The Human Agency Driverless Cars Must Preserve

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In 2016, we set out to understand the future of driverless mobility — and specifically, how a mobility company can build products and services that will optimize the relationships between people and advanced assistive systems in an increasingly automated future. This case study will shed light on how an ethnographic approach inspired by actor-network theory allowed us to look closely at human-system interactions, build a unique perspective on the forms of agency people value most, and understand how mobility companies can harness this understanding to build automated systems that strengthen their relationships with consumers.

Drawing from the core tenets of actor-network theory, our research placed an emphasis not on individuals or even broader social ecologies — but rather, shifting networks of relationships between humans, objects, ideas, and processes. We divided our resources between two research tracks: i) human mobility, studying the complex network of relationships that gives shape to it, and ii) technology, studying networks of relationships surrounding six analogous advanced assistive technologies that are likely to prove pre-cursors to the relationship between people and driverless cars, ranging from the DaVinci surgical robot to the driverless tractor. While the objective of the former track was to understand the relationship between human agency and mobility, the latter was designed to help us understand how advanced assistive technologies might aid or impede this relationship going forward.

Studying human-system interactions within broader, complex networks allowed us to uncover an insight about agency that is core to how mobility companies should approach automation. Agency doesn't have a single, fixed value to individuals; rather, people derive greater meaning from and thus value agency over higher-order tasks and responsibilities — often revolving around role determination and fulfillment, such as "being a good father" or "being a precision farmer" — much more than they enjoy and value agency over lower-order tasks — like paying the household bills, or keeping track of contracts with farm suppliers. The people studied aspired to preserve their enjoyable agency over higher-order tasks, and thus perceived automation as most helpful when it liberated them to higher-order responsibilities by removing the burden of lower-order ones.

This understanding allowed us to see that mobility companies can reframe mobility as much more than about getting between destinations. Instead, they should see mobility as a broader and more valuable system within which automation can be used to lessen users' burden of control over lower-order tasks, while augmenting people's agency over the most meaningful tasks. This could mean, for example, using automation to remove the lower-order task of navigation, so drivers can focus on curating a unique set of destinations through a city for their passengers; or removing pain points around parking that might dissuade a driver from driving to see a friend, so drivers can focus on higher-order social tasks like setting the mood for a great dinner. Since this study, this focus on unlocking the higher-order value of mobility has become a part of our client company's approach to driverless cars and advanced automated systems. This case study will invite social scientists to consider how we might refine and continue to apply this actor-network inspired approach to build an even more granular ambition for the future of automation in mobility.

INTRODUCTION

In 2016, ReD Associates was commissioned by an automotive client — we'll refer to them to as "A Auto" going forward — who recognized the potential of an anthropological approach to help them solve a conundrum: What value could they deliver to people through driverless vehicles? This case study will shed light on how we built a perspective on the experiences and forms of agency people value most in a context where automation has the ability to take tasks off people's plates. Our use of actor-network theory as an analytic frame helped us to distinguish between the types of tasks people wish to have automated and those they may wish to continue to perform, and how to let users have agency even when tasks are being automated.

BACKGROUND

Of the many transformative technologies crowding today's airwaves, driverless vehicles are arguably being touted as one of the most transformative, predicted to change the auto industry, how people move, and our experience of the urban environment. They are likely to become one of the next major digital platforms, like the smartphone, on which a raft of new integrated services will be offered to people powered by personal data and connectivity. This belief has fueled and been fueled by massive new investments, like Google's self-driving car project which began in 2009. By the mid 2010s, competitors ranged from established automakers to new entrants like Tesla to tech giants like Apple, to mobility service companies like Uber.

