Deriving Non-Driving-Related Activities in Highly Automated Driving via an Autoethnographic Approach by Traveling Canada in a Recreational Vehicle

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Figure 1: Depiction of our camper and the route from Vancouver to Calgary with the individual stops during the trip.

ABSTRACT

Automated vehicles will alter traffic fundamentally. Users can engage in various activities, such as working, reading, or sleeping. However, based on these activities, there are challenges and opportunities to adapt the vehicle, possibly transforming these into "tiny houses". Some activities will most likely be conducted, especially those already undertaken, such as making phone calls or listening to music. However, there are limited possibilities to derive activities occurring in longer trips or with a high level of automation. Therefore, we propose to derive non-driving-related activities based on a 12-day trip in a camper as a surrogate for prolonged exposure to automated driving. We report the autoethnographic results of our experiences and deduce relevant future research questions. We highlight the possibility of employing Vanlife as a method to study these upcoming challenges.

CCS CONCEPTS

• **Human-centered computing → Interaction design process and methods**; **Ubiquitous and mobile computing design and evaluation methods**.

KEYWORDS

autoethnography; camper; automated vehicles; NDRAs

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1 INTRODUCTION

Automated vehicles (AVs) of Society of Engineering (SAE) levels 4 and 5 [37] are expected to alter traveling fundamentally [12]. Users can engage in non-driving-related activities (NDRAs) such as reading, working, or sleeping [10, 32].

However, it is unclear which NDRAs might be most prevalent during automated journeys. It is, additionally, unclear how traveling habits will change - with anticipated reduced costs of traveling (due to perfected driving styles) and without the need to actually drive oneself, traveling could see a surge. Previous work used a "web survey, in-situ observations, and an in situ survey" [32, p. 1]. While insights derived using these methods are valid, they lack insights into future NDRAs derived using longitudinal observations. They also lack insights regarding the advanced potential benefits AVs could offer, such as the ability to function as compact and self-sufficient living spaces [43].

Nowadays, we see the conceptually closest vehicle to an AV to be an RV (short for a recreational vehicle, also called a camper). Currently, long journeys in an RV as a passenger come closest to an automated drive, and the interactions inside match needs to be known from surveys (e.g., sleeping, reading, or watching movies). Therefore, the two authors employed an autoethnographic approach to derive NDRAs during a 12-day road trip in British Columbia, Canada. We describe activities and their challenges and derive anticipated NDRAs in AVs. Based on these, we pose several research questions (RQs) and themes that can guide future work.

Contribution Statement: (1) We describe our method of employing an RV as a tool to derive NDRAs in future AVs. (2) Results of our autoethnographic approach reveal undescribed activities and provide RQs by identifying and addressing previously unexplored areas of investigation.

2 RELATED WORK

2.1 Autoethnographic and Autobiographical Approaches

Autoethnography is a "reflexive method by which the researcher's lived experiences of the subject matter are expressed and evaluated, and by which the researcher's perspective is then analyzed" [2, p. 4]. Autoethnography is generally reported to be employed when a thorough understanding of one's experience is essential to the development or assessment of a (new) technology. Although autoethnographic works may influence technological design, autoethnographers almost never participate in the design process directly during autoethnography. In contrast to the reflexive autoethnography, according to the definition given by Neustaedter and Sengers [28], **autobiographical design** is "design research drawing on extensive, genuine usage by those creating or building the system" [28, p. 514]. They argue that for an autobiographical design to be successful, the system must be used for an extended period of time, and the designer must be the system's user.

