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Data Economy: Interweaving Storytelling and World Building in Design Fiction

Trievuy Luu

Umeå Institute of Design
Umeå University
trieuvy@above.se

Martijn van den Broeck

Umeå Institute of Design
Umeå University
martijnb@google.com

Marie Louise Juul Søndergaard

School of Communication and Culture
Aarhus University
mljuul@cc.au.dk

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Abstract

In this paper we explore the design of a design fiction as an iterative process of interweaving storytelling and world building. With the design fiction Data Economy, we present how we have imagined and externalized a data obsessed future through a protagonist, narratives, plots and diegetic prototypes; this includes the short stories *Memoirs of Jesse*, the short film *Data Economy* and a number of designed objects. Data Economy explores how far people are willing to go to satisfy their individualistic hunger to consume by creating a tension between consumerism and data collection. By analyzing the design fiction, we discuss social and ethical issues of data privacy. With a focus on narratives, plots, protagonists and diegetic prototypes, we argue that the designerly potential of design fiction lies in its ability to interweave the literary methods of storytelling with the designerly methods of world building.

Author Keywords

Design fiction; data economy; future scenarios; data privacy; storytelling; world building; diegetic prototypes.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI).

Introduction

Through consumption and the use of technologies we recreate ourselves every day [26]. Our relationship with objects confirm and exhibit our status in the eyes of others. However, consumption comes with a price both to ourselves and to the planet. We criticize companies for using our personal data for commercial purposes, but simultaneously keep feeding the beast. E.g. in April 2018, Facebook was highly criticized for sharing our personal data with third-party apps [22]. Since there may be more companies, authorities or individuals following these paths, we need strong ethical considerations on how to design datafied technologies and treat data privacy.

To explore a data obsessed future, we created the design fiction Data Economy [18]. Data Economy uses storytelling and world building—through text, image, video and artefacts—to explore a possible future where data is sold and consumed and our privacy and social relations are at risk. Data Economy is addressing ethical challenges that need to be considered today through a mundane future world [12] and the crafting of a narrative and plot within that world [3]. Data Economy helps us to carefully and critically reflect on the extrapolation of upstream technologies [16] such as faceless interaction [14] and trends such as self-tracking and personal data. Instead of proposing (anti-) solutions [4], technofixes [13] or displaying a future utopian or dystopian world, Data Economy uses storytelling and designed objects to stay with the trouble of data privacy through design fiction [23].

In this paper, we present the design process and the design outcome of our design fiction. We present how we have used methods of storytelling and world

building to explore and externalize a data obsessed future set in 2036. This includes a collection of short stories describing the everyday life of our protagonist Jesse, as well as designed objects that exist in our future world, such as a diary belonging to Jesse, newspapers written in 2036, a faceless mask, a digital wallet and a biometric data collector.

Whereas it has both been argued that design fiction is a world building practice [8] and one drawing on the literary tradition of storytelling [3], we argue that the design of a design fiction is better conceptualized as an iterative process of interweaving storytelling *and* world building. By both caring for the design of diegetic prototypes and the ways that they drive narratives and plots, we argue that the interweaving of storytelling and world building may help designers develop more critical and reflective design fictions, that do not only sketch out a future world but also the implications of the technologies and the human conflicts in it.

Design Fiction as World Building or Storytelling

As argued by Blythe, “Design is a fundamentally imaginative act that involves picturing the world as other than it is” [3]. Similarly, fiction allows us to enter into a world different to our own [3]. Within HCI and interaction design, design fiction is a method to speculate on possible futures and the social, ethical, cultural and political implications of a future technology [2,17,21]. Science fiction author Bruce Sterling has defined design fiction as “the deliberate use of diegetic prototypes to suspend disbelief about change” [21]. Drawing on Sterling & Kirby [15], Coulton et al. define diegetic prototypes as “prototypes [of technology] which exist within the unreality of a fictional world” [8].

Argued by Tanenbaum, "Design fiction, then, uses these fictional depictions of future technology to tell a story about the world in which that technology is situated" [24]. However, Coulton et al. have argued for an "erroneous" link between stories and design fiction. Similar to Sterling, they argue that design fiction "tells worlds not stories" [8,21]. They posit that design fiction is a world building activity, with no inherent link to narrative or storytelling [8]. In their definition, "Design Fictions are collections of artefacts, that, when viewed together build a fictional world" [8]. Hereby, they place an importance on the diegetic prototypes that act as "entry points" into a future world, rather than the stories that might unfold (within) a world. In opposition to Coulton et al., Blythe has argued that we should pay more attention to the professional literary craft of design fiction, such as plot (related events), narrative (judgment) and storytelling [3]. He argues that the texts, images and artefacts of design fiction tell stories and "A deeper understanding of storytelling through text, image and artifact may help us develop more nuanced and reflective research fictions" [3].

