews.

of several films rather than a single filmic narrative. Internally, we discussed our need to design a strong *conceptual composition* that achieved both thematic unity and differentiation among the films. We wanted a unified set of themes, moods, and narratives across the films. Yet we also wanted variety in terms of use cases, technologies, and values and harms for users.

Our decision to create multiple films, rather than a longer singular narrative, was in part based on our aim of having participants *make comparisons* among different possibilities. We reflected upon the differences between a single film/story and multiple film/stories within a theme or world. Whereas the film industry prefers the former, speculative design and HCI design research often prefer the latter. We attribute this to the ability of a set of three or more films (or design artifacts in general) to implicitly create a space of possibilities and encourage divergent thinking, creative comparisons, and imaginative extrapolations. In contrast, a single, long, immersive film tends to draw the viewer into one specific possibility. This multi-film approach can be seen, for example, in the work of Oogjes et al. [54], and [60]. There are countless examples of design research projects within and outside of HCI that involve a set of artifacts rather than a single artifact.

We selected three main themes to permeate each film: (1) surveillance capitalism, (2) individual agency, and (3) paternalistic technologies. We drew these themes from our readings of current events, academic research, journalistic reporting, and cultural works of film and art. This body of work informed the design of our films and, importantly, imbued each with a grounding in reality. However, these references to key cultural events or academic concepts go unnamed in the films because we wanted to elicit such connections from participants. In this paper, we forego a detailed accounting of these references and provide specific examples instead. In the film *December 26, 4:36 pm* we draw on implications outlined in HCI research papers about emotional sensitivity and recommender systems [45, 66]. Portions of the system overlays in *Avoidable Inconveniences* reference the city of Seattle, WA, USA, city council’s recent motions for CCTV and gunshot detectors in lower-income neighborhoods. We also drew on research from outside of HCI, particularly surveillance studies, cultural critique of capitalism, and critical technology studies, including *The Relevance of Algorithms* [30], *The Filter Bubble* [55], and *The Age of Surveillance Capitalism* [87].

3.1.1 Detailed Scenario Development. Once we had created an initial conceptual composition of coarse scenarios, we developed twenty detailed scenarios covering a broad range of use cases (figure 3). Each scenario included a logline (one-to-two sentence description of the scenario, setting, and characters) and relevant critical themes, examples, and trends. Each scenario included a three-frame storyboard, using the digital service ShotDeck to pull stills from existing films to prototype the mood and storyline of each (figure 3). This allowed us to rapidly ideate both concept and aesthetic choices such as visual tone.

In the spirit of soliciting rapid user feedback on designs, we then presented these scenarios within our university research studio and to experts in our social network, including four designers and two academic researchers. This feedback helped us down-select the final four scenarios that we adapted into short films. Our early testers indicated that some scenarios formed richer sources of discussion. These responses helped us judge which concepts to develop further, and which we should cut. In the process of down-selecting, we balanced the subject matter of the video, the technological details of location-based recommender systems, and the critical themes evinced.

We then conducted an initial stage of refinement to fine-tune the mood and tone of the films. We took each scenario and diagrammed alternative variants that together encompassed a range of positive and negative implications. We then developed detailed plots, scenes, narratives, and character arcs for each film. The final four scenarios consisted of 1) *Avoidable Inconveniences*, 2) *December 26th, 4:36 pm* 3) *Evidence of Insurability*, and 4) *Routine Repetitions* (see figure 2). We then moved forward with pre-production.

These four scenarios were largely chosen for how they fit together into a compact, cohesive set of provocations. We discussed the range of individual technologies these scenarios would cover, including route recommendations, location-specific advertisements, location monitoring, and surveillance. Additionally, these scenarios functioned as disparate building blocks of a shared world. We expected that this overlap would encourage participants to draw lines of connection between the four films. We hoped these inter-film connections would evoke a broader range of reflections on past videos from participants.

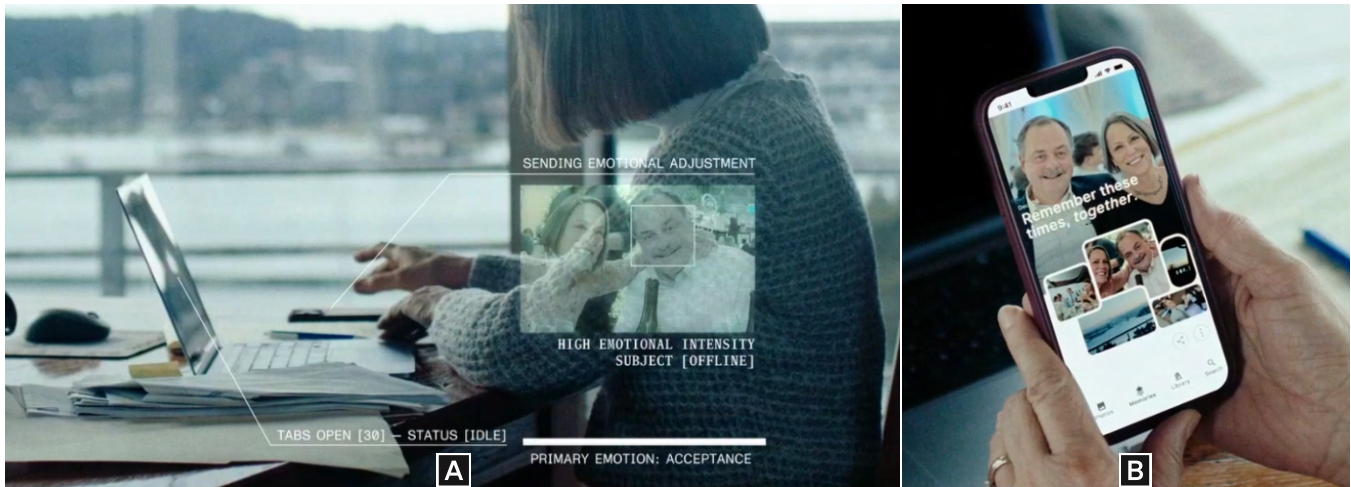


Figure 5: [A] An example of an overlay showing system surveillance and rationale, followed by [B] the main character receiving an emotionally triggering notification of her deceased husband.

