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“Interview with Things:” A First-thing Perspective to Understand the Scooter’s Everyday Socio-material Network in Taiwan

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ABSTRACT

In the city, mobility is calling for new forms of smartness. To understand what is needed to design thoughtful forms of smart mobility, this paper combines thing ethnography and animistic research approaches to reveal the interwoven networks of personal and social relationships that develop around scooters in Taiwanese everyday life. To this end, a three-day study with six different types of scooterists was conducted in Taipei. Cameras and sensors were directly attached to the scooters themselves, to collect data from a 'thing' perspective. The data collected were then organized and offered to professional actors, who were invited to 'speak' on behalf of the scooters. Through the performance of the actors interpreting and empathizing with the scooter's everyday life, intents, expectations and relationships between scooters and scooterists were revealed and captured. We further discussed how the socio-material networks among scooters could provoke various creative and meaningful arrangements in everyday life.

Author Keywords

Smart mobility, thing ethnography, scooter, Taiwan

ACM Classification Keywords

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

INTRODUCTION

As James J. Gibson [13] said, mobility has been one of the cornerstones shaping our humanity. The ability to move and change perspectives affects not only how we perceive the world, but also how we imagine the world. From crawling to walking, from the saddle to the hover board, the

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flourishing means of movement not only lead us out of the cave in Plato's allegory, but further change the ways we live and the relationship among people, things and environments.

With emerging new technology and innovation, the future of mobility is always an exciting issue. Tesla Motors has launched several electric cars powered with cleaner and more sustainable energy systems. More than enhancing the efficiency and the sustainability of the vehicle, Tesla has also devoted itself to enriching the driving experience using its smart agent and smart interface. Using various embedded sensors and actuators Tesla collects data rich with fruitful insights and patterns for the optimization and customization of the product and system. Likewise, the Taiwan-based company, Gogoro, aims to propose new ways of imagining mobility through the power of emerging technology. Behind its Smartscooter and its energy system, there are over 80 sensors continuously learning people's riding patterns in order to better facilitate different use habits and to find ways to save energy. Along with the vision of the Internet of Things (IoT), the concept of “the Internet of Cars” even opens up various opportunities for us to share real-time information among individuals or to cooperatively map out the state of the roads in a city [37].

With the emergence of new technologies, it is becoming widely believed that a vehicle should be seen as an interactive system that both intertwines with people's everyday life and connects their life together with various related products [37]. Faced with these emerging opportunities and challenges in the scope of mobility design, we need to improve our understanding not only of developments in cutting-edge technology and new structures for connecting products, but also our understanding of the socio-cultural relationships which develop among designed artifacts and people.

Recent IoT studies highlight different challenges. First, most IoT developers are still limited by a technology-driven approach and by a sense of technological determinism. In order to understand people's everyday life and practices, a more human-centered design vision is needed [17]. Second,

surrounded by numerous connected objects, users need a more understandable and friendly way to exert control and to cooperate with one another [39]. In addition to these concerns, researchers and developers also need a new approach to understanding the social network which evolves between people and objects [12]. Third, a more flexible and cooperative product/system is essential to react to the changing complexity of everyday life [27]. To sum up, in order to construct an IoT ecosystem where people and things (both of the smart and the dumb kind) could appropriately collaborate, not only the technical and material dimension should be recognized, but the relationship and social meanings between things and people should be more carefully considered. However, current approaches in mobility design have mostly focused on energy consumption, efficiency optimization, and sustainability and customization. To understand people's complex relationships with things in everyday life, a new research approach is needed.

From the perspectives of material culture studies and science technology studies, several researchers have conducted insightful studies about the history of transportation. Hebdige vividly illustrated the changing images of scooters from the 1920's to the 1960's in Italy and England [15]. Analyzed using three “moments” – the production, mediation and consumption - of the scooter, for example, it is clear that the design of scooters was dynamically influenced by manufacturers' promotional efforts and by the use and appropriations of the users. From these narratives, we can see that they have never merely been seen as functional vehicles, but also as means of self-expression and as links among communities. Focusing on the same object but in a different field, Lai conducted a study about scooters in Taiwan from the Japanese colonial period to 1970 [18]. During the colonial period, a scooter was both an admirable luxury and a frightening representation of governmental authority. As scooters became more affordable for lay people, scooters started to become involved in various lay practices and daily life, such as commuting, goods transportation and picking-up children.

Informed by these studies, the fruitful socio-material relationship between scooters and people is being revealed. Recognizing the interwoven relationships and empowerments surrounding the scooter in our society, we argue that the vehicle shouldn't be studied merely as an “object” arranged by people, but as a “subject” that co-performs daily practices with users and has a social impact on people's everyday life [11]. In other words, an intersubjective ontology and epistemology are needed to capture and further illustrate the various relationships and empowerments of a scooter.