Until 2016, most of these competitors had been busying themselves with the complex engineering challenge of developing the hardware necessary for a car to drive itself without human intervention on any road in any condition. But "A Auto" was keen to explore what driverless cars could do for people after that had been achieved. Most driverless car competitors could agree that taking the driver out of the driving equation would result in safer, more efficient, more predictable and cheaper journeys from A to B (Reiner et al 2015). But "A Auto" wanted to explore more fundamental, higher value benefits of AV – once people are relieved of the task of driving what new valuable activities and experiences could be offered in its place, and what challenges of living in cities might driverless cars be able to alleviate? In order to deliver on their promise to do really big things for people that went beyond getting from point A to B, they approached ReD for a human perspective on the experiences that would make driverless vehicles meaningful to people, families, communities, and cities.

This is not the first piece of ethnographic research of its kind. It adds to a conversation started in previous EPIC work on mobility and autonomous vehicles — such as Stayton, Cefkin, and Zhang's research on autonomous vehicles at Nissan (2017) — contributing an argument as to how mobility companies can begin to segment and prioritize tasks for automation. The authors of this paper believe that we need to understand how outsourcing human agency can impact core roles associated with an individual's identity. An ethnographic toolkit is helpful for understanding how people can still feel purpose and relevance when the future is increasingly providing more limited opportunities to signal and express a core aspect of humanness—intelligence and agency.

In the following pages, this case study will shed light on the unique methods we employed in our ethnographic work with "Auto A" that allowed ReD Associates to look closely at people's relationships to mobility and automation through the lens of helpful relationships to both people and things. Recognizing the utility of objects within peopled networks is a unique proposition of actor-network theory. We used it innovatively as a point of analysis for our study to understand how non-human objects (both with and without autonomous capabilities) contribute to an individuals' goals that go beyond accomplishing daily tasks. That is, how does technology help someone become better in their myriad roles as caretaker, entrepreneur, or adviser? Our answers to this question helped us develop a framework that allowed "Auto A" to distinguish between roles that users wanted to maintain agency over and why it was important to do so. We then highlight specific challenges and recommendations for researchers that broadly apply to practitioners within the autonomous vehicle space and those struggling to define value propositions that are hazy and unimpactful.

RESEARCH

ReD Associates has been working with this automotive client for a number of years, which was long enough to have established some appetite for a social science-based research approach within the company. Not having to start from a place of fighting for the validity of a social science-based approach set the ReD team up to gain approval for an ethnographic approach.

The insights that "A Auto" needed in order to push forward in autonomous vehicles — insights into what value automation might bring to the mobility space, and how it should show up —are difficult to elicit using surveys, focus groups, or interviews. Ethnography, in contrast, allows researchers to take a holistic, hypothesis-free look at people's lives; be exposed to the full range of needs, challenges, and aspirations that might be relevant for innovators; and observe hierarchies of value and meaning in action. The simultaneous breadth and thoroughness of an ethnographic approach nicely mirrors the virtually infinite list of valuable experiences that might take place in a driverless vehicle. More importantly, it offers unique potential for narrowing this list down.

ReD's strategy for taking on the challenge of observing the future in the present was fourfold.

Selecting a broad research phenomenon

ReD projects start with the selection of a core research phenomenon. It differs from traditional scoping because we attempt to ground the project in something that is observable every day—and therefore a core element of human experience. We selected "the helpful relationship" as the study's core research phenomenon because of the potential for assistive devices to upend a universal and ubiquitous role. By studying what people in everyday situations experienced as helpful and the nature of their relationship to the things or actors that were helping them, we hoped to answer two core questions —what and a how. What sort of help would people value from autonomous vehicles? And how should that sort of help be delivered? (Help, in this case, could come in the form of addressing a problem, or enhancing or delivering a valuable experience.)