3.2 Aesthetic and Look Development

The look development process for the films took place during and after the scenarios were developed. As a team, we agreed that the films must meet a high level of production quality to facilitate engagement and to allow us to study the uses and modes of engagement with high-fidelity films comparable to those produced by large tech companies or independent filmmakers. This level of quality was informed by stills from related films on platforms like ShotDeck and commercial concept videos. We filmed and colored under a Kodak 2383 Print Film Emulation look (an industry-standard film stock). We chose to film in 6k for ultimate flexibility in re-framing and stabilizing the image in our post-production pipeline. To simplify production, we shot the films on a single 35mm f1.4 lens.

3.3 The Video Production Pipeline

Once the scenarios were finalized, we moved on to the pre-production phase that employed a rolling production schedule. Author 1 drew on their prior knowledge and experience producing videos to complete all four films in two months. (See Figure 4 for an overview of the process). Author 1 adhered to standard procedures, script writing, story-boarding, (see figure and script writing). For each of the four films, a typical process for Author 1 was to write a script on Monday, create a storyboard on Tuesday and send it to the talent on Wednesday. Author 1 then assembled a skeleton crew, including a gaffer, onset sound, and Author 1 (camera operating and directing). Each week, Author 1 would assemble a rough cut of what had been shot the week before and complete a rapid color grade and editing process. Authors 1 and 2 then reviewed the film to discuss additional editing or minor modifications to subsequent films. Occasionally, if Author 1 could not find help, they would record motion without sound (MOS), adding all audio in post-production. While we sacrificed greatly on lighting quality, camera stabilization, and a layer of refinement typical of a longer production cycle, this rapid approach allowed the authors to be flexible (e.g., shooting alternate versions, coming up with shots on the fly, etc.), and shoot in a more

documentary and concept video style, that aligns with trends in HCI video work [32–34, 52, 53].

3.3.1 Screen Testing. After completing the initial versions of the films, we conducted a preliminary screening with four colleagues—two PhD students with expertise in data privacy, one professional designer, and one Design faculty member. This was akin to a test screening, a technique used in film production to evaluate the clarity of the narrative, the critique being applied, and the depiction of algorithms within each film. The feedback revealed major shortcomings: the narratives lacked clarity, leading to misinterpretations of the plots; the role of recommendation systems was obscured—with their role deemed non-existent; and the user interfaces failed to convey their intended messages effectively.

In response, we revised each film, focusing on strengthening the narratives through strategic edits—including shortening the duration—to enhance narrative clarity. We also re-shot and updated the user interfaces, ensuring each was of higher fidelity and more effectively communicated within the story’s context. Our largest change was our decision to add onscreen *overlays* representing the behind-the-scenes technologies supporting the use cases, such as algorithms and data sharing (see Figure 5).

Upon completing these revisions, we conducted another screening with a subject matter expert in location data, privacy, and security. The revised films elicited fewer questions about the narratives and the roles of recommendation systems. Instead, they sparked visceral reactions, indicating a high level of engagement with the themes presented. This feedback was encouraging as we proceeded to engage with our main study participants.

4 Study Methods

The project’s next phase was the design and implementation of our study, participant pool, and subsequent study protocol.

4.1 Participants and Recruiting

A goal of our co-speculative approach was to see how individuals with relevant domain expertise and potential decision-making power would respond to our films. Thus, we recruited a range of professionals with technical understandings of recommender systems and knowledge about how or why these systems are created. We were keenly interested in experiences of professional dynamics and how experts did or did not defend design decisions. This reflected our goal of understanding how personal agency is viewed within these environments.

We relied on our professional network for our first four participants. We selected technology professionals who self-identified as working in the industry and engaging with location data or recommender systems. After completing our first four interviews, we reassessed our primary participant profile and decided to maintain it for further recruitment. We then used a combination of snowball recruitment and emails to experts at our home institution with which we had no prior research relationship. Four participants were recruited via word of mouth; the remaining four were referred via snowball sampling.

Our final pool of 11 participants consisted of four professional software developers, one professional UX designer, one PhD student studying recommender systems, one PhD student studying digital surveillance, one PhD student studying predictive policing, one professional artist whose previous work focused on surveillance, one community activist engaged in philanthropy and nonprofits, and one assistant city attorney dealing with public data. A summary of participants is provided in appendix A.

4.2 Study Protocol

Our study protocol consisted of a brief introduction describing the project's critical nature. We told each participant: "The goal of this study is to examine and speculate possible futures with location-based recommender systems and consider how we might avoid or navigate toward certain futures." We then noted that we were using an approach called speculative and critical design and briefly answered any questions participants had at this point about our study goals. We chose to disclose that we designed the films to translate various critiques that we found expressed across news, popular culture, and academic research. We disclosed this critical nature of the project for two reasons. First, we explained our intent as an act of transparency and rapport building. Second, we thought explaining our intent would be productive rather than leaving participants guessing. In prior studies, we have found that a lack of context can leave participants suspicious and confused. We also wanted to ensure participants understood these were not real consumer products or technologies intended for new product development. Despite revealing the critical orientation of the films, we deliberately avoided giving participants any specific insight into our personal views so as to help encourage participants to make their own judgments about the positive and negative aspects of each film.

The interviewer then proceeded to screen the films. Each film was introduced with two pieces of information: a one-sentence plot overview and a one-sentence description of topics (figure 2). We then played the film. Once the film had concluded, we waited for initial participant reactions or, if they did not react soon, we

prompted them for their first thoughts. We then proceeded to ask questions from our discussion guide (appendix B). We devoted roughly 20 minutes to each film.

The session concluded with closing questions asking participants to reflect across all of the videos. Each interview lasted 120 to 180 minutes. Films were always shown in the same order seen in figure 2. Because we had designed the films with a subtle narrative arc and experiential progression, we decided to maintain this order in the study screenings rather than counterbalance them, as a conventional empirical study design might include.

The study protocol was updated twice throughout the study—after the second and fourth interviews. The first revision slightly updated the discussion guide by explicitly adding refined questions about individual agency and responsibility to ensure we asked the questions consistently. The second revision added two new components. The first item was a scenario summarizing the plot of the first film that would be read to the participant before viewing. This component was added to help compare responses to a text-based scenario versus our high-fidelity films. The second item was a short animated video from a car insurer describing their RightTrack program (a similar concept to the service in *Evidence of Insurability*). This was added so participants could see at least one concrete reference point to a real-world event, which in this case was an insurance program that offered discounted rates in exchange for tracking driving analytics such as speed.