In the HCI and IoT disciplines, discussions about the impact and potentials of things are also rising. Given the pervasiveness of sensors and actuators, Blecker described

a specific type of connected products as “Blogjects”: objects which are able to monitor their statuses and further blog these data [1]. The eyes and ears of these blogjects not only witness invisible facts for us, but could even have a political impact on various social issues [1, 43]. The IoT research team - ThingTank – argued that objects shouldn't just be seen as research objects, but as co-ethnographers and co-designers in research and design processes [3, 10, 12]. Via a metaphor of enchantment, Rose illustrated the thoughtful qualities within well-designed interactions between people and smart products [34]. As things become smarter, these various social impacts and the possibilities emerging from them call for a proper lens with which to observe them.. By seeing things relationally and symmetrically, we proposed the “Interview with Things” as a means to make sense of data collected through thing ethnography and in this case reveal the nature of the scooters in Taiwan.

In the remainder of this paper, we will first review several related works which provide the epistemological and methodological background to understand things symmetrically. Then, the research field – the scooters in Taiwan – and the research method –an interview with things – will be introduced. With a thing oriented ethnographic data collection method and first-person perspective data interpretation provided by professional actors, “interviewable scooters” are constructed. Along with the interviews, we reveal and capture various insights about the social relationship and the intents of Taiwanese scooters in everyday life. Finally, we discuss how understanding the social networks among things can be beneficial for designers to craft a more engaging and appropriate product/system. The paper concludes by proposing the use of relation-focused design speculation and performance to provide some perspective into the socio-material networks which exist among things and people in an everyday context.

SEEING FROM A ‘THING PERSPECTIVE’

Over the past decade, several observations have been conducted in HCI to better understand how things are positioned within socio-material networks [16, 28, 30]. Some studies in particular, have looked at competences and skills as being co-constructed through collaboration between humans and nonhumans. For example, Wakkary and Maestri [42] illustrate how daily objects and environments cooperate with people to shape a family's routines in a study of domestic everyday appropriations. Even more radically, Rosner [41] discusses how even materials collaborate to shape everyday objects and practices, such as in the case of traces of glue left on the side of the press of the bindery that accumulate over time to affect the properties of the bindery and how it works.

More recently, approaches in HCI, informed by an explicit methodological de-centering of the human, have opened up new opportunities to capture and understand the socio-

material arrangements that develop around things [10, 12], echoing the growing idea that artifacts have a different perspective on everyday life than people [3, 4, 6, 21]. These approaches are informed by prominent accounts in the social sciences and philosophy such as Actor Network Theory (ANT) [20, 38], New Materialism [41], and Object-Oriented Ontology (OOO) [7]. Despite their different stances, the fundamental argument of these schools of thought is that nonhumans and humans should be considered symmetrically if we want to gain a better understanding of the socio-material networks in which nonhuman things are embedded.

Alongside explicit methodological reworkings of this asymmetry in HCI research [10] are also design paradigms such as neo-animism [24]. Animistic approaches aim to facilitate speculation about the complex relationships among people and things in ways designers can empathize with. As several ethnographers and sociologists have pointed out [5, 14], an animistic way of thinking has long existed in human society to suggest how we should imagine and interact with the things we encounter. In the age of smart artifacts, according to Marenko [24], neo-animism “offers a bold new way to rethink the complexity and pervasiveness of the world full of things that talk to each other and to us.” Animistic narratives are the embodiments of how people imagine and understand things in their everyday life; in a lively way they express the functional values and socio-cultural meanings of the things that people look at. The emotional and social relations among things and humans are not just a human projection, but also the embodiments of the networks in which things co-inhabit with other actors. These narratives appear to be an effective way for designers to understand and work with the socio-material nature of things [24, 34].

Animistic approaches have entered the HCI discipline recently. Philip van Allen et al.’s “AniThings” [40] showed the potential contribution of animism to interaction design. By assigning multiple characteristics to smart artifacts, people can feel less passive and more engaged. Both Laschke’s “Things with Attitude” [19] and Rozendaal’s “Objects with Intent” [36] focus on how to negotiate values and intents within the interaction between things and people. The Addicted Toasters project by Rebaudengo [32] similarly speculates about a new social relationship among things and humans when things develop more of their own interests and desires. By giving things a more central position in design, various opportunities are emerging for ideation and conceptualization. However, there is a growing need for methods that can facilitate a bridge between animistic imagination and research insights generated in the field through a ‘thing perspective’ [10].

Thing ethnography [10] is a methodological approach to access things’ everyday trajectories and gain novel insights into their socio-material networks. In the Thing Tank pilot study [12], three daily objects – a kettle, a cup, and a fridge

- were enlisted as co-ethnographers and instrumented with time-lapse cameras and sensors. Data, patterns and unexpected insights were accessed and revealed from the perspective of these three objects [10]. Thing ethnography provides a thing-centered way to access insights that may fall out of our awareness or sense of relevance. For example, making a phone call or doing push-ups when the kettle is boiling water might be seen as unremarkable. However, looking at it from a thing perspective reveals how the kettle creates empty time that people feel compelled to fill with other activities. In this way, thing ethnography opens up a fresh way to access the ‘unremarkable’ impact of things on our lives and to identify design opportunities.

