Cleaning our Plates: Information Systems Contributions Toward Animal Liberation

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Abstract

Animals experience complex emotional lives and have the capability to suffer. Much of that suffering is inflicted by humans, often exacerbated through designing and using information system artifacts. Inspired by animal-computer interaction research in computer science, this paper proposes a model of Animal-Human-Information System interactions based on representation theory to understand animals as stakeholders in systems development. Focus is placed on animals as users of systems and the impacts that systems have on animals directly and indirectly to reduce animal suffering. Research directions for information systems scholars are discussed.

Keywords: animals, ACI, information systems, social justice, representation theory

1. Introduction

"What one generation finds ridiculous, the next accepts; and the third shudders when it looks back on what the first did."
– Peter Singer: Author of Animal Liberation (1975)

A systematic review of the scientific literature shows that non-human animals[1] experience complex emotional lives (Proctor et al., 2013). For example, dogs and pigs share similar levels of cognitive complexity (Marino & Colvin, 2015). Even if one disagrees with the scientific literature on sentience, animals' ability to feel pain is apparent (Sneddon et al., 2014) and should affect how we treat them. In computer science, our colleagues have started taking animals seriously as stakeholders in interaction design to improve quality of life and animal-human relations (Mancini, 2011, 2017; Rault et al., 2015).

It is worth asking then, how do we as humans treat our animal stakeholders? If we observe a dog or a cat, perhaps we might find them cherished companion animals loved dearly by their families. Farmed animals are not so fortunate. To produce meat and secondary products like eggs and dairy at scale, animals are routinely castrated without anesthetic, forcibly inseminated, raised in cages where they can barely move, and left on their side in gestation crates for entire pregnancies (Newkey-Burden, 2017; Slevin, 2018). The day of slaughter, be it by gas chamber, a bolt to the head, thrown in a grinder, or slitting their throat (Danovich, 2021; Gregory, 2008), is perhaps the most merciful day of a farmed animal's life.

The farmed animals share the same levels of sentience and ability to suffer as the animals we welcome in our homes. The companion animals are loved, and the farmed animals are slaughtered on a scale of 80 billion per year (Ritchie & Roser, 2017). Activists investigating and exposing these farming practices are criminalized (Strong, 2019). Yet, the same abuses committed outside of the farming context would be considered animal cruelty crimes. Even the romanticized "small family farm" would be abhorred if the free-range chickens were instead free-range cats. Further, while workers play a role in perpetuating the suffering of animals, those working in factory farms are often exploited immigrants conducting traumatic tasks in wretched work environments for pitiful pay (Nagesh, 2020).

Why does this concern information systems (IS) research, however? After all, moral concern for animal rights is nothing new (e.g., Al-maari, 1021-1033; Schopenhauer, 1840; Singer, 1975), predating the mass adoption of digital technologies. However, like other societal issues, animal suffering is deeply intertwined with information technologies, and existing injustices are exacerbated by applying those technologies.

In industry, specialized information systems have been created to facilitate the slaughter of animals (e.g., IO Cárnicas, 2023; Merit-Trax Technologies, 2023.). Research on these systems is limited (e.g., Bahlmann & Spiller, 2008; Grande & Vieira, 2013) but generally focuses on how these systems make animal slaughter more efficient, not animal welfare outcomes. On the

[1] The remainder of this manuscript will refer to non-human animals as “animals”.

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consumer side, individuals use applications like grocery and food delivery that offer easy access to many animal products. Information technology did not create the issue but has enabled suffering to scale in the face of increased demand for animal products.

Farmed animals represent perhaps the most pressing area of human-inflicted animal suffering per capita. However, it is not the only area where IS scholars should take animal welfare seriously. Animal suffering issues also exist in scientific research and product testing (Lee, 2016), captivity (Salas et al., 2018), companion animals, and wild animals (Delon & Purves, 2018), to name a few. If we accept animals as stakeholders and worthy of consideration, we must re-evaluate all our relationships with them seriously. This paper will primarily focus on farmed animal suffering, not to downplay other animal suffering, but to prioritize the area where humans inflict the most harm. A harm and suffering that only continues to scale as more countries develop economically and demand more animal products in their diets (Ritchie & Roser, 2017).