Once the interviews were completed, the recordings were transcribed using Dovetails' transcription feature. Analysis was conducted using a modified grounded theory coding scheme to search for emergent patterns and themes iteratively. Author 1 led each iterative round of analysis, and met frequently with Author 2 to discuss and review emergent themes. While reading the transcripts, Author 1 inductively used thematic coding to identify thematic groups in participant responses [61]. Quotes with these codes were extracted from the transcripts and grouped into themes, with a short paragraph summarizing them. Due to space limitations, not all themes are presented in this paper. In later stages of analysis and as we entered the paper writing stages, we selectively drew on critical concepts from the humanities to frame our findings, including Mark Fisher's *Capitalist Realism* [26] and, later, Dencik's reinterpretation and definition of *Surveillance Realism*, [17].

5 Findings

Our findings are organized into two sections. First, we describe participants' engagement with our films based on our observations of their behavior and verbal responses during our semi-structured interview discussions. This includes their visceral reactions, deeper reflections, and creative and personal responses—such as making connections to examples from their own lives or offering solutions or courses of action. Second, we report on specific themes that emerged from participant responses toward digital surveillance in general and location-tracking and recommendation systems in particular.

To protect anonymity, participants are referred using a pseudonym (as assigned in appendix A).

5.1 Forms of Engagement: How Participants Reacted to Speculative Video Scenarios

Based on their behavior (e.g., tone of voice, attentional indicators) and content of their responses, we found that all participants were highly engaged with each of the four films. Many participants applauded the fidelity and storytelling qualities, often drawing comparisons to popular film and television shows (e.g., *The Bear*, *Anthony Bourdain: Parts Unknown*, and *Black Mirror*, which are highly popular television shows in the USA and Europe). Participants were clearly often excited to speak about what they had just watched. In addition to reflecting on digital surveillance, many participants were also eager to discuss the formal aspects of the film and how it made them feel. We read this as evidence that our careful editing and addition of overlays had greatly improved the capacity of our films to engage and addressed the criticisms raised with our earlier versions. That said, several participants continued to highlight areas they found less engaging, including slow pacing, repetitive transitions, and occasional lack of narrative tension at several moments across the films.

After viewing a film, most participants immediately responded with little or no prompting from us. One common reaction was to draw connections between the fictional characters and scenarios and the participants' experiences. For example, Mira connected the dubious targeted advertising of a vulnerable user in *December 26th 4:36pm* with her experiences during the COVID-19 pandemic:

"I feel like there was a point where during the pandemic when things got really good with the ads being personalized in the content or feeds. My sister, and I were like, oh, maybe we need to get a bike or something. Not a Peloton, but it was a treadmill or something. And then literally, we googled it once, and then we were getting ads on YouTube and everywhere for this type of stuff. And that was the moment where it hit me and my sister were like, oh, my God, maybe we need to browse things in private." — Mira

We also found that many participants considered multiple perspectives or identities residing within a character, rather than assuming a univocal version of the story. For example, Ashia—a PhD student studying community policing and public safety—projected herself into the role of the main character in *Avoidable Inconveniences* and vacillated between two perspectives: "there's like my researcher mind and then there's like my woman mind and I know a lot of people who feel unsafe, do this [share locations]."

Participants described how the films leveraged conventional filmmaking techniques to create feelings of anxiety, unease, or uncertainty, which brought participants closer into the characters' points of view. Haris—an assistant city attorney working on public data—reflected on how the films drew him into the perspective of the film protagonists:

"I thought from a cinematic perspective, it was really—I don't know, it sort of, like—immediately I sort of got, like, this clench in my chest. Even though I knew the waitress was going to be fine, like, I was like, 'oh, god, what's, what's happening?' You know, I've watched enough movies that I thought I knew what was going to happen next." — Haris

Overall, we found that our films successfully functioned as tools for presenting a hypothetical future scenario and then eliciting meaningful and insightful personal reflections. We attribute this success in large part to our use of conventional filmmaking practices—such as shot composition, narrative arcs, and sound design—to guide participants through a scenario and emerge in a position where they were brimming with thoughtful reactions, personal reflections, and critical questions.

In general, we found that the vividness of our films and the particular details of the scenarios successfully elicited responses in which participants made thoughtful connections to other examples or ideas—ranging from personal anecdotes to well-formed opinions or beliefs. In passing, we note that as researchers who have conducted dozens of qualitative interviews without the use of films or design prototypes, we found that our films were highly **generative** of thoughtful participant responses in the form of stories, beliefs, and expert knowledge.

Although we did not design our study to *measure* the reactions of our high-fidelity speculative films against a control treatment, such as a purely verbal description of a scenario, we nonetheless were interested in the question of whether our participants might have responded similarly or not to a different stimuli. For this reason, we read a text-only summary of the first film, *Avoidable Inconveniences*. This allowed participants to compare the two versions of the videos. Sofia provides a revealing response to these two versions—high fidelity film versus short verbal summary:

"[The text summary version] was bit more abstract ... you read the description ... for the first video. And I was like, oh, okay. That's what I should expect to see. But **it didn't really, like, hit me** until I, like, watched the video about, like, **some of the implications of this technology.**" — Sofia, emphasis added

Without explicit prompting from us, Ashia quickly offered a similar reaction but further highlighted a difference between "intellectually understanding" versus feeling emotionally "affected:"

"[The films are] good ways to get this sort of visceral reaction. Because in the scenario that you wrote out, I mean, **I was able to intellectually understand it**, but [without] actually connecting with someone there and seeing visually what is being represented. .. [The film version] **really affected me more because I've had friends who've died of suicide.**" — Tân, emphasis added

Other participants noted how the *vivid details* of the films prompted them to think and discuss in ways that the text-based version did not. For example, Ashia explained that she inserted herself into the abstract text version of the story, but the film version prompted her to consider the perspective of others. Ashia called out specific details of the film that caused this perspective shift, such as when "the woman put the overcoat on" and how "the man was just lying on the bench" caused.