2.2 Non-Driving-Related Activities and Their Evaluation

Pfleging et al. [32] employed a web survey, in-situ observations in a subway, and an in-situ survey in suburban trains to elicit probable NDRAs. They identified numerous activities that they categorized as *Doing Nothing*, *Entertainment, Physical Needs, Watching out of the Window*, and *Communication, Productivity, Use of Mobile Devices*. The authors acknowledge the limitation that "reported behavior and actual behavior do not always coincide" [32, p. 98]. Russell et al. [36] also observed train and bus rides, with their findings aligning with the work of Pfleging et al. [32] finding that people mainly watched the surroundings, listened to music, or talked to other passengers. Hecht et al. [16] analyzed NDRAs in a 60-minute conditionally automated ride in a driving simulator. Again, observed behaviors were looking at videos or the environment, music, phone calls, or general mobile device usage. In a Wizard of Oz field study with 12 participants, Detjen et al. [11] coded videos based on the dimensions of Pfleging et al. [32]. However, they found three additional activities, namely, writing, taking pictures, and cosmetics. Meurer et al. [27] let 10 participants use a shared Wizard of Oz-operated AV during one week, leading to 33 rides. In those, participants engaged in NDRAs such as media consumption, but also NDRAs without media consumption such as eating, sleeping, working, writing emails, or phone calls. Additionally, even more entertainment options were demanded. Finally, possibilities to understand the current ride or even possibilities to alter the ride were wanted.

To the best of our knowledge, these works represent the most relevant attempts to capture NDRAs in AVs. While they use different approaches such as surveys, observations in trains, and Wizard of Oz, the results are limited by the duration of user engagement and lack of embodiment.

2.3 Automated Vehicle Designs and Philosophies

It remains unclear whether the preferred future travel mode will change from private ownership to a shared model [29]. However, the transition of drivers becoming passengers allows a different use of time in a vehicle, questioning the **driver-centric interior design** tradition that has been in place for more than a century. With the findings of 14 co-design sessions, Stevens et al. [43] suggest that the current driver-centric approach will be replaced by an **activity-centric design**, allowing passengers to efficiently include driving times into their daily time management. This goes along with AV interior layouts created during their co-design sessions, which were mostly set up like campers or tiny houses to support all kinds of activities, such as working, relaxing, dining, or playing [43]. Lyons and Urry [23] further suggest that the relationship between travel time and activity changes, as travel time itself will be able to be used to undertake activities, which will lead to a reduction in the cost of travel time and, in turn, might lead to an increased investment of time in travel and thus in the AV. From a study with nine participants, Lee et al. [21] derived four design requirements to support potential activities in AVs: *System functionality*, *input control*, *information display*, and *in-vehicle space*. Research explored the potential use of AVs as a mobile office, focusing on interior design and interaction, as well as broader implications, such as productivity, work-life balance, novel challenges, and societal impact [8, 13, 18, 20, 22, 38, 42]. The automotive industry also shows visions for AV interiors: For instance, the Mercedes-Benz F 015 concept car features a variable seating system with four rotating lounge chairs that can be configured for face-to-face interactions [1].

2.4 Design Methods for Automated Vehicle Design

Pettersson and Karlsson found that the introduction of AVs "means a radical leap in users' understanding and attributed meaning of the car" [31, p. 700]. They compared methods to investigate users' expectations and found that outcomes of various mediating tools differed and concluded that tools should be selected according to the type of RQs being asked. Pettersson and Ju [30] published a survey on the techniques to explore automotive design considering automation. They define the relevant themes of automotive design as being *Interaction, not interfaces*, *Whole body experience*, *Personal spaces*, *Long term interactions*, *Changing roles of the car*, and *Adapting to different cultures*. Regarding possible design techniques, they list *Enactment*, *Contextual Inquiry*, *Scale scenarios*, *Wizard of Oz*, *Field Experiments*, and *Video and Animation Prototyping*. The authors conclude that while each technique has benefits and drawbacks, it is most useful to use a combination of them for a holistic view. Recently, Suzuki et al. [45] also proposed a method to explicitly design Vanlife, highlighting the need to study this space.

3 OUR APPROACH

We present insights from a twelve-day road trip in a camper of the class C-Small in October 2022 in Canada from Vancouver to

Calgary through the Rockies (see Appendix A). This trip was not intended to be research; it was meant to be a purely recreational journey. However, after three days on the trip, we found that some qualities of the camper life referred to possible experiences in AVs. Therefore, we followed a three-step process. First, the two authors independently wrote down the **tasks** necessary during the road trip (retrospectively for the first three days and then continuously). We avoided tasks that were already mentioned in previous publications (see Section 2.2). Then, the two authors discussed emerging **challenges** deriving from these tasks. These tasks and challenges were then grouped thematically. Finally, the two authors deduced relevant **RQs** and themes. Agreement about the challenges and RQs was reached through an extensive discussion along steps two and three.