Framing the project as a phenomenon drastically widened the team's possibilities for observation: While they couldn't observe the habituated use of a driverless car within respondents' everyday contexts, they could observe the wide range of needs that driverless cars could eventually deliver on. The team could also observe the habituated, in-context use of more common, analogous technologies that provide help — such as a family's in-home interactions with Alexa, or with a vehicle's automated parking features. What's more, they were able to study helpful relationships beyond those with technology — considering, for example, carpooling systems; interactions with personal assistants; or forms of assistance exchanged between family members and friends. The last benefit of studying a phenomenon as spacious as "the helpful relationship" is that it allowed the team to get beyond the hypotheses and biases built into existing technologies, and open the client up to new forms of value they might strive to inject into consumers' lives.

Dual research tracks

"The helpful relationship" was studied through two main research tracks — human mobility and technology — mirroring these two core research questions roughly (but not exactly). Designing the research in this way allowed the research team to carry out ethnography that was more conducive to success in this project insofar as it i) ensured coverage around both what value driverless vehicles should deliver and how, and ii) allowed the team to observe a range of "helpful relationships," from more mainstream to more marginal and cutting edge.

Human mobility – In the first research track, human mobility, researchers sought to answer questions like: What is the role of the vehicle in people's lives today? What is the role of mobility? What is it that people are 'connecting' when they make use of mobility solutions? What forms of help and value do people experience as the move amongst the settings of their day-to-day lives? And: What unmet needs and aspirations remain? The hope was that this track would primarily shed light on what sort of help people might value from autonomous vehicles.

Relying heavily on ethnographic interview and observation (including ride-alongs), the researchers spent 1-2 days embedded in the everyday lives of people across five global cities selected on a spectrum from advanced mobility infrastructure to basic mobility infrastructure. Each researcher was tasked with gaining an in-depth understanding of not just one core respondent, but of their day-to-day relationships to mobility, technology, and broader social ecologies. Over the course of five weeks, the project team met with 32 respondents and 5 fleet vehicle systems (businesses that use multiple vehicles as part of daily operations). (While the project's initial research plan also included ride-alongs in driverless vehicles on the client's testing grounds, this was ultimately excluded from the study for logistical reasons.)

Proxy technologies – It was the second research track — technology — where the team was able to most freely explore and unpack the how aspect of "the helpful relationship:" How should help from autonomous vehicles be delivered?

This second research track brings us to a third aspect of the team's approach, - observing people's relationships with already existing proxy technologies. Looking to the world's most advanced and embedded assistive systems, the goal of this research track was

to understand the complex interplay between people, advanced assistive systems, and ideas that makes these systems successful or not; and to extract principles that could be applied to autonomous vehicles. They sought to investigate questions such as: What is the user experience of interacting with an advanced assistive system? How do people experience help from automation? When does automation bring value to their lives, and when does it cause resistance? Where do people wish they received more help?

This research track centered around seven half-to-full-day immersive deep dives in which the researchers could observe the relationship between practitioners and advanced assistive technologies. Visiting sites across four global markets, the team was able to observe interactions with the Da Vinci surgical system, the John Deere autonomous farming system, Disney World's MyMagic+ smart pass system, a Boeing Autopilot Flight Training Simulator, the Roomba vacuuming system, a machine-learning-powered vial filling assembly line in a pharmaceutical factory, and an experimental digital system that puts computer algorithms at the center of the industrial design process.

Drawing inspiration from actor-network theory

The team employed an approach inspired by actor-network theory. The hope was that understanding and mapping out relationships between humans as well as humans and technologies would help produce insights that could be used to optimize the relationship between people and driverless vehicles, and perhaps even the relationships between driverless vehicles. For each of the proxy technology studies, as well as key helpful relationships and systems observed, the researchers went through a process of asking and mapping: What does the system do? Who and what is involved? What flows of information and activity can we observe? And: what makes these 'flows' successful or unsuccessful?

Triangulating with existing perspectives

Finally, field research was triangulated with existing perspectives on the future of automation and autonomous vehicles through a combination of desk research and interviews with over 25 analogous systems experts, human science thinkers, and user experience and design practitioners. These interviews proved invaluable to the team in understanding existing assumptions and orthodoxies around the future of automation, as well as both mainstream and marginal narratives on the what and how of autonomous vehicles' potential future value.