In order to effectively cooperate with things as co-ethnographers, we need approaches for analyzing and making sense of collected data. In the data analysis sessions of Thing Tank [10], the collected photos were presented to designers and ethnographers in the format of timelines to place stress on the sequence of events and were used to unpack the trajectories of objects. In this way, the movement, temporality and agency of things were revealed. As a different experiment, the use of object personas [3] made it possible to develop an animistic approach to the analysis of collected data. By inviting participants to speculate on the inner life and social relationships of the objects, object personas use defamiliarization as a strategy to explore and make sense of data. By considering the objects as agents, object personas allow interactions and relationships among things and people to be vividly described and portrayed.

In this paper, we discuss “Interview with Things” as a novel method to make sense of data from thing ethnography and to develop insights into the socio-material networks in which the scooter as a ‘thing’ is embedded in Taiwanese everyday life. Compared to data analysis sessions, “Interview with Things” aims to create a way to empathize with things from a first-person point of view rather than from a third-person perspective.. Compared to object personas, “Interview with Things” aims to be more immersive for the designer and thus to better facilitate the transition from analysis to creative ideation.

INTERVIEW WITH THINGS: TAKING A ‘FIRST-THING’ POINT OF VIEW TO MAKE SENSE OF THING ETHNOGRAPHY data

“Interview with Things” aims to access and illustrate things’ subjectivities and agency. Both multi-stakeholder data analysis sessions [10, 12] and object personas [3] are used to interpret collected data through an animistic metaphor. These methods have proved themselves to be a useful way for researchers to understand things as social actors with their own intents and life. However, in these cases, while the data was collected from a thing’s perspective, data interpretations were mainly constructed from a ‘third-thing’ perspective. While the ‘third-thing’ perspective gives researchers a broader scope to look for meaningful and unexpected patterns, and potentially reach higher levels of

abstraction in correlating events, we believe that a ‘first-thing’ perspective” can be helpful for researchers (and designers in particular) to help them empathize with the given data, to “step into thing’s shoes” and gain richer understandings about things’ social lives. To step into one’s shoes, role-playing [31] has been widely applied to portray and empathize with certain users. Similarly in the case of things, this type of role-playing is not anthropomorphization. Rather it is a technique that uses the acting out of things’ particular attributes as a way for humans to access, make sense of and empathize with the “always withdrawing” inner life of things [7].

To better “step into the thing’s shoes”, human actors were recruited to act out the inner life of things. Applying professional actors’ skills in HCI research is not new. Role-playing methods have been widely applied in the so-called “wizard of OZ” experiments [26] and as a way to emphasize particular qualities and contexts of experience [44]. Empathy is a defining characteristic of designer-user relationships, and it positions design methods in terms of “dynamically shifting relationships” between designers, users, and, in our case, things.

Able to capitalize on well-trained skills and professional experience, we assumed actors would be well positioned to speak for nonhumans. On the one hand, they are trained to empathize and ‘give life’ to humans, artifacts or even abstract objects without form (e.g., water or air). They are also more used to feeling and imagining from a “first-thing” point of view rather than analyzing from a third-person perspective. On the other hand, they are trained to express ‘life’ to audiences and could therefore be the ideal bridge between the thing and the interviewer (researcher/designer).

Based on these considerations, we characterize “interview with things” as a constructive and speculative approach for interpreting the data collected from a thing perspective, which uses a ‘first-thing’ point of view as a way to emphasize and empathize with particular qualities and contexts of a thing’s experience. Similar to role-playing [31] and also design fictions [23, 25], “interview with things” is primarily concerned with the richness of insights and inspiration generated in the process, rather than with the reliability and representativeness of results.

The process used to make things ‘interviewable’ is described in the following sections and articulated in three stages: (1) data collection; (2) data organization; and (3) data interpretation. In the data collection stage, multiple sensors are attached onto the thing to collect data from the thing’s perspective. In the second stage, the gathered data are prepared and organized for the benefit of professionals. Finally, in the data interpretation stage, the actors speculatively immerse themselves into the inner life of the thing, and help make sense of it through performance.

1. Data Collection: Thing ethnography

To access the various everyday practices around scooters in Taiwan, six scooters in Taipei were enlisted as co-ethnographers in this research [12]. Because of its mobility and its accessibility, it was thought that the scooter could collect fruitful insights and patterns from both a geographical dimension and a social dimension. A time-lapse camera (Yi Action Camera) (see figure 1) and a smartphone with a GPS-tracing App were installed on each scooter for a 3-day observation period. The time-lapse camera was attached to the scooter’s handle, facing the scooterist, and was set to take a photo every 10 seconds. Without the shutter button being controlled by a human, the time-lapse camera was expected to capture both well-known practices and unknown practices around the scooter. At the same time, a series of time-lapse photos could also serve as a speed-up video to browse through the 3-day life of the scooter and the scooterist.



Figure 1: The time-lapse cameras (Yi Action Camera) were attached on the handles of the scooters.

The smartphone with the GPS-tracing App was assigned to collect the daily routes of the scooter and other geographical data such as location and acceleration. As opposed to other home objects, the scooter, being a vehicle, is very mobile and speedy. Using the geographical data collected by the smartphone, the dynamic everyday life of a scooter could be more completely captured. Time-lapse photos and GPS routes were collected on the same temporal dimension. By mapping the visual data and the geographical data together as components of one timeline, more detailed contexts could be pieced together and revealed.