Reflecting on NDRAs in alternative forms of mobility, such as taxi and bus rides, offers valuable insights and can be seen as complementary to our method. However, these scenarios typically do not allow for the extended exposure that can be crucial in studying long-term human interaction with AV systems.

Moreover, discussing vehicle size and its implications for AV design is critical. If future AVs resemble the size of RVs, they might offer similar spacious experiences; however, the more probable trajectory involves shared or smaller vehicles prioritizing efficiency and a smaller CO2 footprint, resembling an important limitation of our approach.

4 RESULTS

In the following, we report the results of our research process. We report tasks and the accompanying challenges, as well as the derived themes and RQs.

4.1 Tasks

Arrangement & Camper Layout: For us, the camper's layout was all about flexibility to support our various activities. We found ourselves constantly tweaking the setup to suit our needs, such as turning our dining corner into a bed each night and then back again in the morning or modifying the sleeping setting when we brought along a friend.

Storage & Organization: We quickly learned that smart storage solutions were key to a smooth trip. Assigning places for items based on how often we used them and making sure everything was secure before hitting the road became second nature. Regularly revisiting the organizational system helped keep everything in check.

Cooking, Food, and Kitchen: Cooking, Food, and Kitchen tasks were about more than preparing meals; they involved planning grocery shopping, figuring out how to store food/drinks efficiently, and keeping the kitchen area clean.

Water & Waste: Tasks associated with managing water and waste involved routinely inspecting and refilling the water tank, monitoring black and grey water levels, properly disposing of grey and black water, and correct segregation, space-saving storage, and emptying of waste.

Personal Care: Personal care like dressing, doing hair and makeup, or taking showers included adapting to space constraints and changing facilities, such as campsite washrooms or the availability of a washing machine.

Relaxation: Finding time and space for Relaxation was essential. After long drives or exploring, we sought out the perfect spots to park, where we could relax and enjoy the surroundings.

Scenic Routing & Navigation: The identification and selection of scenic routes, destinations, points of interest, and recreation opportunities along the route required consideration of road conditions, accessibility, overnight accommodations, and parking options. In addition, alternative navigation strategies were required for planning and navigating to specific locations that may not be readily available through traditional online mapping applications (e.g., starting points of hiking routes).

Sightseeing: Touristic activities included exploring the surroundings, weather, and environments, observing (or evading) local wildlife, and documenting the experiences, such as journaling or taking pictures and videos while driving.

Law-Related Tasks: Navigating law-related tasks was a learning curve. We made sure to familiarize ourselves with local laws and regulations, obtaining the necessary permits, and adhering to parking and camping guidelines to ensure we were always in compliance.

Coordination: Our trip required coordination and time management, such as taking into account desired destinations, opening hours, budget management, time scheduling for driving, resting and relaxation, managing the maintenance and cleaning of the camper van, monitoring and maintaining inventory of supplies, and staying flexible enough to accommodate unforeseen circumstances. This required regular and effective communication and compromise with each other to ensure that everyone's needs were met.

Connectivity: Staying connected in more remote areas often required some creativity. Finding WIFI or a mobile network meant looking for public hotspots and asking for WIFI in restaurants or campsites/parking areas.

Weather & Environment Adjustments: Weather and environment adjustments were a constant consideration. We kept a close eye on the weather forecasts, ready to adjust plans as needed to make the most of outdoor activities or to ensure comfort and the cleanliness of the living space by, for example, removing dirty and wet shoes before entering.

Social Connectedness: Maintaining social connectedness was important. We stayed in touch with friends and family back home, sharing adventures and sometimes even meeting up with fellow travelers or locals along the way.

Connectedness with Nature: Our journey was also about connecting with nature, whether it was appreciating a sunset or playing games that involved the landscape around us (e.g., I Spy With My Little Eye). One task was also making sure we both stayed connected to the nature around us, whether one was driving or engaged in other tasks, such as pointing out the changing scenery, like a stunning sunset or a hidden deer by the roadside.