The design literature has long engaged (e.g., Friedman, 1996) and continues to engage (e.g., Costanza-Chock, 2020; Wambsganss et al., 2021) with the embedded values, contexts, and social justice outcomes of the systems we build. While we generally fail to meet these aspirations in the human context, in the animal context, we barely even acknowledge a problem. This is beginning to change in the computer science literature (e.g., Mancini, 2017; Mancini et al., 2022), but IS has thus far been silent on animal welfare issues.

In this paper, I make a case for expanding social justice and compassion beyond our human boundaries to include animals as stakeholders in developing information systems. Animals have multiple roles as stakeholders in the IS context. In some cases, they are users of a system, meaning a system is designed for them to achieve a goal, such as feeding systems. In other cases, a system interacts with an animal by collecting data or enacting physical environmental changes, such as slaughterhouse management systems. Additionally, systems the animal does not even come in direct contact with, such as food ordering applications, can create demand for products that bring about their death or abuse.

This research has three primary objectives: ***RO1:*** *Bring attention to the problem of animal suffering contextualized for IS scholarship,* ***RO2:*** *Develop a theoretical framework for understanding animal-human-information system interactions,* and ***RO3:*** *Propose research directions unique to IS scholarship on animal-human-information system interactions.* In the context of information systems, I focus on establishing the theoretical domain of *interactions* between and *impacts* on animals by information systems and human use of information systems. These objectives are grounded in a larger goal of reducing animal suffering. The following section will establish the theoretical perspective of this paper.

2. Theoretical Perspective

This research takes a pragmatic approach to addressing animal suffering. Despite its failings, the pragmatic, incremental realism of liberalism has been a foundation by which significant societal change has been achieved (Gopnik, 2019). As such, I differ from more radical theories of change, such as critical animal studies (Best, 2009) or veganarchsim (White, 2012), in that I would accept regulating a slaughterhouse to reduce suffering on the margin on a longer arc towards abolition. I take this perspective not to compromise the moral stance of this work but rather on a note of pessimism and to prioritize immediate reduction of suffering where possible over the purity of principles that readers may not share.

This incremental pragmatism should be applied carefully, however. To conduct design without considering the social justice implications of design risks further exploitation of animal stakeholders. Animal-computer interaction (ACI) researchers have noted that we do not operate in a socioeconomic reality that values the needs of animals (Mancini et al., 2022). This means that the technologies we produce to reduce suffering are often applied to improving the efficiency of a slaughterhouse, not improving the lives of animals (Mancini et al., 2022).

As such, this research will take a political ACI position (Mancini et al., 2022), an extension of the HCI literature's social justice-oriented interaction design strategies (Dombrowski et al., 2016). The primary design commitments of this approach are commitment to conflict as a force for positive change, reflexivity on positionality and values, personal ethics and politics on issues of animal justice, and expanded empathy to gain a deeper understanding of animals. Design strategies in this framework emphasize designing for transformation, recognition, reciprocity, enablement, distribution, accountability, disruption, reconfiguration, and pollination of systems (Mancini et al., 2022). In short, what we design needs to liberate the oppressed, not strengthen the oppressor.

The design justice literature also influences this work. This includes the *values* embedded in systems, the *practices* of who designs systems, *narratives* of how systems are designed, the *sites* where design takes place, and the *pedagogies* by which design justice is taught (Costanza-Chock, 2020). Previously, this framework has been applied to human social justice issues, but it remains relevant to the animal context. Especially as animals generally do not have agency or protection from the systems built by humans.