As previous studies have shown [18, 22], scooters in Taiwan are used very differently depending on the various lifestyles of their owners. In order to insure the richness of the collected data, 6 participants with different work and lifestyles were invited to participate in this research. The range of their jobs and identities were: (1) student, (2) office worker, (3) motorcycle enthusiast, (4) housewife, (5) insurance agent, (6) plumber. Given each participant’s different uses and practices with their scooters, it was thought that a great variety of the scooter’s inner-life could be captured. During the three-days of research, the participants were asked to keep living their daily life as usual and to take care of the cameras and GPS tracers.

2. Data Organization: Preparing materials for the actors

Rather than presenting raw data, we organized and prepared material in formats that we assumed were easier for actors to understand and empathize with. By limiting the efforts that the actor needed to put in as an analyst, we wanted to help them in their effort to immerse themselves in role-playing their scooter. *Time-lapse photos*, *daily routes*, and *video perspectives* were offered as the main sources for actors to experience the scooter's vision and mobility. *Event reports* were created to provide a simplified event log aimed at helping the actors make sense of multiple datasets in context. *Object portfolios* contained basic information about the scooter, including its portrait photos, type, age and history.

Time-lapse photos – to see through the scooter's perspective
The photos collected from the time-lapse camera were organized and displayed via a laptop (see figure 2). The laptop provided efficient ways for the actor to both see each photo in detail and to briefly browse through the photos as a time-lapse video. In this way, the actor could find out the most interesting behaviors and events that occurred as well as develop a sense of the overall relationships between things and people.

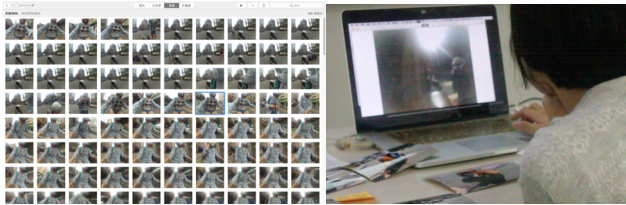


Figure 2: Time-lapse photos were presented via a laptop. The actors could both browse through and look in detail.
Daily routes – to experience the scooter's mobility
Via the GPS app within the smartphone, the 3-day moving routes were recorded and printed in A4 paper. With the daily routes, the actor could quickly recognize frequent locations such as the home and the working places of the scooter and the scooterist. At the same time, the geographical mobility of the scooter was expressed through these data.

Video perspectives – to experience the scooter's dynamicity
The scooter's perspective video (see figure 3) aimed to provide the actor with a dynamic experience of being a scooter. The 10-minute video was recorded from the same perspective as the time-lapse photos. Several clips with different usages and situations were edited and put together.



Figure 3: Edited videos of the scooter's perspective were presented via a projector.

Events report – to make-sense of multiple data in context
Organized from the time-lapse photos and GPS data by the researchers, the events report included the basic information about the events which happened during these 3 days in a timeline format. When the actor was browsing through the photos and routes, the event report was read and explained to him/her. With the event report, the actor didn't need to spend too much effort on identifying the current situation or guessing what kinds of events were involved. Supported with this contextual information, the actor could better focus on being the scooter rather than on being an analyst.

Object portfolio – to understand the scooter's background
The object portfolio included the portrait photos of the scooter and the scooterist and the basic information about them. The photos (see figure 4) presented the visual appearance of the scooter and the scooterist. For the information about the scooter, there were statements including its brand, type, age and history. For the information about the scooterist, there were statements including his/her age, work and lifestyle. Using the object portfolio, the actors were able to portray the image of the scooter from more dimensions.



Figure 4: Portrait photos of the participating scooter and scooterist (Pudding and Mrs. Cheng).

3. Data Interpretation: Actors' performances

Six professional actors joined the interviews individually (see figure 5). Each actor was given one scooter's data materials prepared in a data organization section.

Each interview lasted about two hours and was fully audio-recorded and partly video-recorded. The interview agenda included a characterization section and storytelling section as warm-ups, two interview parts about the thing's social relationships and identities, and a self-introduction as a recap of the interview. During the interviews, the interviewer (researcher) also treated the actors as the real scooters to the make it easier for the actors to engage in the role-playing.

1. Characterization – "feeling" as a scooter

In the characterization section, the organized materials were presented to the actors with the goal of re-constructing the inner life of the scooter. In the meanwhile, the interviewer helped the actor to understand the given data.

2. Storytelling – a warm-up section to get into the thing

On the basis of the given materials, the actor was asked to share three impressive or special events which had taken place in its past three days. This activity works as a warm-

up helping the actor to tell stories from the scooter's perspective.

3. Social relationships – mapping out the socio-material networks among things and people

In this section, the actor was asked to reflect on the scooter's social relationships with other objects and people. By means of post-its and pens, the mentioned things were pinned down by the researchers on a poster as the interview unfolded.