While measuring the precise impacts of design videos versus other formats is outside the scope of our study, our study does offer tentative evidence that our videos may have forged emotional connections, perspective shifts, and other meaningful responses that more abstract and low-fidelity formats might not have. In

particular, we found that our films *quickly generated lots of detailed sharing of thoughts and opinions*, and did so in ways that we have personally found difficult to elicit without the aid of high-fidelity design artifacts.

In general, all participants engaged in nuanced and critical deliberation about the positive and negative aspects of the scenarios. As we expected, all participants identified negative aspects of the future scenarios depicted, including personal harm to characters, unethical business practices, and undesirable future effects of the underlying technologies. For example, in response to *December 26th 4:36pm*, Paul found it "just sort of gross to, like, capitalize on somebody's misery in that way." He goes on to suggest that her lack of awareness and agency is an underlying ethical problem. "It was not something that she wanted, you know, because she wasn't clicking on the ads." Rather, it was "a bunch of companies that know that if they hit people at their emotionally lowest points, that they'll be able to get them to buy stuff."

Another typical example of a negative reaction is exemplified by Haris in response to *December 26th 4:36pm*:

"Oh, God, I hated it. ... I hated the idea that all of that data is being funneled, and how likely it is that she'll click on whatever it is that we send her based off of her emotional state. And they've got all the location history and the pic .. [It's] manipulative. Really manipulative. And I hated that. I just, like, it just boils down the entire human experience to an incredibly cynical transactional exercise. So that's my initial reactions. I mean, great video [with regard to quality and content]." — Haris

Themes of manipulation, exploitation, profiteering, and a lack of transparency and agency were themes alluded to throughout our discussions.

While many interpreted the scenarios as harmful or concerning in many regards, multiple participants also expressed excitement about the proposed concepts and considered what would be needed to make them a reality. This was not totally unexpected. We had designed our films as "ambiguous dystopias" that left ample room for identifying positive aspects or deliberating trade-offs. For example, Paul—a lead software developer at a small technology start-up—displayed a general optimism throughout many of the films. In direct response to *Avoidable Inconveniences*, Paul described the "safer routes" technologies as something that "would be really cool," and an improvement to current location suggestion apps. Alan—a software engineer at a large AI-driven company—echoed a similar sentiment. "Personally, I'm very open minded, and I might not use the technology, but someone else might find it useful. So for me, I think it could be cool to be built."

Reflecting on the use of high-fidelity speculative design films in general, we found that our films tacitly prompted participants to critically reflect on the positive and negative aspects of the scenarios. This allowed us to then dig deeper and understand their relevant prior experiences, broader belief systems, and creative and future-oriented responses for addressing the concerns they raised.

5.1.2 Empathy informing emotion-driven speculation. As participants viewed the videos, they formed relationships with the characters while simultaneously seeing the surveillance and recommendation apparatus functioning in the background (via our system overlays). This juxtaposition elicited a deep emotional response. The protagonists were relatable, and their struggles palpable. This, in turn, seemed to cause participants to reflect on their own relationships with everyday surveillance, evaluating it in a new visceral way.

After viewing *December 26th, 4:36pm*, Albert (a software developer at a large multi-national tech company) speaks about an immediate personal connection he drew to his parents:

"At the end of the video, I definitely had an emotional reaction that, I mean this is a subject that I've considered before, but even if it hadn't, it does upset me. ... watching the video, I thought about my parents, specifically about my mom, the video leads you right there. And so in terms of an effective delivery method, yeah, I think it would definitely get people thinking about it, or I think the other reaction would be, again, sort of overwhelmed apathy." — Albert

Participants drew on personal experience and applied their lived experience with and against the characters' experiences onscreen. They projected their own world onto the characters of the film, ascribing histories, feelings, and emotions to them, allowing them to speculate about the role of technology in the world.

Connecting with the character's reality, participants were widely able to imagine themselves in the situation of the character on screen, experiencing the emotions, ideas, or opinions of that person, then drawing connections to their own lives, as expressed in the previous quotes. Subtle actions from characters onscreen could ignite significant discussion after the fact. Any action performed by a character was taken as intentional.

The medium of film has historically excelled at this, from its use as propaganda to advertising. Best summarized by the popular American film critic Roger Ebert's 2005, 'Empathy Machine' quote about the medium of film:

For me, the movies are like a machine that generates empathy. If it's a great movie, it lets you understand a little bit more about what it's like to be a different gender, a different race, a different age, a different economic class, a different nationality, a different profession, different hopes, aspirations, dreams and fears. It helps us to identify with the people who are sharing this journey with us. — Roger Ebert

The speculations and reflections described by our participants provide evidence that filmmaking techniques can be used to extend narrative design fiction approaches while also promoting critical reflection and speculative imagination.

Participants praised the films for foregrounding the algorithms, data, and other behind-the-scenes technologies that enable recommendation systems. Our participants, who often held sophisticated understandings of how these technologies operate, directly responded to moments in the films when we presented overlay visualizations to indicate that an algorithm was processing data.

Participants responded to these moments by discussing incentives, ethics, and potential actions that legislators and policymakers could and should take.

Some participants reflected on the unseeable nature of recommendation systems—and the system’s constant behind-the-scenes collection of data. Witnessing realistic portrayals of digital surveillance and location tracking in the physical world heightened their awareness of the permanence of digital data. This sparked visceral reactions, including feelings of disgust and exploitation. The blurring of physical and digital boundaries in the films (through the use of overlays) prompted some participants to reflect upon data and algorithms that were hidden in their everyday lives.

For example, Michael—a software engineer at a large e-commerce company—reflected upon how the films reminded him that sophisticated profiles are being constructed about him on a daily basis, but he rarely thinks about this during the course of his everyday life:

“[When watching the film] you feel like you’re being watched. And in [December 26th 4:36pm], it’s very clear that there’s a profile being built of this person. I think seeing the things that are going into that feels very invasive, because when I go and, I don’t know, visit somewhere with my phone on me, I feel like it’s between me and the people who see me there, but it’s really not. Or when I buy something online, it’s between me and the seller, but it’s really not. And I think seeing it all spelled out on the screen, it said, like, oh, this person bought, you know, sleeping melatonin and wine and flowers or whatever at this time and then went to this location and did these things. And that’s why we think they’re more likely to buy our stuff. It feels invasive, even though I don’t think any of those things are *not* happening right now.” — Michael

Here and in other examples, we found that our films prompted participants to think about digital surveillance that they knew or assumed was happening to them on a daily basis, but thought about very little during their day-to-day activities. At a formal level, participants showed that are our decision to include overlays referencing the operation of behind-the-scenes was effective in prompting reflection on the underlying technologies.