4.2 Challenges

Arrangement/Layout: The vehicle's layout is challenging regarding time, options, and constraints. Based on the limited space, rearranging is frequently required. This puts demands on the furniture

to be usable in various ways. Thus, designing multifunctional, easily transformable, and space-efficient furniture with user-friendly interfaces is crucial.

Storage: Limited space and storage capacity can challenge organizing and managing supplies, clothing, and equipment. There is a need for proper planning and organization to ensure that all necessary supplies and equipment are brought on the trip. Additionally, to be safe, the different items have to be arranged so that they do not fall over, get messed up, or break. For example, during the trip, almost all the plates broke.

Privacy: Privacy-related challenges can occur both in and outside of the vehicle. Regarding outside challenges, the parking spot, with the distance to other vehicles, defines the possible level of privacy. Determined by the closeness of the people sharing the interior, there can also be a privacy challenge. Daily affordances such as personal hygiene lead to instances in which privacy would be desired.

Security: Depending on the route, the destination or parking spot can be in distant or dangerous areas. Therefore, personal security is a constant concern during the journey. Potential threats include animals and robbery.

Law: Depending on the country and specific location, finding suitable places to park overnight can be difficult. Additionally, crossing borders can result in unfamiliarity with local laws (e.g., weight restrictions or tolls).

Time Management: Time management in an RV trip can be challenging because there are many factors to consider, such as driving time, setting up and breaking down camp, and planning activities and excursions. Unforeseen events such as roadblocks, spontaneous trips, or closures of campsites or parks are also likely.

General Upkeep: General upkeep challenges include cleaning various areas of the RV, such as the windshields, mirrors, or living area, and inspecting the safety features, including brakes, lights, battery, and tire pressure. Additionally, one must check the oil, transmission, brake, power steering, and coolant levels before starting the trip and make sure they are at the correct levels.

Vehicle Motion: When traveling, we often need to reach for additional items such as food, books, or clothing. While it would be possible to stop, we reached for these while driving. This led to instances where the vehicle motion, either by the movement itself or because of motion induced by, for example, a bumpy road, almost led to injuries. Additionally, vehicle motion can lead to unwanted body movements, for example, while reading or taking pictures.

Information Scarcity: Information scarcity can be challenging for various tasks, including sightseeing, storage, law, and general routing. Because of out-of-date or missing data, for example, it would be unfeasible to enter a campsite, park, or grocery store.

Weather and Environment Adjustments: Fast-paced weather and environment changes require re-assessing one's plans, including changes to the vehicle and personal equipment (e.g., clothing, personal hygiene).

Water and Waste: The limitations of RV sewage and waste disposal systems can be a challenge when camping in areas without hookups. Depending on the season, these systems can be significantly less available.

Connectivity: Depending on the location, it can be difficult to find accessible and convenient internet and phone service. This makes it difficult to access updated information or make changes to plans while on the road, or connect to family and friends.

Social Connectedness: Depending on the party traveling, social connectedness can be a challenge. This includes connecting with other people on the campsites.

Social Conflicts: When encountering the necessity to make decisions, for example, regarding trip-related planning, there is the potential for social conflicts. This includes, for example, goal conflicts.

Navigation and Sightseeing: With most map applications, there is no possibility to adjust the navigation based on preferences (such as scenic views, accessibility, etc.). Therefore, one has to experience conditions, environment, nature, and experience opportunities in advance and manually integrate them into the navigation through route points. This requires a lot of information and coordination before the start. If routes are not planned sufficiently, or priorities are set incorrectly (fastest way to the campsite vs. detour via point of interest), this can mean that the vacation experience is affected negatively. Moreover, all persons must remain alert to ensure not missing possible viewpoints or attractions on the route and make stops or reroutes depending on them. The driver, whose attention is directed outwards, can draw the attention of the co-drivers to interesting views when they are busy with other tasks. However, this requires the driver to turn his attention from the road to the surrounding scenery and to be aware of the interests of the others.