With Data Economy, we contribute to the field of design fiction by working across and beyond the methods of storytelling [3] and world building [8]. We do this by working carefully with how plots and narratives are developed by our protagonists and the diegetic prototypes of our future world, thus letting the plot be driven by human conflicts and dilemmas rather than the technology. In the following we present, how our design process of Data Economy was characterized by interweaving methods of storytelling and world building; of writing stories and building prototypes.

The Design of a Design Fiction

With a focus on data privacy and consumerism, our design fiction aimed to imagine and question a data obsessed future set in 2036. The initial process was driven by design exploration [11]; a set of design experiments and the creation of diegetic prototypes [7,15]. Whereas the design experiments helped us to build on existing technological and societal trends and insights from our current world, the diegetic prototypes helped us to externalize our thoughts and imagine possible future scenarios. The design experiments included a social media experiment in which we gathered data about an unknown person and interviews with journalists about the future of data privacy. The diegetic prototypes consisted of a series of newspapers from 2036, a mask and a personal diary belonging to our protagonist Jesse. By creating diegetic prototypes, we explored the details of our future world and protagonist. In conversation with the diegetic prototypes, we crafted short stories through an iterative writing process in order to make the future world humane and relatable, rather than spectacular and extreme. Through the iterative writing process, the short stories started to embody depth, emotions and a strong plot, which brings ourselves and the audience closer to our protagonist and the future world. The final design outcome, the short film, came to existence by continuing developing Jesse as our protagonist and crafting a plot and diegetic prototypes that abide by the logics of our future world [24]. Therefore, rather than as the result of the short stories, our short movie is the continuation of the short stories. It comes after the final chapter of our short stories, and thus it carries on a consistency in our creation of a fictive future world. In the following sections we will describe our design experiments and diegetic prototypes.

Figure 1. A page in the future newspaper "De Nieuwe Krant".
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Designing and Writing Newspapers

Early in the process, we created a series of newspapers, as if published in 2036 in a possible future world. The format of the newspaper helped us to externalize our research on the impact of artificial intelligence (AI) and data in our culture. The focus was how AI might impact the relations between people in the Netherlands of 2036. We created three different newspapers and for each newspaper we created a set of fictive news articles around the topic of AI. Following the genre of newspapers, each newspaper was aimed

at a different societal class in our world. E.g. The newspaper "De Nieuwe Krant" (Figure 1) was focused on the academic societal class, whereas the newspaper "De Brabander" was targeted as an entertainment newspaper. The contrast between these two newspapers would early on highlight different perspectives around the topics of AI. Fictive newspapers and magazines make us easily connect with a future world because they are a very mundane part of our everyday life today [6,20]. Thus, our newspapers served as "entry points" to our future world

Figure 2. In the experiment SuperDATA, we manually scanned the web for data from of a random person to recreate a day in their life.

© Trieuvy Luu & Martijn van den Broeck

Figure 3. Jesse is wearing a faceless mask to be able to stay anonymous.

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[8]. As we understand the newspaper medium and its impact in society today we find it believable and authentic even if it is from 2036. We believe that newspapers will continue to exist and by imagining which news, advertisements etc. that may exist in a newspaper in 2036, we explore the social, cultural and political aspects of an everyday life in 2036. Our newspapers were thus diegetic prototypes of our future world and their purpose was to be a tool for imagination and exploration of future conflicts.

SuperDATA

In a design experiment called SuperDATA, we imagined the role of an AI to scan the web for all data shared online and to connect all the dots to create realistic simulations of past events. Through a social media experiment, in which we manually scanned the web for a random person's social media information, we were able to recreate a day in the life of Brenda surprisingly accurately (Figure 2). We found out that our targeted Instagram user had a concert that day. We knew what she was wearing and with which friends she was attending the concert. We knew which seats she had and how she personally experienced the whole concert. These are information only gathered from her and her friends and location data. Early in the design process, this SuperDATA experiment highlighted the value of personal information and the need to protect it. The experiment brought forth questions regarding one's privacy and highlighted that concerns of data privacy are already present today. This experiment forms the foundation for our narrative and plot of our design fiction. The concerns raised here—regarding AI development and data privacy—are similar to our protagonist Jesse's concerns in our short stories and

short film. Therefore, our narrative in our design fiction is deeply rooted in our existing world.

The Faceless Mask

In our speculation of a future of data sharing and data collection, we imagined a world in which people are wearing masks to stay anonymous. To further explore and manifest this speculation, we created "the faceless mask" (Figure 3). With this diegetic prototype, we produced imagery of Jesse wearing the mask in a cafe in the future; images that we used to accompany the short stories. E.g. in figure 3 we see a man hiding from others to protect his personal data. The image stimulates the viewer to imagine a narrative of how the mask might impact its surrounding relations with people. The imagery is a visual way of thinking that contributed to writing the chain of events in the short stories. In the short stories we read how people act and feel about the masks; we see how our protagonist and people around him develop around the idea of wanting to be anonymous. This physical manifestation provides a "peek into a future" through an image, which makes our mind speculate on the impact of the mask and the surrounding world. As Blythe would argue, the object itself embodies a plot; it triggers judgement. Even if the mask feels somehow strange, we connect with the image, because we recognize elements such as the coffee and the physical diary. The mask itself looks clean and futuristic. The white color and the geometric shapes look similar to 3D printing and face recognition. Thus, the mask does not look dangerous or worrying, but stimulates our imagination. As a diegetic prototype, the purpose of the mask is both to build a world, drive a plot and develop Jesse's character.