5.2 Reflecting On Digital Surveillance, Location-Tracking, and Recommender Systems

We now discuss participants’ responses with regard to location-tracking and recommender systems and digital surveillance more generally. Here, we focus on two main findings: (1) **concept realism**—the experience in which participants described our fictional film scenarios as both plausible futures and as descriptions of the present, and (2) **future fatalism**—the expression of a lack of agency to address the realistic future problems they saw within our films, and already existing within the present. We then dig deeper into these findings to discuss participants’ views on enacting change within their professional environments and personal lives and the hope that policy may come to the rescue.

5.2.1 Concept Realism. Participants expressed a form of *realistic thinking* when speculating. They often spoke about surveillance as inevitable, along with its reductions for personal autonomy. For example, Alan highlighted trends in his prior workplace, and across platforms like Instagram and Facebook ads, wherein companies frequently sell location data to one another. In reference to *December 26th 4:36pm*, this “chain of transactions,” Alan argues, could lead to potentially harmful uses of personal information:

“I do think it’s already kind of happening, with like Instagram ads, Facebook ads. It is already kind of happening. My biggest concern is how far spread out it is. I’m not saying it’s fine if one company does it. But it’s worse when one company sells your data to another, and you sell it to another and then to another, and then it’s just a chain and domino effect of kind of like your location being sold and that being used for possibly nefarious uses.” — Alan

Paul utilizes a similar frame when viewing the world projected by the films—writing off alternatives as unrealistic due to several factors, most notably the way Internet technologies are embedded as pervasive and inescapable. In reference to *Avoidable Inconveniences*, Paul says “I think it’s already at a point where there’s not much we can personally do to avoid it.” He goes on to explain that even though someone could, in theory, choose to not use the app in the film or a similar technology in the present, in reality, society will “need a really big push to boycott something that is central to so much of their own interacting with the world as it is.”

Both Alan and Paul express a matter-of-fact sentiment that this future is already here, or at least inevitable, so it is unrealistic to imagine alternatives. At best, they suggest we should hope for large-scale societal outrage. This sentiment was echoed or expressed by nearly all participants across every grouping.

More subtly, we observed that all participants variously described the films as realistic. Typically, participants referenced two levels of reality depicted in the films. First, they reflected upon how the films appeared plausible or likely and extrapolated current trends. Second, they described how the films, in part or through analogy, described concrete elements of the present—such as Paul’s reflection on the practical inability to opt out of useful but highly surveillant everyday technologies in the quote above.

5.2.2 Future Fatalism: “*I don’t like it, but there’s little I can do about it*”. Participants perceived the extrapolations in the films often as dystopian visions of the future, grounding their analysis in existing technologies, current trends, and underlying motivations. When viewed as dystopian, this reflection often spurred a visceral reaction, leading to declarations of wanting to live off the grid or revert to simpler times. However, these initial reactions were quickly dismissed as unrealistic. Eventually, participants often reluctantly landed upon a fatalistic worldview, resigning themselves to the belief that meaningful change was likely unachievable both societally and particularly with regard to their individual agency.

Speaking towards resistance, Michael outlines the methods by which users might counteract current and future forms of location tracking and surveillance, assessing their potential effectiveness and ultimate fruitfulness:

“You can try fighting it, there are people who use, VPN’s or whatever to browse the Internet, and they set up their browser privacy settings to not accept any cookies or whatever they want to do. And then they just keep getting hit by captchas when they try to go to every site. It’s impossible to not use the Internet anymore, which makes life very difficult in society today. And so I think to some extent, it is hopeless if you want to truly try and be anonymous and private online. So I do think it’s a bit hopeless to try and resist the machine, but maybe that’s okay.” — Michael

Similar to Michael and Albert, many participants expressed a fatalistic viewpoint at various points in the interview. At times, their responses evinced outrage or else despondency because they did not feel they had agency to address the troubling surveillance trends they saw happening now and likely to increase in the future. Each participant identified at least a few negative (i.e., harmful, concerning, etc.) aspects of the films and other examples they presented from their own lives and public discourse. In response, we asked each participant a version of the following question: “What might be done to prevent, mitigate, or resolve these negative scenarios you identified?”

Next, we present two major themes related to participants’ personal agency. First, the limits of change from within their workplace roles. Second, a hope or expectation that policy is a potential solution, given the limits of their personal agency within their workplace roles.

5.2.3 On Change from the Inside. Participants highlight a critical tension within the design and development process. While they recognize their potential for instigating change and accepting responsibility, many felt constrained by structures that prioritize organizational goals (including profit) and rigid hierarchy over transformative impacts. Participants often expressed a desire to enact positive change but described their limited capacities and potentials for negative personal repercussions, such as failing to meet product targets, retaliation from ethics boards, and poor performance reviews from supervisors.

Mira (a product designer at a well-known design consultancy), describes life at a consultancy as “handicapped” by their market position and, at best, they are only able to operate ethically by offering recommendations to companies:

“I guess in consultancy, like, agency life, it’s like, you can make a recommendation, but ultimately it’s up to a few select high-up-there people to determine whether it’s like a green light or a no-go. I think a lot of things are driven by revenue and engagement and numbers, so we’re maybe motivated by the wrong things.” — Mira

Tân—a non-profit-philanthropy-oriented community activist—adds additional perspective to the picture, describing not only the economic draw that disincentivizes workers but also the cultural and social systems at play in the teams that create and distribute these technologies. He argues that viewing personal agency to make a change often comes with an understanding or thought process that identifies issues absent in many design and development teams:

“Who do we have in tech? It’s mostly white dudes. Right? ... So if that’s who we mostly have in tech, then that’s going to affect the algorithms that are being developed.” — Tân

Sofia (a PhD Student studying recommender systems and productivity) represents a nihilistic perspective, sharing her experience from <anonymized large technology company>, which she says backed out on a promise to avoid controversial AI technologies. “Like <anonymized large technology company>, they were like, ‘we’re not going to make [our own] facial recognition stuff.’ And the employees that I worked with there were really happy about that. And then later, they started to make exceptions, but they were like, ‘oh, it’s not, it’s not technically facial recognition.’”