Representation theory (Wand & Weber, 1995) is this work's primary IS theory. This theory will provide a language to frame the animal suffering issue in IS terms and establish the relevant domain of study for the IS research context. In this research, I aim to identify the unique areas of contribution and phenomena for IS scholarship. As a native IS theory, representation theory serves as a lucrative foundation for further theory development.

Representation theory posits that information systems are physical symbols representing real-world systems (Wand & Weber, 1995). Information systems consist of three structures: the physical structure (technology implementation), the surface structure (presentation), and the deep structure (representation) (Recker et al., 2019; Wand & Weber, 1995). The physical structure implements both the surface and deep structures of the system, and the surface structure enables access to interpret the deep structure representation.

Table 1 briefly overviews the key theoretical literature used, concepts adapted, and highly relevant citations. With these theories as a guide, the next section will propose a model of animal-human-information system interactions.

Literature	Concepts	Selected Citations
ACI/Political ACI	Animals as system users, animal agency, animal interactive design, animal ethics	(Mancini, 2011, 2017; Mancini et al., 2022; Rault et al., 2015)
Social Justice Oriented Design	Social justice outcomes, Design values, practices, narratives, sites, and pedagogies	(Costanza-Chock, 2020; Dombrowski et al., 2016; Mancini et al., 2022)
Representation Theory	IS as physical-symbol systems, IS Structures, IS Boundary, System Representation	(Recker et al., 2019; Wand & Weber, 1990, 1995)

Table 1. Theoretical Summary

3. Proposed Model of Animal-Human-Information System Interactions

Figure 1 shows the interactions between animals, information systems, and humans. It does not contain every possible permutation of component interactions but focuses specifically on the relationships that most directly impact animals as system stakeholders. Most research will likely draw on multiple components and relationships simultaneously from Figure 1; each need not be studied in isolation. The following sections will define the components and relationships of the model and their relevancy to animal stakeholders.

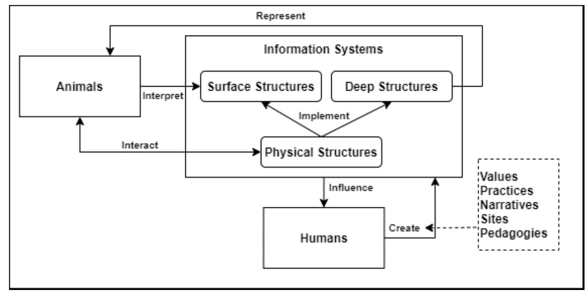

Figure 1. Animal-Human-Information System Interactions

3.1. Model Components

Animals refers to any animals that may use a system and animals that are affected by the human use of a system directly or indirectly.

Humans refers to any humans that may use a system that an animal uses and a system that affects animals. Since animals cannot develop information systems, humans also refers to humans that create information systems for animals to use or create information systems that affect animals.

Information Systems refers to the technical artifacts animals and human actors interact with. The focus is on three types of information systems. The first are *systems that animals directly use*, meaning they are a stakeholder user of the system, such as a feeding system. The second is *systems that affect animals directly but animals are not the users of*, such as slaughterhouse management systems. The third is *systems that affect animals indirectly*, such as food delivery applications that facilitate the purchase of animal products.

The information systems themselves consist of *physical, deep, and surface structures*. All interactions with the system are facilitated through the physical structure components, the physical hardware and the software technologies that construct an information system. Deep structures are implemented in code using physical structure components, capturing the human perception of a target reality as a representation in the system. Surface structures are also implemented with physical structure components, visualizing the deep structure of the system through interface design. The following section will define the relationships between the animal and information system components.

3.2. Animal-Information System Relationships

The relationship *Animals interact with Physical Structures* encompasses animals interacting with the physical components used to construct and use a system. This relationship applies to information systems that animals use and systems that affect animals directly but are not the users of. This relationship manifests in three different ways. The first way is as a user of the system. In this scenario, an animal uses the physical structure to achieve a goal with the system. The second way is as an input of the system, meaning animal interactions with the physical structure are processed and stored by the system. The third way is in the reverse direction, with the physical structure enacting on the animal.