Figure 4. We created a diary of our protagonist in order to continue externalize our thoughts, beyond what short stories can offer us.
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Figure 5. The short stories tell the story of Jesse in the years 2034–2036. Here we see him with his faceless mask in the streets of Amsterdam.
© Trieuvy Luu & Martijn van den Broeck

Jesse's Personal Diary

In order to continue to explore Jesse's thoughts and reasoning outside the framework of the short stories, we developed another physical artefact: a personal diary written by Jesse (Figure 4). Whereas the short stories cover the timeline of our protagonist, Jesse's diary stimulated us as designers to think about his ambitions, rituals, drives and personal thoughts. The diary itself allowed us to imagine and explore the plot and narrative before the actual short stories were written. Each page that we crafted in the diary added more depth to the protagonist and through an iterative writing process we were able to craft an engaging plot with strong storytelling aspects. The personal reflections in the short stories are the results of crafting the diary.

Connection between the Experiments, the Diegetic Prototypes and the Short Stories

The different elements of our exploration of the design fiction world have not developed in a linear timeline but were connected and developed in parallel. E.g. the diary and mask have influenced the short stories, so that the mask that Jesse is wearing in the short stories is the same mask that we crafted and took photos of. Likewise, the diary from the short stories was physically created to expand and explore—and not just manifest—our stories. As such the diegetic prototypes are both part of an exploratory and creative writing process, as they bring the impact of the future world into our present-day speculations, and they are material artefacts that open up our imagination and make our speculations wander [25]. Although written short stories also have potential to facilitate our speculations on future scenarios, diegetic prototypes are inherently open for interpretation and their meanings cannot be

fully comprehended [1]. Our relation to the objects can continue to develop. As objects and technologies from another time and space they continue to provoke reflections on the context of the future world.

Short Stories: Memoirs of Jesse

“If the government won't protect us from illegal data surveillance, we have to protect ourselves”

- Jesse Rooijakkers
Amsterdam, 2036

Foreword

“Memoirs of Jesse” is a collection of short stories written by Trieuvy Luu and Martijn van den Broeck. In this collection we shift perspective to the life of Jesse Rooijakkers who lives in Amsterdam in the year 2034 to 2036. The short stories consist of seven chapters, leading up to the last chapter which is the short film. In each chapter we explore Jesse's perspective through different narrative forms such as: fiction, reflections, life lessons, personal journal and scribbled thoughts.

The short stories “Memoirs of Jesse” take places over a timeframe of three years. Each year is introduced by a short anecdote on the societal context of the Netherlands. The stories of Jesse are however very personal and reflective. They describe the same societal themes, but through a humane lens, focused on Jesse's personal feelings and thoughts. The short stories help us to grasp the everyday life of Jesse and to empathize emotionally with his hopes, dreams and decisions, whether they are ethically justified or not. This contrast

Figure 6. Jesse sits down on an empty bench to enjoy the view.
© Trieuvy Luu & Martijn van den Broeck

Figure 7. Jesse drinks coffee and is wearing his faceless mask in order to stay anonymous.
© Trieuvy Luu & Martijn van den Broeck

between the societal and personal perspectives helps the audience to understand the impact of societal structures on a person's individual life. The stories speculate on the future economic value of personal data, concerns of privacy and trust, and consumptions.

2034

People started to wear masks to protect their personal data from companies and government. By hiding their own face people could act anonymously outside the boundaries of their identity.

Chapter 1: The Early Days

Jesse wakes up from two of his roommates chatting. The sun that shines through the colored windows paints the concrete floor. The smell of fresh bread reminds him that it's Sunday. On the background he hears some kids jamming on the organ. Jesse does not really feel comfortable walking around in his pyjamas so he takes a towel from his closet and rushes to the dressing rooms. It's busy in there. There are only about twenty sinks, but the room is filled with nearly double that number of people. So many people go faceless these days, he notices. Especially during the weekends, it seems. One person with the posture of a teenage girl is forcing her electric toothbrush through the tiny mouth hole of her mask. It must be Karoline, Jesse thinks. Nobody else would really care about getting fined by the dentist. It makes Jesse laugh, internally.

After he has dressed up, he packs his bag and goes outside. Jesse walks along the canals while Kings of Leon is playing through his headphones. Finally, some time to relax. Even though he has only walked for a couple of minutes, he can't resist to sit down on an empty bench to enjoy the view. He takes out the mask from his bag so he can reach for his journal. Wondering when the last time was he wrote, he opens

his journal at a random page. The page on the right catches his eye:

"December 9, 2034. I met up with a girl in a bar today. Jennifer, typical Amsterdam girl. Everything we laughed about she HAD to share online with her friends. I bet I'm going viral tonight."