4.3 Research Themes and Questions

Based on the tasks and challenges, we defined research themes and questions to guide future research. One important finding we observed is that NDRAs and the driving task, even if not performed by oneself, influence each other. For example, taking pictures during the drive depends on the vehicle slowing down to avoid sudden movements and enable a good shot. Therefore, research on NDRAs is often directly related to actually being in the situation.

Context-Dependent Vehicle Adjustments. Adjustable and modifiable vehicle interior designs offer versatility and adaptability to changing needs and environments. It can help to improve efficiency and effectiveness by better matching the capabilities to the specific needs in different contexts, such as travel time (short drive vs. long term travel), underlying user targets (*the journey is the reward* vs. *the destination is the reward*), or varying numbers of passengers. Additionally, it can also lead to more sustainable transportation systems by reducing the environmental impact of vehicles through increased fuel efficiency and reduced emissions. Questions that arise in this area are: (1) How and to what extent can context be recognized by the vehicle? (2) What do efficient modular and adaptive vehicle interior design approaches could look like? There are already some works dealing, for instance, with the topic of 3D shape forming (e.g., [3, 19, 44]), automated temperature adjustment [5], or even dynamic exterior adjustment [7].

Context-Dependent Driving Adjustments. Depending on individual preferences and intentions, the driving task is relevant to performing NDRAs. For example, when on vacation, the main objective is often not to arrive at a specific location. The NDRA of sightseeing

becomes dependent on the driving task. This also includes information about the surroundings, for example, knowing that it will rain the next day can inform the routing to take advantage of that day to be a "driving day".

In regard to route navigation, it is crucial to examine the potential conflicts that may arise between the desires of passengers for recreational activities and the decisions made by the AV regarding the route taken. The AV may prioritize efficiency or safety, which could result in a journey that does not fully align with the passengers' desired tourist experience. One RQ may be how AVs can be programmed to balance efficiency and safety with passengers' interests for a route that supports their recreational needs, e.g., offers scenic views. Given that AVs do not require an attentive driver, the question arises of how this affects the sightseeing experience and the ability to explore the surroundings and uncover nearby attractions. To address this issue, it may be necessary to develop interaction approaches to keep passengers informed of happenstance events or tourist attractions that are of interest. Finally, parking may also present conflict potential, as AVs may focus on quick and functional parking, which can conflict with the passengers' desire for scenic views, safety, or the presence of certain facilities in the vicinity.

Thus, the limits of the possibility of contextual understanding and adaption of the driving task must be investigated.

Mitigating Vehicle Motion Influences. Vehicle motion, such as vibration or lateral acceleration, conditions the performance in NDRAs, as it significantly impacts movement capabilities and reduces interaction quality for haptic interfaces [6]. Counteracting approaches can be taken from a number of research directions. One direction could be to reduce motion, for example, through adaptive platforms or foresighted vehicle motion planning (e.g., preventing stops at traffic lights). Another option could be activity-based motion planning (e.g., reducing speed during the execution of sharp turns in the case of activities such as drinking or eating). Some work already deals with activity recognition but mostly for driving-related activities (see Stampf et al. [41] for an overview). However, one can also approach the problem from the opposite direction by reducing the negative effects of motion, for example, through input correction, for which there are already approaches (e.g., for touch interfaces [24]).

Involving the Advanced Sensing and Motion into Experiences and Mitigating Negative Effects. One expected category of activities in AVs is gaming [17, 46]. For this research theme, mainly two themes seem important. The first one is how to incorporate and leverage the sensory and motion of the AV to generate enriching experiences. The second one focuses on mitigating motion sickness induced by novel forms of interaction, such as by using virtual reality [25, 33].

Connectedness. Some research suggests increased trips if AVs become common [12]. Additionally, these trips could be longer due to no need for rest. Depending on the surroundings and characteristics of the trip, this could lead to the necessity for users to connect with nature, other people along the road, or even within the AV.

Previous work has looked into the challenges of shared AVs, especially for female users [39, 40]. However, the opportunities advanced sensing and background information provide have not yet been explored.