The relationship *Animals interpret Surface Structures* captures how animals perceive system outputs. This relationship only applies to information systems that animals directly use. In a traditional information system, we would consider surface structure elements things like how a user interface is displayed on a screen or system reports (Wand & Weber, 1995).

In the context of animals, this remains the same, but the content of the system displays would be tailored to what the target animal can meaningfully process. The physical implementation of the surface structure is also more diverse. Animals may use auditory signals, wearable haptic feedback, or even headsets as their methods of processing system feedback rather than a traditional screen. This structure will vary a lot between animals with different capabilities and needs, as well as depending on the purpose of the system.

The final relationship is that *Information Systems represent Animals*. This relationship refers to how animals are represented in the deep structure of the system, with a more faithful representation of reality leading to a more effective information system (Wand & Weber, 1995). Just like with surface structures, the deep structure is constructed using physical technologies and is limited by the capabilities of those technologies. This relationship applies to all three information system types: systems that animals directly use, systems that affect animals directly but they are not users of, and systems that indirectly affect animals.

How each system type represents the animal is different. In vet management systems, an animal may be represented faithfully to track holistic health over time despite the animal not being a direct user of the system. In a slaughterhouse management system, the animal may be represented as livestock instead. The whole essence and experience of the animal is not captured, only those relevant for raising, slaughtering, and preparing the intermediary animal product for sale.

Similarly, in a food ordering application where animals are indirectly affected by the system, the animal will be represented as various food products. Dishes with various types of meat, dairy, or eggs are available to order; the animal has been completely commoditized and, in many cases, is unrecognizable from its formerly living counterpart. In a system where an animal is a stakeholder user, such as a feeding system, the representation would include the overall structure of the target real-world process being digitalized. The goal orientation of the animal user and how that animal can achieve the goal is relevant, but general information about the animal may be more limited to the specific goal of the system, such as the weight and breed of an animal and related feeding guidelines. The following section will define the relationships between human and information system components.

3.3. Human-Information System Relationships

While discussing human relationships with information systems in the context of animal stakeholders may seem counterintuitive, a model without them is incomplete. Humans are the actors that create the information systems animals interact with. They also are, at worst, an oppressor and, at best, a guardian in most relationships with animals due to power imbalance between species. In Figure 1, I do not model all human relationships with information systems as that would essentially encompass the entirety of the discipline. Similarly, I do not include a direct relationship with animals, as the relationships relevant to IS scholars are generally mediated through an information system interaction. Instead, I focus on the two most relevant relationships to animals as system stakeholders.

The first relationship is that *Humans create Information Systems*. This relationship applies to the development and implementation of systems that animals directly use, systems that affect animals directly but they are not users of, and systems that indirectly affect animals. Most relevant to all three system contexts are the deep structures humans create. When animals are represented in the system, they are not determining what parts of their experience are represented. The deep structure is where the designers' values and narratives (Costanza-Chock, 2020) are embedded. Humans decide to represent an animal as purchasable products in an application as an example. They accurately represent the extant real-world structures of the livestock industry in the system's structure but do not faithfully represent the animals as living beings.

In addition to representations, humans create systems with specific goals and design decisions. The goal may be to assist an animal, such as designing a vet management system to store health records about an animal. Alternatively, humans may develop systems that oppress animals by applying technologies to make slaughterhouses more efficient. Design decisions also impact systems for which animals are users. If a system allows for animal-system interactions, humans must consider what technologies best suit animal stakeholders' mental and physical capabilities. Physical structure design that works for a human may not work for a chicken, and what works for a chicken may not work for a fish. There is a lack of practices, pedagogies, and design site access for including animals in these design processes (Costanza-Chock, 2020) for the systems that affect them.