Jesse can't hold his laugh reading the last sentence. He had totally forgot about Jennifer. He flips the page. More than he enjoys writing in his journal, he enjoys reading in it. The bucket list on the right brings back memories from his trip to Japan with his brother. They camped next to Mount Fuji for 11 days before the shy mountain finally revealed itself. Even thinking about it gives Jesse goosebumps.

His hands have turned cold while he was flipping through his journal so he packs and continues his walk. It's really quiet today in Amsterdam. Maybe most people are still sleeping, he thinks. After about half an hour, Jesse passes by one of his favorite coffee places. It looks cozy inside, so he enters and takes a seat. The waitress walks towards Jesse. He remembers her face from last time.

"Good morning, can I get you anything?"

"A cappuccino please" Jesse says. He pauses for a second. *"By the way, do you mind if I go faceless in here?"*

The girl smiles and replies: *"Ah, no problem... Just make sure you do not switch seat so I can still find you to bring your cappuccino."*

"Cool, thanks."

Figure 8. The page in Jesse's diary shows a pros/cons-list of if he should get a faceless mask.
© Trieuvy Luu & Martijn van den Broeck

The waitress walks away and Jesse reaches for his bag under the table. He grabs his mask and puts it on. Then, he opens his journal where he left off about an hour ago. "*Should I get myself a faceless mask?*", it says.

Two weeks ago, those masks weren't that common, Jesse recalls. Now, he is happy that he got one and he thinks he should write something about it. Once his cappuccino has arrived, Jesse flips to a blank page. He grabs his pen and starts writing on the top left corner:

"April 5 2034, Kerkstraatje. It's been so long I almost forgot how to write. When I heard about the identity leak from last month I immediately stopped writing. The last place where I could spill out my thoughts.. gone as well. So far, my identity hasn't ended up on the streets. Luckily.

This time, I'm taking measures. Right now, I'm wearing a mask that I bought last week. When I put it on I become anonymous. Not just in the sense that people and cameras can't recognize me, but also in the sense that it creates some kind of magnetic field that prevents any personal data spread. So, I am pretty sure this won't be read by anybody. That is the way it should be.

I'm actually surprised what a silly mask does to me. It makes me feel like I'm home. Wherever I put it on. Not just at the church, even in this coffee place. You know, that feeling of carelessly running around naked through your bedroom? Or cooking a burger without worrying about insurance? It's been long since I felt like that.

The mask also brings back memories. When I was 11 I sneaked into my brother's room to play a video game that I was legally too young to play. Back then, I did not get into trouble because there was no way the game publisher would find out. Neither did my brother, nor the shop he bought the game from."

After filling up two pages, Jesse puts down his pen.

Chapter 2: The Belgian Girl (Part 1)

Last Tuesday I took my mask outside for the first time. Pretty soon I saw another person wearing one too. It's funny that I instantly felt connected. I'm sure she felt the same, I could tell by her body language. I stopped for a second and we ended up talking. Behind the mask was a young woman I suppose, with a cute Belgian accent. We shared some interests so I

Figure 9. A page in Jesse's diary with the description and the picture of the Belgian Girl, who is pointing at the traffic sign.
© Trieuvy Luu & Martijn van den Broeck

asked her out for a coffee. She agreed but then we were puzzled how to decide on a time and place while staying anonymous. It was quite hilarious.

"Let's meet *exactly here*", she said and pointed to a traffic sign which was next to us.

"In *exactly one week, exactly at the same time.*" I agreed and I took a picture of her pointing at the sign. I wonder if she'll actually show up.

Chapter 3: Dad's Life Lesson

My dad used to tell me stories about when he was younger. About when he was my age. Every week, lots of people would come together to dance. They would enjoy many drinks. He told me every weekend it was crowded and people could act without having to think about the consequences. They would dance all night, dance until the sun came up. Everyone was careless. It's strange to think of such a world. They were so privileged. I wonder how it feels to act so careless.

2035

The Dutch Parliament proposed a law to make it illegal for companies to automatically collect personal data from citizens. At the end of 2035, the law for Data Protection passed the parliament and went into force.

Chapter 4: A Brief Thought

Privacy. Such a strange word. I can live life alone in the forest and be totally private. But that is not a way of living. I have to keep working on myself: help out with my part in society, do something good every day. And I do not want to leave my friends behind. I guess.. my privacy is now in the hands of my closest friends. Liam, Sarah, can I trust you?

Chapter 5: The Belgian Girl (Part 2)

I had the greatest day with the Belgium girl today. God, it feels so relieving to be anonymous! We even shared some secrets, knowing that no one will ever find out. It feels so good to talk!

It was hard in the beginning, I have never talked freely before. And surely she hadn't either. But once I started, she picked up the pace and in the end she couldn't stop talking. We talked about so many things. Her hobbies, her passions and her dreams. She told me her big dream in the coming years is to travel to Cuba. It was her dream to settle in each small village for several months and then move on to another small village. I never thought about going to Cuba. Would it be hard to make new friends there? Maybe I should put it on my bucket list.