4. About yourself – reflecting on scooters' identities

Placed in the last section, this exercise helped the actor to further reflect on the constructed characteristics, identities and inner desires of the scooter.

5. Self-introduction – Recap of the interview

In this exercise the actor was asked to perform a solo introduction about the scooter and its life. This provided an overall recap of the interview.



Figure 5: The interview with the actor.

Reflection

Most of the actors found it pretty familiar to make sense of the given data through role-playing. Accordingly, their ongoing performances and dialogues in the interviews were fluent and natural.

In about half an hour, all of the actors finished their speculative constructions. Most actors took a special interest in the self-portrait photos and in the scooter's history which had been provided in the object portfolio used to help them identify themselves in a specific context. The time-lapse photos, the GPS routes and the event report were considered to represent the 3-days of the scooter's life. Several actors said it was an impressive and inspiring experience to feel and see the world from the perspective of a scooter. The video from the scooter's perspective was recognized as a rich resource for the actors. As an actor said: "In the video, I was more able to feel the strength when I was parked and to feel the attitudes of my user. These kinds of detailed feelings were harder to be interpreted from the photos."

The actors showed impressive potential to decenter human perspective. During the interviews, the actors not only "felt what the scooter felt", but "thought and reflected in a scooter's way". For example, one actor implied her

difficulty understanding some "too human" words. Another actor also mentioned that, for her as a scooter, all things can be categorized into things that don't move (e.g., buildings), things that move by themselves (e.g., humans and street dogs) and things moved by other things (e.g., scooters and cars). In these cases, the actors skillfully immersed themselves into things and discarded their human-oriented thinking. By thinking and reacting as things, these actors broadened our understanding and imagination about the scooter as a non-human.

RESULTS

By means of six interviews with the actors/scooters, the research revealed fruitful insights about the scooters' inner life and the socio-material networks that develop around the scooters. Firstly, through questions about the social life of the scooters, we recognized how various social relationships develop among scooters, scooterists and other artifacts, along with projected intents and expectations. Furthermore, through questions about the scooter's duties, desires and dreams, we illustrated the diverse characteristics of the scooters and then speculated on what scooters may want to become.

Social relationships – The social-material networks among scooters, other things and people

In this section, the actors/scooters shared their social connections with other things and people they encountered in their everyday life. On average, about 10 objects/people were mentioned and introduced. The scooters not only had different relationships with their users, but also lived a variety of social lives among other objects. The objects mostly frequent mentioned involved objects which had had encounters with the scooter and had shared/ conflicting intents with the scooter. The relationship between the scooterist and the scooter was based on the practices and expectations of the scooterist and the scooter. These roles and relationships changed as different scenarios changed.

Object-Objects: How things relate to each other with intent

While a variety of objects were mentioned, several objects such as helmets, traffic lights and pavements were referred by most of the actors/scooters. Most of the time, the objects were mentioned because scooters frequently encountered them and certain intents were perceived by the actors/scooters.

According to the intents that the scooters saw the objects standing for, the helmet was recognized as the "teammate" which shares the same interest of safety, while the smartphone was seen as the "annoying newbie" due to its conflicted interest of occupying the user's attention.

"The relationship between us (scooter) and the helmets are like a sort of teamwork. Because of our high-speeding, we need the helmets to cover the works of providing the safety - it's just like that we help each other. Because of our existence, they exist - it also points out that we are somehow dangerous so that a means of the damage-prevention is needed." (Fighter125) "I don't like her phone. It always distracts her from riding." "I don't like

this annoying newbie who makes troubles to her. Perhaps it needs some training to join our team.” (Vino50)

From the talk about the helmets, we can recognize that the close relationship between the scooters and the helmets was not only because of their frequent encounters, but also because of their similar intentions on providing an ideal riding experience. In contrast another actor/scooter mentioned the conflicting relationship between the user’s smartphone and itself. This statement illustrated the struggle of intentions between the scooter’s team - which aimed to keep the ride safe and efficient - and the smartphone which tended to distract users with messages.

Object-Humans: How practices shape relationships

From the interviews, various relationships between the scooters and the scooterists were revealed. These relationships could be constructed by examining the daily practices which they shared together. As reported by the actors/scooters, as more personal appropriations or unique practices were carried out with them, they felt that closer and more meaningful relationships were developed with their users. It also became apparent that the dynamic relationships between scooters and scooterists are affected by different practices and scenarios.

For example, in comparison with a previous “master-servant” relationship with its ex-owner, a second-hand scooter recognized the current relationship with its user as being one of “working partners”. Through work-related use and various modifications, it perceived that it was the recipient of richer expectations and responsibilities given by its new user.

“We are like working partner. It’s different from the relationship between me and my ex-owner in the first five years. We are more like a group. Because of me, he can get his works done.”

“I think the relationship between me and my ex-owner is more like the master-servant relationship. However, now Mr. Liu puts more burdens and expectations on me, so I feel our relationship becomes more equal. Because he needs me, our relationship gets closer.” (Fighter125)

From its words, we can see the scooter’s relationship as a “working partner” was shaped through the practices of its user. As a result of the unique cargo-carrying practices with which the scooter was engaged, the expectations of the user were embodied in the role-recognition of the actor/scooter.