The other relationship modeled is that *Information Systems influence Humans*. This relationship captures the ability of the information system design to influence human behavior, in this context, around the treatment of animals. This relationship applies to all three information system types: systems that animals directly use, systems that affect animals directly but they are not users of, and systems that indirectly affect animals. For systems that animals are direct users of, outputs of a system may also be directed to a human actor who can then make decisions that affect an animal, such as refilling an automatic food system for a companion dog. Similarly, for a system animals do not directly use, such as a veterinary management system, reports or interface alerts may influence a human actor to care for a companion dog a certain way.

Not all influences from a system result in positive animal-human interactions, however. For a food ordering application, surface structures can promote the purchase of animal products, sending market signals for more meat and secondary products to be produced through harming animals. In a dairy farm management system, surface structure elements may influence a farm worker to forcibly inseminate a mother cow to continue her milk production or schedule her for slaughter if milk production is no longer physically or economically viable. Now that the model components and relationships have been defined, the next section will discuss actionable research directions based on the model.

4. Discussion

Figure 1 establishes the extent to which animals are intertwined with information systems. However, it does not guide IS scholars on what research areas to focus on. In this section, I propose three research directions that emphasize the political ACI position described in the theoretical perspective, focusing on reducing animal suffering. When developing these directions, the focus was placed on what IS research can *uniquely* contribute rather than emulating work left better to ACI, animal science, or critical animal studies research. Although our discipline overlaps with computer science, so there is some shared ground with the ACI community.

4.1. Research Direction 1: Documenting and Dismantling Information Systems of Animal Oppression

The first research direction I propose is documenting and dismantling tools of animal oppression. Many information systems that impact animals are not tools that better their lives but facilitate their oppression at scale. For example, modern slaughterhouses, like any other organization, run on a mixture of standard and specialized industry information systems (Syarif Hartawan et al., 2020). However, research on such specialized systems is lacking (Bahlmann & Spiller, 2008).

The limited literature on these systems generally falls into two categories. The first investigates the effectiveness of these systems on outcomes for slaughterhouses (e.g., Bahlmann & Spiller, 2008; Grande & Vieira, 2013; Syarif Hartawan et al., 2020). The second type of research is often animal and veterinary science studies that can access data from these information systems to research food system safety and animal health surveillance (e.g., Collineau et al., 2022; Ranucci et al., 2021; Vial & Reist, 2014). The information system is a data source, not the study's primary focus. Notably, concerns over animal welfare outside of their need to meet requirements to be processed for slaughter are absent.

The above works represent the status quo; inherent to their purpose is an acceptance of the current socioeconomic reality that does not value animal life (Mancini et al., 2022). It is my opinion that we should not be contributing to those literatures. If we study animal interactions with information systems, it should be done in service of the animal as a stakeholder, not as a commodity. To do otherwise would be conducting IS research for harm.

The first step to understanding the relationship between animal oppression through information systems is to document the farm management information systems (Lewis, 1998; Tummers et al., 2019) used by the industry. While many of these systems are irrelevant (e.g., crop management or farm finances) to animals, a subset of these systems is used in operations focused on animal slaughter or secondary products such as egg production. As part of documenting these systems, we should focus less on the individual technologies and companies but on the capabilities and affordances offered by these specialized information systems.

An example of this type of research was recently conducted on dairy farm management information systems (Kassahun et al., 2022). Through a review of scientific and grey literature reviews and surveys, researchers identified 50 different information systems used by the Dutch dairy sector and identified 33 unique features of this type of software (Kassahun et al., 2022). Other work in IS on health information exchanges may also guide how to document the existing systems landscape in practice (Sun et al., 2021).

Similar work would be valuable on the information systems used in the meat industry and how they are interconnected. For one software vendor in this industry, there are slaughterhouse, sausage, ham, meat cutting plant, and food traceability management systems offered on their website (IO Cárnicas, 2023). This suggests that the types and uses for these software systems might be complex, with various feature sets that oppress animals.