2036

Companies started to offer money in exchange for personal data. Through this exchange companies would act rightfully according to the law.

Chapter 6: Liam's Watch

As a teenager, Jesse grew up in an era filled with technological advancements. One of these are the introduction of biometric scanners and data sensors. Now that companies started to offer money in exchange for data, it became very convenient to generate and sell data to earn for a living.

"It is pretty easy." Liam explains to Jesse. "You just have to think about what kind of data companies could benefit from. Let's say for example: you have been trying hard to discover new music, and you find a band that you just love. This is important data, and you could sell this personal data to high bidding companies. On the other hand, if you are

thinking about making money through running, you have to understand this: a lot of people can run 5 km, but not a lot of people can run 35 km. So you understand now as well that the price for your run data increases after you passed the 35 km mark.”

“Hmm, I never thought about it like that. So they pay you more because it is more unique data?”, Jesse asks.

“It is because they really want to find out who you are.” Liam replies.

“Do you really think I can make a living from that? A full time job?”, Jesse asks.

“It is not easy”, Liam says. *“You have to think as a corporation. You have to be original, and you have to be the first. As long as you collect data that is rare or intimate, it will be sufficient to make a living out of it.”*

Jesse nods silently, thinking deeply about what Liam just told him.

“Do you see this watch?”, Liam lifts his arm and reveals his watch on his left arm. It is a pretty watch, it looks shiny and solid. Even though Jesse does not know so much about watches, he replies: *“it’s a beautiful watch”*.

Liam continues: *“I sold my last year’s health-kit data for this watch. As long as you actively keep recording data. It will pay off”*. Liam proudly shows his watch to Jesse. *“And once you get used to generating and selling your data, it becomes natural! You don’t even have to think about it anymore!”* Liam says while laughing.

Jesse stares in the air and is deeply emerged in his own thoughts.

Chapter 7: Jesse’s Morning Ritual

Every morning Jesse has the same ritual. He wakes up. Turns off the alarm. He is tired. The night before he has been working late. Sleep is not so important as long as he does not feel like he can’t perform. He gets up, makes his way to the bathroom, he cleans himself from his biometric data. He washes his face with a facial cleanser, brushes his teeth, showers and after the shower he applies his eye and face cream. After the shower his dress-up ritual starts. Jesse has a favorite blazer that he always wears on work events. This piece is elegant and fits his personality well. It gives Jesse confidence. Then he puts on his rings. He is not married, but he has three rings. Two rings on his left hand, one on his right hand. After the rings he puts on his watch and his glasses. Jesse grew comfortable wearing the two trackers. These days he would not feel complete without it. The last step is his perfume. He puts it on before leaving. Jesse values his ritual. It gives him confidence. For Jesse doing his rituals is what makes him feel at home.

Data Economy: The Short Film

The short stories that make up the seven chapters of “Memoirs of Jesse” present the timeline up to the short film “Data Economy”. Whereas Memoirs of Jesse communicates a future world through written words, Data Economy makes the world come alive through video, sound, and diegetic prototypes. In our short film Data Economy (watch the film on: <https://vimeo.com/197395760>) [18], we continue the narrative from the short stories, where data collection for commercial purposes has been illegalized. Instead, people actively collect and sell their data to companies to earn money and keep up the high standard of living, that society expects. As a commodity that companies

Figure 10. With the use of the wallet (left) and Ohm's (right), Jesse performs his morning ritual of cleansing his body from biometric data.

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can buy from citizens, data has become a currency, and since unique data is a scarcity, data is valued based on the intimacy of the data and the market demands. E.g. the wine preference of a celebrity will be valued high, just as knowing a person's sexual preferences. Our design fiction exposes this fictive future world of consumerism in which people are constantly faced with the dilemma whether or not to give up personal privacy and the privacy of others, by selling their data and feeding their individualistic hunger to consume. In Data

Economy we experience this dilemma through the eyes of our protagonist Jesse. We follow his everyday life and habits of harvesting personal biometrical data and selling data based on other people's lives, and we experience how this new data economy shapes and changes his identity; how he struggles to stick to his own values as technologies, societal laws and companies enable new ways of living.

Diegetic Prototypes in the Short Film

To build a fictional world and enable new actions, we designed diegetic prototypes that abide by the logic of our future world [8]. These prototypes build on people's collective imaginings of future technologies [10], inspired by for instance the science fiction series Black Mirror [5], and their novel crafting makes the world and the plot of the short film believable. The diegetic prototypes include 1) Ohm's, a biometric data scanner, 2) the wallet, a voice- and touch controlled transparent computer that enables Jesse to sell data, and 3) smart glasses, through which Jesse connects to the surrounding world. The diegetic prototypes are not merely "entry points" into our future world, rather they drive the plot in our design fiction.