Likewise, a well-maintained scooter recognized its relationship with its user because it could be distinguished from other scooters. In contrast with other “normal” scooters and “normal” daily usage, the scooter and the scooterist developed their relationship toward being special and important.

“I feel our relationship is based on providing each other the senses of being needed and feeling important. With his dedicated maintenance and modifications, I feel special and

important when I compare myself with other scooters.” (The Moon)

It is also important to point out that the roles and relationships among things and people are not flat and fixed. According to different situations and practices - for example, driving on the roads or waiting for a traffic light - the relationship between the scooter and the scooterist changes.

“When we are moving together, I feel we are united and connected. Via the strength of hands on my handle and the speeds he stressed, I can feel his emotions.”

“The traffic lights in Taipei are pretty long. When we are waiting for the traffic light, his attention is no longer with me. He is used to using his phone instead.” (Fighter125)

Here we can see the change of relationship between the scooters and the scooterists under different scenarios. For the actors/scooters, the scooterists were like their connected parts when they moved together, while their connection broke down when they stopped. The roles and relationship among the things and the people are highly dynamic. Along with daily practices and the different situations, a scooter could be seen as a functional product, a working partner or even as a united extension of a person’s body.

In summary, we have described the interwoven socio-material networks among the scooters, the objects and the scooterists. On the one hand, along with the actors/scooters’ reflections on their things’ ecosystem, we revealed how different intents within the things lead to conflicting or cooperating relationships among objects. On the other hand, we illustrated a variety of relationships that developed as a result of the practices and appropriations of the scooterists. Along with different situations and personal usages in everyday life, unique interconnections between the scooter and the scooterist were dynamically shaped and reshaped.

About yourself – Reflections on the scooter’s identities

As the final section of the interview, the actors/scooters were asked to further reflect on their own identities as a scooter. On the one hand, the actors/scooters indicated how their characteristics developed along with the intents embedded in their design and the intents projected via people’s practices. On the other hand, in response to questions about scooters’ desires and dreams, fruitful speculations on a scooter’s agency and the shifts in its socio-material networks were also evoked.

Characteristics and duties: What a scooter should be and do

Talking about their work and duties, most of the scooters would put the safety and the comfort of their user as the meant-to-be objectives for a scooter. However, frequent conflicts emerge between these embedded expectations and user’s values which are expressed through their abuses and appropriations in everyday life. Ignorance shown by the user of the proper use of the helmet chin strap, for instance, can be seen as a conflict based on the different expectations of safety in the design stage and the use stage.

“As you might already see, she usually forgets to wear the helmet right and tight. She also tends to be clumsy on other things. Because of these, as a scooter. I think I have the responsibility to be more cautious than her.” (Pudding)

Along with the different intents and expectations given by the designers and the users, the arrangements around the scooters could be very varied. Just as the plumber’s scooter was appropriated to carry tools, other arrangements were made around the scooters which expressed the users’ identities and enriched interpersonal relationships. Echoing these social and material arrangements, the actors/scooters also identified themselves with different characteristics and duties.

“Perhaps, because I was modified and maintained with good looking, I am kind of vain.” “When he rides me on the roads, people will notice that he has a good-looking bike as me. I think it also makes he feel ‘special’ and ‘different’ from other people.” (The Moon)

“My special work is giving his girlfriend a ride. I take it as a mission to make them feel ‘closer’. Especially I am such a tiny scooter which can’t run very fast or steady.” (Jog50)

As each actor/scooter illustrated, the characteristics of the scooters were diverse based on the intents and expectations assigned to them. Users’ intents were embodied through practices and appropriations with the scooters, while there were also other intents, such as safety, embedded in the design of the scooter. Along with these values and intentions from different perspectives, the characteristics of the scooters were reflected and further performed in the interviews.

Desires and dreams: What kinds of agency scooters are calling for

This section ended with questions about the scooters’ ‘desires’ and ‘dreams’ in the future. Like the previous reflections about their characteristics and duties, the actors/scooters tended to formulate their desires and dreams in response to the intents of the users and the intents of themselves as designed artifacts. At the same time, what these proposed desires and dreams have in common is the calling for a higher agency to perceive the context, to express opinions and to respond with changes. Along with these full-of-imagination talks, the smartness and the agency of the future scooter were creatively sketched from a scooter’s perspective.

On the one hand, with the awareness of its user’s intents in a variety of dynamic situations, one actor/scooter wished that it could be more flexible and arrangeable, so that it could, for instance, provide a wider seat for kids and make parking easier with a thinner body.

“I wish I could freely change my stature between thin and wide. Because she needs to take two kids to the school, it will be easier and safer for them to sit on a wider place. However, I felt pretty crowd when I am parked. If I can become thinner and smaller, it will be better for me.” (Vino50)

On the other hand, several actors/scooters expressed their desires to build a more interconnected relationship with their users. For example, one actor/scooter wanted to have a means to communicate as complex information as the human’s language and facial expressions can do. Another concept of communication was proposed by a scooter which expressed a need to be able to express its own statements and problems to its user. With clearer and more directed expression, a more connected relationship can be developed.