While participants did speak about harm reduction and small actions developers could take, this was often undercut or overshadowed by an existential factor. Next, we unpack participant responses regarding policy, law, and regulation, followed by the closely related topic of public awareness and perception of data.

5.2.4 Policy to the Rescue? Participants frequently emphasized the need for policy change, identifying regulation as often the “only hope.” They viewed state intervention—at local, state, and federal levels—as the essential means to outmaneuver the structural forces inhibiting solutions to problems of digital surveillance. While this reliance on policy solutions is logical, it also revealed that participants struggled to envision possible alternative solutions beyond external interventions from the government.

This sentiment is captured in Sofia and Michael’s responses to our question, “What personal responsibility exists to not bring these futures about?”

“I guess this is not really about personal responsibility. ... I’m assuming, like, to prevent certain things like this existing, I would assume we would need some policy. Not that policy can fix everything... I could see companies overriding their employees if they could justify it in some way.” — Sofia

“The reason I brought up regulation is because I think it’s difficult to make that happen. I think the people who build these systems don’t often have the autonomy to say ‘no,’ like, ‘I don’t want to do it this way.’ I think it’s going to take some kind of bigger, like a government regulation or law to have anything like that happen.” — Michael

This was a common trend across nearly every interview. The concept or need for policy would override other aspects of the discussion. Yet participants rarely presented a coherent or detailed vision of what these policies might be or how they might be created. Instead, participants often spoke in more abstract and idealistic terms. For example, Tân advocates for the true enforcement of such policies, questioning the validity and enforceability of laws that protect us.

“We just don’t realize it. And we gotta be in this space to discuss, like, is this okay, is this, just normal now? And if that’s the case, then maybe the laws need to be brought up to speed, because right now, I don’t think that the laws have caught up with technology

yet. ... And our country, the US, is not very good at passing very quick laws. And so that's going to be a challenge." — Tân

While policy is often advocated by technologists and the HCI community, policy-oriented practitioners we talked to had less faith in the government's ability to meaningfully regulate the technology sector.

6 Discussion

6.1 Pragmatic Insights: The Powers of High-Fidelity Speculative Design Videos

We begin with pragmatic lessons that other researchers and designers may use in the context of high-fidelity video prototyping, co-speculation, and participatory studies. We found that we were able to use our high-fidelity speculative films to elicit meaningful reflection, sustained and interested engagement, and valuable personal views and experiences from all participants. While our study is unable to empirically measure the impact of our videos compared to other formats, we nonetheless reflect on tentative evidence suggesting the powers of high-fidelity speculative design videos to engage expert participants within a semi-structured interview discussion. We have highlighted four types of participatory engagement that our videos appeared to excel at mediating:

- (1) Deep attentional, emotional, and intellectual engagement with the videos.
- (2) Considering pros and cons of depicted technologies.
- (3) Seeing situations from others' perspective.
- (4) Commenting on behind-the-scenes technologies, such as algorithmic data processing.

While other design and discussion formats can, of course, also mediate these types of engagement, we have offered specific examples of how participants attributed their responses to details of the videos. For example, Sophia described how the "implications of this technology" didn't "really hit" her until she saw the video. The text-based version of our video did *not* trigger her to reflect critically upon the implications of the technologies, nor create an intense emotional response.

However, our approach does have limitations and tradeoffs. Producing high-fidelity videos requires a substantial investment of time and requisite expertise. Although we described our successful approach for completing our videos on a 1-2 month timeline, the use of video is not always needed or appropriate depending on the aims of a project. Next, we tease apart our uses of speculative scenarios videos to help researchers understand the functional possibilities and the downsides of layering too many uses into a single research study or design intervention.

6.2 Co-Speculative Design Films as Multi-Purpose Tools

Our research through design project is openly exploratory. We designed our films using an authorial critical design perspective [57] that curated and then translated cultural critiques into accessible and engaging fictional films. We see this as a conventional "critical design" approach [23]. However, we then shifted toward a participatory co-speculation study, where we combined the goals

and methods of participatory design, user studies, and qualitative research interviews.

In an exploratory manner, we chose not to narrow our study to a very specific goal, such as measuring whether videos generated "better" responses than text, identifying positive and negative design features, or learning how professionals assess their agency to address systemic problems. Instead, we explored a layering of multiple uses for our co-speculative deployment of our films.

Reflecting on the value of our videos within our interviews, we highlight four general-purpose uses of speculative design videos foregrounded by our work.

1. Tools to trigger debate. In part, we designed our videos to operate critically as counter-narratives to the utopian visions of corporate concept videos. We also balanced our films' utopian and dystopian elements to encourage critical reflection rather than outright condemnation or celebration. Our study clearly surfaced passionate critiques as well as reflective internal debate, such as when Harris surprises himself by identifying a beneficial application of a technology he initially labeled as manipulative.

2. Prototypes for user testing. In part, we designed our videos as prototypes to test design concepts with users. We were interested in feedback regarding both positive and negative aspects of the use cases depicted. For example, in the response referenced above, Harris identified a potential positive use of location-based surveillance to alert family or authorities if someone was in danger of harming themselves. On the other hand, Harris felt that it was manipulative to surreptitiously sell the protagonist a therapeutic product based on personal information regarding her deceased husband, even though that product might help her.

3. Empirical probes. In part, we designed our videos as empirical tools to elicit our participants' "preexisting" views, perspectives, and personal experiences. For example, Michael and other participants expressed a recognition that it was practically impossible to opt out of digital technologies, which were inherently surveillant and manipulative. Michael uses specific depictions within our films to generalize this idea and reflect upon his views. In this sense, our film appears to have, at least in part, drawn out participants' preexisting views and past experiences.