KEY FINDINGS AND TAKEAWAYS

We exist in a cultural moment when the boundaries of automation are undefined. Many discourses overlook human agency entirely, promising that "intelligence" will in time infiltrate just about every aspect of human life — from how we cook and shop, to how we date, work, create, travel from A to B, and much more.

Perhaps the greatest victory of this project was that the insights delivered to "A Auto" shifted the emphasis from where automation *can* play a role to where it *should*. At the core of these insights was a model that outlines the three universal, high-level needs that people have around experiencing meaning and value in their lives, and clarifies the relationship between these needs, technology, and mobility. This model helped "A Auto" get closer to answering

the what component of this project's research mandate — What sort of help would people value from autonomous vehicles? — narrowing in on three 'domains of value' within which to conduct further research and innovate. It has since become a key component to how "A Auto" seeks to deliver value to its consumers in and beyond its automation efforts, and is used frequently in departments as disparate as branding and service development.

While this universal model cannot be disclosed in this case study for confidentiality reasons, this case study will disclose a secondary component of the insights: three universal principles for developing valuable and agency-aware automation. These principles touch at a high level on both the what and the how of the project's research mandate: what roles assistive systems should and should not take on in the mobility space and beyond, and how they should behave.

Not all tasks should be automated

While this universal model cannot be disclosed in this case study for confidentiality reasons, this case study will disclose a secondary component of the insights: three universal principles for developing valuable and agency-aware automation. These principles touch at a high level on both the what and the how of the project's research mandate: what roles assistive systems should and should not take on in the mobility space and beyond, and how they should behave. Whether studying precision farmers, pilots, or surgeons, ReD observed that there's a certain realm of human activity in which automation is unwelcome, and another realm in which it's very welcome if done right. Agency doesn't have a single, fixed value to individuals. People are often more than happy for automation to take over more logistical, tactical tasks that are experienced as tedious or menial — "low-level tasks" — and particularly those seemingly unrelated to the high-level roles and goals people aspire to fulfill. In contrast, they tend to resist automation that attempts to take over "high-level responsibilities:" more strategic, big picture; curation, decision-making, and execution — often around fulfilling certain roles or goals, such as "being a good father" or "running a sustainable more farm."

Low-level tasks are fairly easy to spot. For the precision farmer, a low-level task might be calculating the right amount of fertilizer to order from a distributor, or predicting how many days you will need a piece of rental equipment given a certain planting cycle. For a father, a low-level task might be doing the family taxes, or planning, cooking, and packing kid lunches for the week.

In the case of low-level tasks, the value of automation often trumps the value of agency. In general, people derive very little meaning, fulfillment, or enrichment from carrying out true low-level tasks — they tend to find them burdensome distractions from the high-level tasks that matter most to them. These are the tasks that automation can more or less remove from people's plates, and where tech can reasonably be expected to show up with credible solutions in the next decade without too much of a capability stretch.

High-level responsibilities can be less easy to spot without a holistic lens: they are often highly individual and contextual, and lack clear markers for completion or success. For the new retiree, a higher-order responsibility might be feeling fulfilled after a career has ended by strengthening existing relationships. For an overworked manager, it might be ensuring time for self-care and relaxation. For someone who has recently moved, it might be making new friends by starting new hobbies.

In any case, people are completely and unequivocally demanding agency over these high-level responsibilities, as well as the decisions and behaviors that seem to directly support them. Not only do these higher-order responsibilities provide an opportunity to engage in strategic, big picture decision-making, but success is often highly meaningful. Succeeding in higher-order tasks can help someone connect to or strengthen their identity, or attain value in the form of pleasure, mastery, status, or personal enrichment. Humans, objects, ideas, or processes that get in the way of people engaging with these high-level responsibilities are getting in the way of all the forms of fulfillment and meaning they potentially offer. This is the form of human agency automation must preserve.