“I am sort of desiring the complex languages as humans have so that I can communicate with other things, like scooters. Although we are the same vehicle and I could roughly know their feelings, I can’t use as rich as the face expressions and the information he (the user) uses. I hope that I can have these ways to deliver these kinds of detailed information.” (The Moon)

“When there were some parts going wrong in my body, I am used to ‘having a strop’ (cause some failures) to express my unwell feelings. If I can directly point out which parts of my body went wrong, such as by changing colors, it will be much easier for me and my owner both.” (Fighter125)

In summary, in the stage About Yourself, we conducted more reflective discussions on the scooters’ identities and how these identities were constructed among their socio-material networks. On the one hand, the various characteristics of scooters were revealed. According to different intents and expectations inherent in their design and use, the actors/scooters recognized themselves as protectors, as vain scooters or a matchmakers. On the other hand, the scooter’s desires and dreams, from a scooter centered perspective, further sketched the possible forms of a scooter’s agency and smartness which could fit into the dynamic socio-material networks among scooters and people, and enable them to respond appropriately.

DISCUSSION

By means of the interviews with the scooters, the socio-material networks among scooters and people were revealed and captured. Empowered with intelligent cameras and GPS trackers, the scooters actively collected various daily practices and interactions around themselves. Via actors’ interpretations and performances, the intents, expectations and social relationships among the scooters and the scooterists were analyzed. By combining sensor data and actors’ performances, the interviews with the scooters broadened our understanding of the social-material connections of the scooter in everyday Taiwanese networks.

The research approach presented in this paper opens up new possibilities for interpreting data collected through thing ethnography using an animistic approach. For IoT in general, the interview metaphor also provides a more immersive method to systematically make sense of collected data. The interview with things allows us to reveal and illustrate the interwoven socio-material networks among the things we currently live with, and based on

empathic understanding, we can further craft the thoughtful smartness of products/systems embedded in everyday networks.

In the following paragraphs, we first discuss the various social-material networks around the scooter as resources for engaging and improvised interactions. Finally, we reflect on the values of the interview with things as a methodology to interpret data from a thing perspective and to create a speculative space for designers to gain inspiration.

Socio-material dimensions of openness of the scooter

As an artifact that is so tightly interwoven within the daily practices in Taiwanese society, it is reasonable to consider a scooter as an artifact which is easily accessible and easy to acquire. In different scenarios, with different users, a scooter helps people to commute, to deliver goods and to maintain social connections. Scooters are low cost, are easy to modify and are flexible, which makes the scooter resourceful in the material and functional dimensions [15, 18]. However, from the interviews with the scooters, we found that the various social qualities - the intents, expectations and relationships - around the scooter are also responsible for maintaining the scooter as an important element in Taiwanese everyday life. In other words, we recognize that the richness of the scooter is not only the result of its material usefulness, but also because of its diverse and dynamic social meaning for its users.

During the interviews, the scooters expressed several conflicts between the intents and expectations of designers and users. For example, the “double carries (sometimes triple)” practice with the small scooter would not be a proper use in the expectation of the designer, while this misuse of the scooter represented a different expectation from the users and indicated the social values among lovers or family members. Likewise, various unique modifications on a scooter might surprise the scooter designer, but through these appropriations the users developed their own ways to express their identities and attitudes. These conflicts between the design and use of a scooter, which echoes Akrich’s concept of the “scripting and de-scripting” [8] by designers and users, make the social meanings of a scooter more complicated and wide spread. Accordingly, along with different intents and expectations, scooterists express different values and creatively carry out different activities with their scooters.

The relationship between scooters and people is diverse and dynamic in different situations. On the road, holding tight to the handles, a scooterist develops a close relationship with the scooter. The scooter’s mobility is perceived as the augmented ability of the scooterist. In contrast, when the red light is on, the scooter turns into a space supporting the scooterist, making it possible for the scooterist to engage in other activities such as checking social platforms or chatting with other scooterists. By seeing a scooter as a resourceful tool, plenty of creative everyday appropriations also emerge around the scooter. The handles of scooters are

arranged as the racks to hang drinks. The backseat is used as a shelf to contain goods. According to these different types of relationship, various affordances emerge from the encounters among the scooter, the scooterist and the environment.

By highlighting the importance of these social qualities, we are not suggesting that, to make the product flourish in everyday life, the social relationships and expectations should be considered rather than the material and functional factors. Rather, social relations and physical resourcefulness go hand-in-hand to bring various creative practices around the product into our imagination. On the one hand, the openness and accessible nature of the scooters provide rich possibilities for the scooterists to create new arrangements. As new appropriations or practices become routine, new social relationships between the scooter and the scooterist develop. On the other hand, along with new relationships and expectations, the scooterist can look for different values and affordances from his/her encounter with the scooter. In other words, the resourcefulness of the scooter prepares the possibilities, making it possible for the scooterist to engage in developing the intents, the expectations and the social relationships surrounding the scooter.