Narrative, Plot and Storytelling in the Short Film

In "Data Economy" we draw on the power of visual storytelling, plots and narrative. We intended to engage our audience in the dilemma of consumerism and data privacy through the eyes of Jesse. Our design fiction draws on three basic plots: "rags to riches", "overcoming the monster" and "voyage and return" [3].

This first plot "rags to riches" [3], describes a person going through a transformation from poverty to wealth. As Data Economy's storyline unfolds, we witness

Figure 11. A close-up of the Ohm's biometric data collector.
© Trieuvy Luu & Martijn van den Broeck

Figure 12. The wallet with the text "Pregnancy reveal Mila and Robert. Collected by wallet. Highest offer: Babyplanners \$241.53".
© Trieuvy Luu & Martijn van den Broeck

through Jesse's perspective, how convenient it is to sell personal data to earn money. We see Jesse being ambitious and coming up with smart ways in order to generate unique data. E.g. Jesse creates a "photo with heart in the mirror" even though Jesse does not have a girlfriend. Jesse is working hard on himself to transform himself to fit into his society and the technology. The data economy technology seems to work in Jesse's benefit and he transforms from being rather poor to earn enough to buy a suit.

This second plot refers to "overcoming the monster" [3], in which the data economy technology is the "monster" which is in conflict with Jesse's morals. In the story, we continue to follow Jesse's character development up to the point where he gets his hands on Mila's high-valued pregnancy data (Figure 12). Jesse and the viewer are confronted with the critical and ethical questions: Is it morally justified to sell Mila's data? For how much money would I betray a friend? At this crucial point, the technology of a data economy reveals its dark side, and the plot is whether Jesse is able to overcome this "monster" and stick to his values, or if the technology "will win" and eliminate its users' data privacy. As we have followed Jesse throughout the design fiction, we empathize with his decision. This leaves us with the tension that Jesse is the product of the fictive world, and rather than criticizing Jesse for making unethical decisions, we should question the impact of future technologies; in our case, questioning the trends around data privacy and the legal, technological and commercial framework around it.

Data Economy also draw on a third plot, which is "voyage and return" [3]. We take the viewer on a journey in our design fiction world, and when the

viewer returns to the existing world they are able to articulate the problem space of the technology and its consequences. The question of whether it is morally justified for Jesse to sell Mila's personal data can be abstracted into the question: Can we let technology freely change our moral values? Thus, as the viewers return from our design fiction world, they may see the world differently and be better at critically reflecting on our current society.

Inherent to these three basic plots is the use of diegetic prototypes. In using the diegetic prototypes in the plot, *as an inherent part of storytelling*, we move from focusing on the technology as such—and its technical and practical implications—, to explore and question what social, cultural and political implications a future technology might have on ourselves and our everyday life. We argue, that this potential of interweaving the literary methods of storytelling and plots with the designerly methods of world building and diegetic prototypes may help designers create more critical and reflective design fictions.

Analysis: Symbolic Narratives in Data Economy

To create a strong link between our fictive world and our present world, thus creating a strong engagement for our audience, we played with narratives; narratives that have a strong symbolic meaning in our present world and continue to exist in our future world. These narratives add depth to our plots in the ways that they embody meaning and a judgment [3]. Our narratives include: 1) the ritual of Ohm's similar to brushing teeth, 2) the suit as a symbol of economic growth, and 3) the home as a safe space. These narratives are suited to

Figure 13. Performing this action has become a daily ritual, similar to brushing teeth.
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Figure 14. The suit is a symbol for economic growth. In the opening scene of the short film, we see Jesse longing for this suit.
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preserve and communicate existing knowledge from the present and to open up for new knowledge in our future world [24]. As symbols, they rely on our personal belief-system and our shared way of seeing the world: our ethics, values, causality, politics, psychology and emotions [24]. By using these narratives, we create a space for our audience to empathize with the future world and reflect on their own belief-systems.

1. *The Ritual of Ohm's*

The Ohm's biometric data collector represents an everyday routine as it is used every morning and exclusively within the safety and comfort of the home (Figure 13). Ohm's is a small device that connects to the user's biometric sensors through their mouth. Through this connection, the data from all biometric sensors is transferred externally, enabling the user to either keep or sell the data. Performing this action has become a daily ritual, similar to brushing teeth. We envisioned this ritual to be the most mundane activity to do. We wanted to portray how accepted and normal it is to extract your data, just as it is with brushing our teeth. In our present world no one questions why we brush our teeth, just as in our fictive world no one questions why we extract our data. The ritual becomes a symbol for empowerment and care. Jesse is empowered by taking control over his own biometrical data, and harvesting his data becomes a way of taking care of his body. However, as the ritual of Ohm's becomes integrated so smoothly into Jesse's everyday routines, we might question whether Ohm's is the first step that transforms Jesse's moral values.