4. Creative and critical probes. In part, we designed our videos to go beyond understanding participants' current views and push them to generate potentially new creative and critical responses. In this way, our videos function like cultural probes [27] or technology probes [38], where the goal is not data collection per se but rather design inspiration and speculative insight [8, 67]. For example, in the response referenced above, Michael critically weighed the utility of a VPN tool for preserving privacy versus the easier and more practical option of not "resisting the machine" and being "okay" with it. In another example above, Harris creatively offered ethically beneficial uses of a technology he found "manipulative" in the literal, specific use case portrayed in our film.

6.3 Critically Assessing the Pros and Cons of Film, Speculative Design, and Co-Speculation

Using our delineation of four uses, we now turn our critique back onto our methods to outline pros and cons of our approach. We

argue that these depend heavily on the goals of the project. On the one hand, our study demonstrates that high-fidelity speculative design films can effectively be used as tools to trigger debate, user-test design concepts, elicit “pre-existing” views, and prompt “new” creative and critical responses. While debate and critique are proposed as core uses of critical and speculative design, there has been little empirical evidence demonstrating this and the particular responses of individuals [13, 14, 40].

On the other hand, our study also reveals limitations of layering our four uses together without a clear focus. In future studies, researchers should continue to isolate and empirically assess these specific uses of films, speculative designs, and co-speculation studies. At the same time, we also argue that the emergent and open-ended value of co-speculation may be appropriate in certain situations, similar to uses of cultural and technology probes. As Mike Michaels has argued, there is value to the emergent, generative, “overspilling” effects that open-ended interventions can have when communicating scholarly ideas to the general public [49].

Another critical consideration when using high-fidelity film is that its power to engage can also be a liability. In particular, the power of film to emotionally prime and rhetorically persuade may run contrary to goals of “objectivity” in empirical research traditions, including interpretive social science approaches. If the goal of a speculative design engagement is to promote debate or persuade someone of a relevant critique, then the emotional and persuasive powers of film may be exactly the right tool. However, if the purpose of a research project is to empirically understand the perspectives of a population and generalize these results, then a speculative film may overly prime participants in one direction or another.

6.4 HCI, Policy, and the Act of Pointing Fingers

When it comes to understanding and addressing problems of digital surveillance, what does our research tell us? We found that all participants identified real problems, even though some participants were more critical than others. Further, we found that all participants expressed a fatalistic sentiment. They felt disempowered to enact change in their personal and professional lives. However, the call for policy, law, and regulation often surfaced across our in-depth interviews. At times, it felt like participants were shifting responsibilities for systemic problems onto governments or other higher authorities. While we don’t discount policy’s ability to enact valuable change, this policy-only mindset is, to us, troubling. Here we find critical scholar Mark Fisher’s concept of Reflective Impotence, as described in his book *Capitalist Realism* [2009], illuminating:

“Yes, they know things are bad, but more than that, they know they can’t do anything about it. But that ‘knowledge’, that reflexivity, is not a passive observation of an already existing state of affairs. It is a self-fulfilling prophecy.” — Mark Fisher [26]

In Fisher’s view, it is this self-feeding mindset that clouds visions of personal or collective action, shifting the responsibility away from any action. Interestingly, our two policy-focused participants expressed *the least faith* in the US legislative system, instead criticizing elderly legislators as unfit to enact substantive change in a timely manner. We also note that both participants did not point

fingers at lobbyists and corporate interests, a common target of critique by Fisher and many others.

This act highlights a tension in this project as well as broader HCI discourse. When looking for optimism and solutions when purely technological interventions appear insufficient, policy is often the direction that technologists turn towards [15]. Our work left us wondering how participants might have reacted to an alternative set of films exploring opportunities for collective organizing, engagement in “soft resistance” tactics as defined by Richmond Wong [79], or “harm reduction” as described by two of our technology-focused participants.

Many HCI and design researchers have been working to bridge the gap between policy and technology (e.g., [82, 85, 86]), and we believe this is a critical effort that must be continued. However, our study also left us wondering the extent to which policy is used to shift blame and responsibility, or side-step the limitations of many technology professions and areas of technology research. On a self-critical note, we were also left wondering to what extent critical design and design for debate can inadvertently feed the reflective impotence articulated by Fisher’s work on capitalist realism.

As we analyzed our qualitative data, we wondered if our creation of realistic near-term speculations might have led some participants to see them as likely or even inevitable. This led us to consider if speculative designs, especially those with high degrees of realism, may inadvertently support feelings of reflective impotence, as described by Fisher. To investigate this further, future research on critical and speculative design might, for example, conduct empirical studies to gauge to what extent realistic speculative designs may or may not promote such responses from viewers/users.

6.5 The Critical Need for Positive Visions

We conclude with a critique on negativity and the need for positive visions of the future. All participants generalized concerns and problems depicted in our films to societal trends and their own lives. However, participants also expressed what we called future fatalism, a belief that they were unable to enact meaningful positive change despite their relatively privileged positions of authority and decision-making. This may have been a result of the negative valence of our films. However, at least in part, participants were clearly expressing views they had considered previously. Although critique has its place, our findings instilled a sense that speculative designers and HCI researchers should also be proposing positive visions of the future. These need not be naively utopian. But our participants and society as a whole appear in need of real solutions to complex, wicked problems—even if they are speculative. For example, we wonder how HCI might collaborate with policymakers to propose realistic visions of how radical policies might shape more ethical technologies. We also highlight that critical and dystopian-tending designs may coexist with uplifting and utopian-tending designs. Creating or curating a coherent “mixed bag” of speculative concept videos may be another productive route for future research.

Instead of creating either dystopian- or utopian-tending designs, researchers might instead deliberately create a set that included both. Such compositions appear to be relatively uncommon within the critical and speculation design traditions, yet might be appropriate and beneficial, especially when an empirical research study

is part of the equation. In this project, we took a different approach. The plots of our films were influenced by critical scholarship that critiqued current systems. We then translated these critiques to create films that targeted audiences with expertise in design, engineering, and policy. If our goal had been to reach a broader and more inclusive public audience, we would have rethought this strategy.

In any case, we hope our work helps encourage the HCI community to continue to leverage high-fidelity concept videos and to assess and improve the uses of speculative and critical design within the context of research and public engagement.