Once we have a high overview of the different information systems used to oppress animals, we can begin researching how to dismantle those information systems. In the short term, this may target individual features for removal through regulatory mechanisms. We may also propose animal welfare features that are missing from these systems while being cautious that these features improve the lives of the animals, not just the efficiency of a slaughterhouse (Mancini et al., 2022). Sharing our research on those features with animal advocacy organizations is critical as they can influence governmental and industry change more directly.

In the longer term, we can research how these systems can be adapted to meet the needs of a post-animal product economy. It may be the case that these systems need to be dismantled entirely, but if they can be repurposed, it could allow for an easier transition for farmers to begin producing plant-based meats, for example. To attempt dismantling these systems without offering existing farmers and system developers productive pathways could lead to greater resistance and entrenchment of animal suffering.

4.2. Research Direction 2: Re-evaluating Classic Information Systems Development Processes with Animal Stakeholders

The second direction I propose is re-evaluating classic information systems development processes with animal stakeholders. When animals are taken seriously as stakeholders, it does not necessarily upend the traditional systems analysis process but requires us to think differently about conducting those steps. The values we embed in the systems and how we involve the affected population of animals in design (Costanza-Chock, 2020) are critical.

Let us first consider *systems planning*. The primary consideration here is questioning the potential for animal benefit or harm before creating a system. Similar to how green IT initiatives have developed sustainability metrics (Bozzelli et al., 2013), IS scholars could create metrics or ethical questions to consider when planning new systems. In planning for a slaughterhouse management system, it is clear there will be significant harm inflicted on animals, and the system cannot be built by moral actors. However, considerations like the effect of electronic waste or internet of things sensors on wild animal suffering in oceans or forests may be much less apparent, with uncomfortable tradeoffs. This step requires us to seriously engage with the question, "Are we making a better world with ICTs'?" (Walsham, 2012, p. 91) in the context of animal suffering.

The *systems analysis* stage may be radically different, with animals as stakeholders. Unlike humans, we cannot directly ask the needs of animals. Nevertheless, we still need to include them in our design practices (Costanza-Chock, 2020) to the extent that is feasible. As alternatives, ACI research has proposed ethnography (Weilenmann & Juhlin, 2011) to study animal behaviors in their natural habitats and semiotics (Mancini et al., 2012) in which animal responses are observed in digitally mediated interactions with humans. Methods that work for one species may not work for another.

Additionally, the context of the animal-human relation may drastically change the necessary methods. A system interacting with feral cats will have different requirements and ways to discover those requirements than one interacting with companion cats. IS scholars should expand on these systems analysis methods and develop strategies and artifacts, building on our rich tradition of systems analysis in human contexts. This, paired with the interaction design expertise of ACI scholars could prove fruitful.

The *systems design* stage is similarly changed in the context of animals as users. The interactions with the system require unique and varied technologies such as wearables and sensors. Even system evaluation concepts like usability, what it means to like a system (Ritvo & Allison, 2014), or the nature of privacy (Paci et al., 2022) must be reconsidered in the animal user context. ACI research has studied interpretations of animal behaviors for dogs and cats (Baskin & Zamansky, 2015; Westerlaken & Gualeni, 2014), although the vast differences between species may make it difficult to extrapolate to other animals in other contexts. While design *components* are likely better suited for the skillsets of ACI researchers, IS research can contribute to this literature by reconsidering system success and other evaluation metrics contextualized to different animals and their contexts.

4.3. Research Direction 3: Changing Animal Product Consumption Behaviors

When discussing animal suffering, the elephant in the room is the human consumption of meat and secondary products like milk and eggs. In this context, animals are not users of systems but are impacted heavily by system use. There are limits to what we can do to support animals as system users or to eliminate wild animal suffering. Farmed animals, on the other hand, suffer through deliberate human action. This is suffering that could not just be lessened but eradicated through a change in societal behavior and values.