2. *The Suit*

Initially in our short film, the suit is a symbol for economic growth. In the first scene (Figure 14), Jesse

stares disappointingly in front of him after realizing he has far from enough money to buy the suit. In this close-up, we focus on his eyes and we see him imagining his life with a suit. During this moment we see which dilemmas Jesse is facing; he questions his own identity and his place in this society. In this first scene, we begin to empathize with Jesse. This is the seed that develops into the motive for his decision later in the short film. By now, in our design fiction the suit has also become a symbol for having a dream. Dreams give us purpose as human beings. Dreams are the motives that lead us in our lives. They drive our decision-making process. In our short film, we visually hint to the connotation of the dream by cutting to the second scene that shows Jesse waking up from a dream by the harsh alarm-clock.

3. *The Home as a Safe Space*

In our design fiction, the home has become the last space that is safe and isolated from data collectors. It has become the shelter from the chaotic and dangerous outside world. Throughout our short film, we see Jesse performing rituals that seem like mundane everyday routines: waking up, extracting biometric data, showering. In the future world, these routines become well-known habits and thus they create the feeling of being home. When performing his rituals, Jesse feels comfortable and "at home".

Similarly, at the end of the short film, we see Mila being comfortable at home drinking tea. However, as she finds out her pregnancy data was leaked, the home stops feeling as a safe space because her privacy, that was supposed to be kept safe, is now invaded. With the current trends of information digitalization, we envision the scene with Mila as a metaphor for the challenges of

Figure 15. What if companies would offer more money for unique running statistics?
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other people having access to our personal data. In the future, if we cannot feel “at home” in a physical space, what then will make us feel at home?

Discussion: The Futures of a Data Economy

Our design fiction raises an important and urgent topic in our present world that needs to be discussed: Which futures do we envision for our data privacy? And who should be empowered to have control over our personal data? These questions are increasingly important and have gained the public’s attention after the coverage of Cambridge Analytica and Facebook; how much they know about us and that they are able to change public opinions [22]. Another example is how the Chinese government wants to use data to control and score each citizen [22]. Our design fiction shows that discussions on data privacy involve complex questions regarding ethics and authority, on both a governmental and societal scale and on an individual scale.

Beyond the situations directly described in our design fiction, our fictive data obsessed future raises speculations on other possible scenarios. E.g. it could be interesting to investigate grey areas of a data economy, such as forgery of data (as it is done with actual money) which could have unexpected consequences for data-driven services. Building on Data Economy, there is a complex realm of economic design fictions that can be developed. E.g. what would be the equivalent of a phenomenon of inflation in a data economy? Likewise, on a social level it could be interesting to imagine how people would live their life if their every action could be sold (Figure 15). If a rare event, such as completing an ironman, changing relationship status, or expressing an extreme political opinion would result in extra valuable data, would more

people strive for this to happen so they could earn more money on their life? In this way, Data Economy generates open questions, suggests alternative systems and leaves the audience to speculate on the implication of this future world. As a believable and inspirational piece of storytelling, Data Economy could furthermore potentially be the type of useful and demonstrative work that is needed to foster discussions between stakeholders; e.g. debating about the upcoming shift in the economy where personal data and knowledge are the main global currency. Through storytelling Data Economy brings voice to the conflicts and complexities of economy, privacy and individual freedom. It uses storytelling to ask political and philosophical questions of which future—out of all possible—we want [19]. When discussing large scale paradigm shifts, for instance economy, the details and impact on personal lives are hard to grasp but important to bring into discussion. Storytelling, as we show in Data Economy, is a powerful practice of imagining, empathizing, listening to and being responsible of the complexities of a future world.

Conclusion

In this paper we presented the design fiction Data Economy and the design process behind it. This includes the use of literary methods of storytelling, plot and narrative and designerly methods of world building. We used storytelling in the character development of our protagonist Jesse, the written short stories of “Memoirs of Jesse” and the production of a short film “Data Economy”. We used a world building practice in our design of diegetic prototypes, such as the faceless mask, newspapers, Jesse’s personal diary, the biometric data collector Ohm’s and the wallet.

Through an analysis of Data Economy, we contribute to the field of design fiction with 1) the design fiction Data Economy and 2) methods of interweaving storytelling and world building. These methods include how diegetic prototypes are used in plots and character development and how protagonists may enable audience engagement and reflection on our present world.

In our design fiction Data Economy, we have reflected on the implications of future technologies and trends around data sharing and data privacy. Rather than framing the debate in a specific way, we create an opening for our audience to reflect on the societal implications of data privacy and consumerism. This can be used to understand how potential new technologies entering the scene could shape and change not just our built environment and interactions, but our human behavior, our belief-systems and our values.

Storytelling and world building has been presented as contrasting practices of design fiction [8]. By analyzing how our design fiction works in terms of storytelling and world building, we demonstrate that the designerly potential lies in the iterative interweaving of both storytelling and world building. We argue that, rather than two competing practices of design fiction, the interweaving of storytelling and world building is what enables designers to create a critical and reflective design fiction. A design fiction that does not only imagine a future world and its future technologies, but also questions the social, cultural and political implications of the technologies on a societal level as well as how future technologies shape human conflicts, values and emotions on an individual level.