6.6 Study Limitations

Regarding our study aims, our decision to recruit various experts working across design, engineering, art, and research limits our ability to learn deeply about any one of these groups. While outside the scope of the present study, there are two notable limitations of our study design that future studies should consider. Given that this is an exploratory and qualitative study, a major limitation is the ability to generalize results to broader population segments, such as professional designers, engineers, and policymakers. A second limitation is that we do not set out to measure the impact of our films against a control treatment, such as a purely verbal discussion or a low-fidelity storyboard. This limits our ability to draw conclusions about the use of our videos compared to other interventions or discussions.

7 Conclusion

In this paper, a high-fidelity approach to world-building allowed us to explore possible, probable futures guided by domain experts co-speculating with us. By employing these films as tools for elicitation, we were able to facilitate deeper reflections on privacy, surveillance, and the ethical use of technology, contributing to the ongoing discourse within HCI communities by reflecting on the impact and agency of critical design. As a result, our preliminary findings highlight the dual role of policy and personal agency in shaping technological futures, challenging the prevalent 'policy only' mindset, and advocating for broader, more inclusive approaches to addressing complex societal issues. By strategizing a new approach combining a composition of critiques across multiple films, this project provides a new direction for exploring dissemination, reflection, and a collective reimagining of our technological landscape.

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A Participant Demographics

Table 1: Participants and their Occupations

Participant Number	Participant Alias	Participant Occupation
P.1	Sara	PhD student studying surveillance and location-data
P.2	Albert	Software Developer at a large multi-national tech company
P.3	Paul	Lead Software Developer at a small technology start-up
P.4	Haris	Assistant City Attorney for a large US city focused on public data.
P.5	Alan	Software Engineer at a large AI-driven company, previous: large social media company
P.6	Ava	Surveillance oriented artist
P.7	Sofia	PhD Student studying recommender systems + productivity at a large university
P.8	Tân	Non-profit-philanthropy oriented community activist
P.9	Mira	Product designer at a well-known design consultancy, working on AI-driven projects
P.10	Michael	Software engineer at a large e-commerce company
P.11	Ashia	PhD Student studying predictive policing and public safety, prev large tech company

B Sample Discussion Guide Questions for Semi-Structured Interview

Each participant was asked a version of the main question topics in bold. Additional probe questions (roman numerals) were selectively asked, at the discretion of the interviewer.

- (1) **Did the video make you think about your own interactions with the technology shown in the video?**
 - (a) What are your initial reactions? [Probe for specifics]
 - (b) Did the video remind you of any experiences you've had?
 - (i) What made sense in the video? What didn't?
 - (ii) What questions do you have?
 - (iii) Can you compare this to any experiences you've had?
- (2) **Do you think this future is good/bad? What's your normative opinion/perspective? How considered is your viewpoint (thought about it a lot, a little, never before?)**
 - (a) Do you think this future is good or bad?
 - (b) Have you ever thought about this before?
 - (c) On a scale of 1 to 10, where 1 is not preferable at all, and 10 is very preferable, how would you rate this?
- (3) **Did the video make you think about future possibilities that you had not previously considered? / How likely/plausible do you think this is? How similar to the present is this?**
 - (a) Had you previously considered a concept like this?
 - (b) How likely/plausible do you think this is?
 - (i) How similar to the present is this?
 - (c) How near or far from reality does this seem? Why?
 - (i) Does this make you think of any current stories?
 - (ii) What makes this feel close to your reality?
 - (iii) Can you critique the technology in the video?
 - (iv) What makes it seem farther from your reality?
- (4) **Did the video prompt you to think about your own choices or the unintended consequences of your work? [Or work that is being done now]?**
 - (a) What concerns arise?
 - (i) What could/might/ought you do?
 - (ii) What else do you imagine to be in this world?
 - (iii) What else does this 'future' contain?
 - (b) Did it remind you of any past work or professional experiences?
 - (c) Can you give me some sense of how different this is from the world we currently live in on a scale 1-10 and why?
 - (d) Can you give me some sense of how different this is from the world we currently live in on a scale 1-10 and why?
 - (i) How plausible - 5-10 years, you pick a timeframe, and why?
 - (ii) What parameters (social norms/policy/values)
 - (iii) How do you imagine this technology came to be?
- (5) **Did the video prompt you to consider what actions need to be taken now? AKA, how do we avoid the future depicted in the video?**
 - (a) Why do you think we will or won't get to this point?
 - (i) Why would what we see in the video not happen?
 - (ii) What could/should be done? (What can't/won't?)
 - (b) What values/interests/priorities have been prioritized for this concept to come into being?
 - (c) What would we need to do in order to avoid that future?
 - (i) Would we need to prioritize other things [values /needs / interests]?
 - (ii) How do you see location data being used in the future?
 - (iii) "When considering the themes presented in the video or the work being discussed, can you share any insights on potential actions or strategies that could be beneficial moving forward? This could include thoughts on addressing challenges, embracing opportunities, or navigating potential consequences."
- (6) **Did the video prompt you to think about other ways in which this method/genre of video could be used?**
 - (a) Do these videos make you think about your role at all?
 - (i) Do you see use in this method for persuading change [in your organization]?
 - (b) Do these videos differ from other videos you might have seen?
 - (i) What are the uses? Are they not useful
 - (c) Are there differences/similarities to other types of videos?
 - (i) How similar or different is that
 - (d) Could you see value in applying this genre of video to your life?
 - (i) Are there other ways you might use these?
- (7) **What actionable steps might be taken?**
 - (a) If they prev. said it was negative: Do you think this future is avoidable?
 - (i) You've said these examples seem bad; why?
 - (b) What do you think we can do?
 - (c) Are there other ways we (or society) may be able to intervene? You've mentioned top-down intervention. Are there others you can think of?
 - (i) How much power, how much ethical response, and what are the ways to foreclose the course of history?
 - (d) How much responsibility do you think people have?
- (8) **How do these videos / this method (speculative design videos) compare to other formats you may have engaged with, particularly: (1) existing examples (either media/news reporting or firsthand experiences with real products), and (2) abstract projections of the future (e.g., discussions by reporters, scholars, etc.), and perhaps (3) depictions in speculative fiction and other cultural production, especially science fiction film and television?**