Ideally, applications that value animal lives are developed from the ground up, but we must contend with the installed base of applications (Star & Ruhleder, 1996) used to purchase animal products. IS can contribute through digital nudging (Weinmann et al., 2016) through minor changes to existing applications, such as setting default options to plant-based options. This work could build on the green IS literature for ecologically sustainable nudging (e.g., Berger et al., 2020) and diet behavior change (e.g., Šahinagić et al., 2016). Nudging has the additional benefit of not activating the anti-vegan sentiments of users (Bresnahan et al., 2016). These nudges are a short-term individual marginal reduction in animal suffering but, ideally, send market signals for further plant-based options to food producers.

We should also focus long-term on how to support animal advocacy efforts to change these behaviors. Animal advocates face strong opposition as even ethical dialogues (Schwitzgebel et al., 2020) and pamphlets (Haile et al., 2021) only have minor effects on consumption as most people shield their moral identities from the cognitive dissonance of consuming animal products (De Groeve & Rosenfeld, 2022). IS research could contribute by studying more effective digitally enabled methods for presenting these issues to consumers of animal products. Additionally, working with animal advocacy groups to understand how they strategically use technologies and how they could improve both internal usage and effectively engage legislators for animal policy changes.

4.4. Cleaning our own Plates

The last topic of discussion is not a research direction but a suggestion for the discipline to clean our own plates. To address animal oppression as it relates to information systems, we cannot stop at our journals. While rare in IS scholarship, we must speak out against research that tests on animals and call for neighboring disciplines we borrow from to do the same. We must also develop pedagogies that value animal justice when we teach systems design and ethics (Costanza-Chock, 2020) in our classrooms. Green IS scholarship has questioned the default inclusion of meat in meals we serve at conferences (Watson et al., 2010) from an environmental perspective. I echo this sentiment but from an animal ethics perspective. A refusal to offer food made with animal products at IS conferences would raise awareness among the IS community and show our solidarity with and genuine commitment to ending the exploitation of animals. Even changes on the margin, such as making the default meal options (Watson et al., 2010) vegan, would be a step in the right direction for the IS community. If we cannot even meet our own standards, why should we expect others to listen to what we have to say?

4.5. Limitations

While this work introduces an important topic to IS discourse, it is not without its limitations. One limitation is taking an incremental pragmatist stance on reducing animal suffering. I take this position as it has been an effective strategy for animal rights organizations such as Mercy for Animals[2]. It also allows individuals who do not share as strong of a view on animal rights to contribute and prioritizes immediate harm reduction within existing structures. However, this view is necessarily limiting because it operates in the current socioeconomic landscape. A more radical lens, such as critical animal studies (Best, 2009) or veganarchsim (White, 2012), may produce a different vision for animals as system stakeholders untethered from the assumed constraints of my approach. Additionally, many examples throughout

[2] https://mercyforanimals.org/

focus on farmed animal suffering, but this does not encompass the entirety of human-inflicted animal suffering.

5. Conclusion

IS researchers will not solve the core problem of animal suffering alone. This must be a multi-disciplinary, global effort and societal-level change. It is a project that started centuries ago and will not be completed in our lifetimes. But our contributions on the margin matter. Whether it be a change in our own behavior as individuals, as a discipline, or a larger-scale change influenced by our research, the result is reduced suffering for sentient beings that otherwise would have lived a miserable, cruel existence.

It is my hope that this framework and research directions will provide a starting point for substantive IS contributions on animal suffering reduction on a longer arc toward animal liberation. As IS scholars, we can leverage our socio-technical training to engage with design justice (Costanza-Chock, 2020) for animals. The sheer scale of this problem and our own culpability in its continuance can feel suffocating and shameful, driving us to look away. Instead, we must act.

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