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References

1. Jeffrey Bardzell, Shaowen Bardzell & Lone Koefoed Hansen. 2015. Immodest Proposals: Research Through Design and Knowledge. In *Proc. CHI '15*, 2015. pp. 2093-2102.
2. Julian Bleeker. 2009. Design Fiction: A Short Essay on Design, Science, Fact and Fiction. Near Future Laboratory, 2009.
3. Mark Blythe. 2017. Research Fiction: Storytelling, Plot and Design. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (pp. 5400-5411). ACM.
4. Mark Blythe, Kristina Andersen, Rachel Clarke, & Peter Wright. 2016. Anti-Solutionist Strategies: Seriously Silly Design Fiction. In *Proc. CHI 2016*, ACM (2016), 4968-4978.
5. Charlie Brooker. 2011. Black Mirror.
6. Barry Brown et al. 2016. The IKEA Catalogue: Design fiction in academic and industrial collaborations. In *Proceedings of the 19th International Conference on Supporting Group Work*. ACM, 2016.
7. Marion Buchenau & Jane Fulton Suri. 2000. Experience Prototyping. In *Proceedings of the 3rd conference on Designing interactive systems: processes, practices, methods, and techniques*. ACM, 2000.
8. Paul Coulton, Joseph Lindley, Miriam Sturdee, and Mike Stead. 2017. Design Fiction as World Building. In *Proceedings of the 3rd Biennial Research Through Design Conference*, 2017.

9. Alan Dix and Layda Gongora. 2011. Externalisation and design. In *Proceedings of the second conference on creativity and innovation in design* (pp. 31-42). ACM.
10. Paul Dourish and Genevieve Bell. 2013. Resistance is Futile: Reading Science Fiction Alongside Ubiquitous Computing. In *Personal and Ubiquitous Computing*, 17 (5).
11. Daniel Fallman. 2008. The interaction design research triangle of design practice, design studies, and design exploration. In *Design Issues*, 24 (3), 4-18.
12. Nick Foster. 2013. The Future Mundane. Retrieved 1 May, 2018.
<http://www.core77.com/posts/25678/the-future-mundane-25678#more>
13. Donna Haraway. 2016. *Staying with the Trouble: Making Kin in the Chthulucene*. Duke University Press. Durham and London, 2016.
14. Lars-Erik Janlert & Erik Stolterman. 2015. Faceless Interaction—A Conceptual Examination of the Notion of Interface: Past, Present, and Future. In *Human-Computer Interaction*. 30:6, 507-539, DOI: 10.1080/07370024.2014.944313
15. David Kirby. 2010. The Future is Now: Diegetic Prototypes and the Role of Popular Films in Generating Real-world Technological Development. *Social Studies of Science*, vol. 40, no. 1, pp. 41–70, Sep. 2010.
16. Shaun Lawson, Ben Kirman, Conor Linehan, et al. 2015. Problematising Upstream Technology through Speculative Design: The Case of Quantified Cats and Dogs. In *Proc. CHI 2015*, ACM (2015), 2663-2672.
17. Joseph Lindley, Paul Coulton and Miriam Sturdee. 2017. Implications for Adoption. In *Proc. CHI 2017*, ACM (2017), 265-277
18. Trieuvy Luu & Martijn van den Broeck. 2016. "Data Economy". Short film. Link:
<https://vimeo.com/197395760>
19. Ramia Mazé. 2016. Design and the Future: Temporal Politics of 'Making a Difference"', in *Design Anthropological Futures*, p. 37-54
20. The Near Future Laboratory. 2014. Winning Formula. Retrieved 2 May, 2018.
<http://winningformula.nearfuturelaboratory.com/>
21. Bruce Sterling. 2012. Sci-Fi Writer Bruce Sterling Explains the Intriguing New Concept of Design Fiction (Interview by Torie Bosch). Slate.com. 2012. Retrieved 2 May, 2018.
http://www.slate.com/blogs/future_tense/
22. Tobias Stone. 2018. Your Privacy Is Over: Medium.com: Retrieved 1 May 2018.
<https://medium.com/s/story/your-privacy-is-over-ed72d06418f1>
23. Marie Louise Juul Søndergaard & Lone Koefoed Hansen. 2018. Intimate Futures: Staying with the Trouble of Digital Personal Assistants through Design Fiction. In *Proc. DIS 2018*. ACM (2018).
24. Joshua Tanenbaum. 2014. Design Fictional Interactions: Why HCI Should Care About Stories. In *Interactions*, Sept 2014, 22-23. ACM.
25. Ron Wakkary, William Odom, Sabrina Hauser et al. 2015. Material Speculation: Actual Artifacts for Critical Inquiry. In *Proceedings of The Fifth Decennial Aarhus Conference on Critical Alternatives*. Aarhus University Press, 2015.
26. Judith Williamson. 1978. *Decoding Advertisements*. Vol. 4. London: Marion Boyars, 1978.