One key exception to this framework is when a task that may appear low-level is actually directly tied to a much higher-level responsibility in a person's life, and thus becomes a task in which it people see value in investing hands-on time and energy. Cooking might be considered "low-level" to a busy working mother who is primarily concerned with being a better friend, family member, and entrepreneur; but the task may in fact feel quite "high-level" to an aspiring chef, an avid host, or someone who sees cooking as a means to the more grounded and relaxed life they desire.

It is not a new idea that tactical, routine tasks will be the first to be automated. But the reason to not automate strategic, higher-order tasks has historically been about the limitations of technology. Recently, the narrative around the value of automation has increasingly set its sights on the automation of higher-order tasks as a way of bringing value to consumers. This work challenges that ambition. Doing so may be technologically possible, but we would argue that in many cases it will not be experienced as particularly desirable or helpful.

Automation should always allow people to retain a sense of overview and control

When delivering help with these low-level tasks, automation must be executed in such a way such that the user always retains both overview and control. ReD observed that when advanced assistance systems removed users' ability to understand, oversee, and even toggle or intervene in the automation process — disrupting their pulse on when automation was happening, what it was doing, and why — they felt these systems had gone too far. This experience left them feeling vulnerable, and helpless against a hypothetical situation wherein they needed to step in, make a change, or leverage information around a low-level task to course correct within a high-level one. The surgical pilot studied by ReD highlighted this fear of helplessness, saying: "If the system makes a mistake and I can't quickly get an overview, I can't intervene." The precision farmer expressed a similar desire to feel like the central control hub of an automated system, saying: "I want a system that puts me at the core."

Providing overview and control is not only important because of how it makes people feel; it's also critical for ensuring that automation does not result in their deskilling. When people do not have overview and control over low-level processes — because of automation or otherwise — these processes become a black box to them, and impede the sort of big-picture thinking needed to carry out high-level responsibilities like strategy and curation. In contrast, when automated systems collect, organize, and communicate data that provides people with a sense of overview and control over low-level processes, they can augment the

sense of agency and expertise people bring to carrying out their high-level roles and responsibilities

Automated system interfaces should make the limits of their capabilities clear

The third and final principle ascertained by the ReD team is around how automated systems should communicate with their users. In short, anthropomorphism is not the answer. This study and countless others conducted by ReD have surfaced endless moments of people struggling with voice assistance technologies, frustrated by the gap between the expectations conjured up by an anthropomorphic interface and the reality of its lackluster performance. People are frequently raising their voices, cursing, making fun of, trying to subvert and outsmart, and sometimes ultimately dismissing anthropomorphic technologies — from automated customer service systems to Alexa and Google Home to in-car navigation systems. Despite this, UX conversations around how advanced assistive technologies should feel almost always draw upon a suite of possible personas. Should it feel like a partner? A wise council? A friend? A servant?

Embedded in these conversations is an assumption that it's a human relationship people seek when they interface with robots. In fact, the people ReD studied would rather carry out "dumb" or repetitive interactions with an interface whose capabilities were limited but clearly defined than have natural, smart, or varied interactions with an anthropomorphized interface like Siri that does not make the boundaries of its capabilities clear — and thus, is liable to disappoint. This study suggested engaging with automated systems should feel less like interacting with a human and more like interacting with a dog. People know what their dogs are trained to do, and have a limited set of fixed commands — almost like verbal buttons — they can employ to activate these behaviors. The result is that people feel a relative sense of overview and control — an in turn, a stronger sense of agency.

REFLECTIONS ON RESEARCH AND IMPACT

Research is inevitably different in theory than in practice. In the case of this study, the team's China researcher was briefly detained outside of Chengdu when his investigation into "how people live" was deemed suspicious. In Munich, a terrorist shooting in a shopping mall resulted in the team's Germany researcher hosting a temporarily displaced client in his Airbnb for the night. Upon arriving at a house in Dallas, another researcher was reminded that autonomous vehicles will inevitably play a role in underground economies — including the one responsible for furnishing this particular home with piles of drugs and cash.