Therefore, as creative appropriations should be appreciated and even facilitated [11, 42], the various and unique social relationships which develop between the scooters and the scooterists should also be considered as meaningful arrangements in the social networks which are part of people’s everyday practices. When the scooters are appropriated as part of a new practice, the user and the scooter also construct a new way to engage and to understand each other. Along with the arranged new relationship, novel meanings and values can be gained and rearranged. In this way, these relatively cheap vehicles have become a symbol for the Mobs to relate with and express their beliefs [15]. An example of this is the way in which the affordable and mobile nature of scooters served as a means toward the independence and freedom of women in the 1960’s in Taiwan [18]. Within these everyday arrangements, people and things not only appropriate the usages of things, but also “translate” [20] the intents and the meanings that are developed among them.

A co-constructive speculation of what it is like to be a thing

The “interview with things” is a methodology that aims to interpret thing ethnographic data from a first-thing perspective. With rich insights gained from the interviews with scooters, this novel approach has expressed its values in the task of data interpretation. However, we would like to point out that the “interview with things” is not only a valuable approach to understand collected data, but an inspiring intervention for designers to speculate and experience what is like to be a thing within specific socio-material networks. Along with the ongoing conversation,

the actor and the interviewer both engage in the construction of the interviewed thing. By encountering and empathizing with a convincing non-human actor, designers can gain rich and novel inspirations which would be difficult to gain without the actors' performances. In this sense, both the outcomes (i.e., the interpretations from a thing perspective) and the process (i.e., as an inspiring intervention) of the interview of things could be valuable for us to understand and to imagine emerging 'thingness'.

Both the actor's acting-out and the researcher's questions and reactions are essential to construct a fluent interview. In other words, the interview with things is not just a solo performance by the actor, but a cooperative speculation by the actor and the researcher. To help the actor to understand the thing and to decenter momentarily from a human perspective, the interviewer also needs to decenter his/her own human-centered logic. For example, instead of using terms such as "personal relationship" in the interviews, we used the term "scooter relationship" to stress the subjectivity of scooters. Similarly, we asked questions like "How do you understand your relationship with your owner? Do you think your owner will have a different understanding on that?" to lead the actor to "step into the scooter's shoes" and reflect on the differences between the perspectives of humans and non-humans.

Furthermore, through the interview with things, designers can engage in an imaginative conversation with the "always withdrawing" non-humans. Echoing the goals of Object Personas [3], the interview with things can particularly help designers and researchers to defamiliarize the things that we are used to. By means of the actors' skillful interpretation and performance, designers and researchers can be easily surprised and enchanted as the thing reveals its own stories and thoughts. Just as the actor that expressed the way she categorizes things as "things which need to be turned on" and "things which can move by themselves", the actors tend to immerse themselves into the role-playing of things and provide unique and even unusual "things-like" opinions. The interviews with things not only reveal the inner-life of the things, but also lead designers and researchers to meet the emerging subjectivities of things.

To sum up, we argue that the interview with things is a creative and inspiring approach to understanding things. Not only the format of an interview provides a "first-thing" perspective to make-sense of thing ethnography data, but the process in itself creates an immersive experience for both the actor and the researcher to gain novel inspirations on the thing's subjectivities. As we identify the interview with things as a valuable way for designers and researchers to speculate about emerging forms of smartness, a variety of further ways to cooperate with the performing arts could be explored. For example, an actor's skills of acting and role-playing could be arranged to form the "prototypes of different smartness" for testing; or the format of role-playing could be extended as a workshop for designers to

get inspiration by acting and interacting as non-human beings. Regardless of things' nature of withdrawal, by interpreting, speculating and role-playing, the interview with things is a sincere invitation for both humans and nonhumans to empathize and to understand each other.

CONCLUSION

This research conducted a thing ethnography study on the scooters in Taipei, Taiwan, and introduced a new method, namely an "Interview with Things," to interpret and make sense of data collected according to a thing perspective. To construct "interviewable" scooters and to understand the scooter from a first-thing perspective, six scooters were enlisted as co-ethnographers to collect data and six professional actors were invited to interpret the gathered data. Each of the actors role-played one of the six scooters and helped generate understandings about the socio-material networks among scooters and scooterists in Taiwanese everyday life.

Through the interviews, we revealed how the routines, appropriations and projected intents among scooters, people and other artifacts contribute to co-constitute socio-material networks. We speculated and discussed in particular the social relationships that people develop with scooters. Based on these results, we further discussed how interwoven socio-material networks provoke various arrangements among appropriations and social relationships with the scooters. Finally, we reflected on the values of the interview of things and argued that this novel methodology could be beneficial for researchers and designers to gain both new understandings and inspirations.

As we begin to decenter our vision from ourselves to the things that we coexist with and cooperate with in everyday life, things are also calling for a more nuanced understanding of both their materiality and their social emergence in networks. Just like a skillful craftsperson has to 'ask' the wood's fibers what they want to become before he/she starts to craft, as designers we should also face the scooter's socio-material fabrics and 'ask' the scooters the same question – which is also what this study aims to do – before we start to craft new forms of smartness.

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