More pertinently, there were methodological challenges. The most significant of these had to do with the broad scoping of the research, and in particular, the question: What sort of help would people most value from automation in the mobility space?

In theory, almost any valuable task from normal life could reasonably be transported to the interior of a driverless vehicle, just as new mobility solutions could realistically connect people to just about any valuable experience. This reality altered what the research team originally thought was a reasonably focused research question — What sort of help would people most value from automation in the mobility space? — into one that was almost impossibly large. The challenge it introduced during research was that no observation was obviously out of scope: researchers had to be ultra-alert, attuned to every last need and

aspiration in the event that they might — in conversation with those observed by other researchers — be core to identifying a fundamental value proposition for autonomous vehicles.

While challenging, this level of breadth was not ultimately insurmountable. This level of breadth did, however, mean that both the universal needs model and automation principles ReD developed for "A Auto" were very high-level, and in some instances ultimately difficult for the client to translate into concrete experiential solutions. There's a strong case to be made that a more iterative approach to ethnographic research — conducting several weeks of research to arrive at the big idea, and then returning to the field to flesh out subthemes and collect more granular data — could have helped avoid this difficulty with translation. As it stood, this project ended with ReD and "A Auto" having identified clear domains of value around mobility and automation. The logical next step would have been to make these domains of value prescriptive, using additional granularity from the field to define clear principles to follow and key levers to pull within each domain.

Another notable challenge was in layering actor-network theory onto the team's ethnographic research and analysis. Initially, the ReD team set out to map out the networks of humans, objects, ideas, and processes observed in the field, and to use these maps to analyze key relationships and dynamics. But applying actor-network theory requires an analytical jump whereby humans, objects, ideas, and processes are all given equal weight, and display behaviors and states — including success and failure states — that can be described using consistent language. While the team found it fairly intuitive to anthropomorphize automated systems — describing the Da Vinci surgical robot as intrusive or socially inept, for example — describing the behaviors of concepts and processes in common terms proved much more difficult.

The result is that the network maps that came out of this project looked more like behavioral maps, or maps of systems: They were very logistical, practical, and did not include ideas as agents. This is not to say that the outcomes of the study were greatly diminished. The systematic lens provided by actor-network theory remained helpful insofar as it illuminated mobility systems that "A Auto" could potentially own in the future, as well as connections they could make to other systems through partnerships (e.g. retail networks). However, a more rigorous application of actor-network theory — and particularly one that places greater emphasis on ideas as agents — could potentially open up new possibilities in future technology studies. Understanding the ideas that surround people's helpful or unhelpful relationships with technology, for example, might surface implications for branding and storytelling.

The third point to be made is not around a challenge so much as an area for methodological growth. ReD's more recent exploration of proxy technology assessments in its methodology has begun to highlight how fruitful it might have been to study mobility settings analogous to the driverless vehicle that could stand in as proxies — for example: taxis; shared second-order mobility experiences like Uber Pool; or contexts like carpooling systems, in which the driverless experience is orchestrated through a social exchange. Expanding the research to include these proxy sites would have helped the research team to establish a stronger foundational understanding of the default behaviors and higher-value experiences present in existing driverless mobility contexts, and more clearly articulate how future contexts might offer a departure.

Fourth, despite our continued work with "Auto A" there were a number of conceptual jumps they needed to make that involved getting outside of the engineering and design domains they traditionally work in. It's worth noting that this is not an easy mandate. Picture a driver, sitting in his or her car. Now imagine that this driver no longer has to drive the car. This means that the car no longer needs a forward-facing driver seat. In fact, the inside of the car no longer has to look the way it previously did at all. And suddenly, this driver could be doing any number of things as that vehicle moves towards its destination: sleeping, working, exercising, bonding, meditating, playing video games, shopping, cooking, eating, watching tv, listening to a podcast, reading a book, learning, hosting a meeting — the list goes on. Each of these new use cases stands to change how people evaluate and choose between mobility options — and thus, the types of journeys for which a vehicle might be used; the types of experiences to which a vehicle might connect people; and ultimately, the forms of value a vehicle delivers in people's lives.

"A Auto" also faces an additional challenge beyond understanding the value of autonomous vehicles. The digital age increasingly asks companies that have historically excelled at manufacturing to compete for a position much higher up in the value chain — delivering not just physical products; but the layers of services and experiences that can now be built on top of them, delivering margins previously unobtainable to manufacturing companies. Competition is no longer happening exclusively on the factory floor, so much as in the design rooms of companies like Apple; where a wealth of experience, instincts, and data is harnessed to connect with, engage, and deliver value to consumers in unprecedented ways.

At the time of this project, a bold subset of voices within "A Auto" had the vision to recognize a shift in the modus operandi of companies like them, and were beginning to advocate for the company's own internal shift towards building services and experiences. There wasn't a strong consensus around exactly how to drive this shift— should the consumer perspective be the domain of a growing UX department? An advanced design department? Consumer insights? But there was consensus that it was critical for "A Auto" to invest in developing its own deep understanding of — and instincts around — the mobility experiences that consumers would value most, and build a value proposition for autonomous vehicles rooted in this understanding. This consensus came from the flourishing of a culture of focusing on the customer as an antidote to a growing awareness that many automotive innovations from the past ten years had not delighted customers in the way engineers had hoped. Enlisting help from ReD was one of the first instances that these voices were able to break through to the powers that be — from the head of engineering to the head of strategy to the CEO — and get them aligned around a single agenda point.

CONCLUSION

If technology refers to "the art, skill, … way, manner or means by which a thing is gained," ethnographic research is today a technology as valuable as any. In a landscape where a suite of emerging technologies is predicted to radically alter the way people live, ethnography can help companies to refine their expectations — recognizing the universal human needs, aspirations, and forms of agency amongst which the value of various technologies is determined. More importantly, it can illuminate a path forward for

companies where meaningful experiences trump the novel and high-tech. With some refinement, an ethnographic approach informed by actor-network theory can potentially take this value a step further, helping companies take a more holistic approach to driving value through new forms of automation — going beyond systems design to consider for example the language, storytelling, and interface aspects that can affect the success of an assistive technology.

For "A Auto", an ethnographic approach to the challenge of creating value in autonomous vehicles highlighted key domains of value in which "A Auto" should concentrate its efforts, as well as key initial principles for doing so. Automate low-level tasks while preserving or even augmenting agency over high-level, strategic ones; Allow people to keep a sense of overview and control over any automation; Avoid anthropomorphic interfaces.

These principles add up to a few key statements about human agency in an age of automation. First, agency is variable in value depending on the task at hand and how this task fits into people's higher-level goals and roles. Second, even where agency holds little value for people, they are highly sensitive to its removal, and expect to be kept 'in the loop' enough that they have the ability to reassert agency at any point in time. And third, agency means no surprises — and people experience automation that acts smarter than it turns out to be as a highly unpleasant surprise.

The limits of this study's impact highlight the value of iteration in ethnography, as well as yet unexplored possibilities of proxy technology assessments and actor-network theory more rigorously applied. But more than anything, they point to ripe territory for methodological exploration and refinement — and within this territory, the rich opportunity for ethnographers to help shape an automated future that enhances and augments human agency, in and beyond the vehicle. Despite our focus on autonomous vehicles, the hope is that this study will offer a building block — both for companies looking to establish meaningful value propositions for emerging technologies, and for ethnographers looking to push forward their methods of studying them.

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