Privacy in Shared Automated Vehicles. AVs have the potential to fundamentally alter privacy needs for individuals engaging in activities such as sleeping or personal care and, most likely, spending extended periods of time within the vehicle. Thus, it is important to investigate how these privacy needs differ from those encountered in traditional manual driving settings. It is also important to consider the specific social dynamics that may arise within the vehicle. For example, privacy concerns may differ depending on whether the passengers are sharing the vehicle with unfamiliar individuals or with trusted friends and family members. Furthermore, the level of privacy may also be influenced by whether the vehicle is owned by the individual or borrowed from another person, car rental company, or taxi service.

Human-Machine Interaction. As sensing and planning capabilities expand, the question arises whether and to what extent the vehicle can take over the driving task and support the completion of NDRAs. For example, helping with planning and time management by providing helpful information about unknown environments. In addition, there is also the question of what human-vehicle support must look like when the vehicle reaches its boundaries, for example, if the user would like to rest but there are no parking slots available at the targeted parking area, the vehicle could approach (e.g., see [4, 9, 47, 48]).

4.4 Limitations

The experiences and results are based on the authors' lived experiences, the van model, and the route choice. Therefore, they are biased toward the authors' activities and needs. This is, however, both a strength and a weakness of the autoethnographic approach. We could only report experiences supported or mitigated by the surroundings of British Columbia, Canada. These could vary significantly in other areas. Future work could consider the described approach and extend it based on feedback from frequent camper users.

5 VANLIFE AS A METHOD TO INQUIRING LONG-TERM EFFECTS OF AUTOMATED DRIVING

Vehicles so far have been an "extension of our selves, a mechanical apparatus which we continuously controlled to travel from one place to another" [30, p. 1]. With the advance of automation, novel relationships with the vehicle become possible, leading to focusing on different activities than in manual driving [10, 32]. In Section 2.2, we presented, to the best of our knowledge, all previously employed techniques for eliciting and evaluating NDRAs. While Wizard of Oz studies have been conducted (e.g., see [11]), these studies come with their own challenges, such as monetary compensation for longitudinal exposure. Therefore, until AVs are available, we argue that novel methods are required to deduce (longitudinal) effects of AVs. This could include, for example, studying behavior in different contexts as a proxy, as we did. Regarding short-term exposure, recent works have used virtual and augmented reality to study various scenarios on-road [14, 15, 26]. However, we see a lack of possibilities to elicit

NDRAs over longer periods while including embodiment [30]. In this work, we propose to use the lived experiences of *Vanlife*, i.e., the term describing the lifestyle of living full or part-time in a vehicle. We found that **Vanlife** provides unique opportunities to study prolonged exposure and that findings relate to anticipated AV use cases, e.g., supporting travel and daily living activities.

5.1 Advantages of Employing Vanlife

Using a van as a research tool to study **experiences** in AVs offers several advantages, including but also going beyond the experience of AV travel use cases:

Experiencing "Automated Driving" for Longer: When not having to drive oneself, the resulting journey represents automated driving. Especially when not sitting in the passenger seat but, for example, on the sofa, the driver becomes a "Ghost Driver" [35].
Experiencing Driving in Different Arrangements: The passenger can sit in a given location if buckled up.
Use Cases: Unique use cases that might be unknown to an average driver can be experienced.
Interaction while Moving: While it is not legal in most areas to walk around, cook, or sleep during traveling in a van [34], numerous people occasionally do so. We do not encourage such behavior, however, if observed, this can lead to additional insights into interaction during movements.
Experiencing Different Personas During Rravel: With changing tasks, the expected behavior, the power to decide, and responsibility change. We found that the driver is in the position of the AV and has to update the journey plan often based on context.
Experiencing "Automated Driving" in a Personal Space: The vehicle is seen as a private and personal context [30]. The circumstances of a van trip allow the participants to feel home-like, facilitating real-world behavior.

Additionally, the van includes general advantages to study **interaction**:
Spacious Interior: Vans typically have a larger interior space compared to other vehicles, which allows for better observation of human behavior and interaction. This space can be configured to suit various experimental setups and accommodate multiple passengers, researchers, and equipment.
Versatility: Vans can be easily adapted to simulate different AVs, ranging from public transportation to private cars.
Real-world Testing: By using a van, researchers can study human behavior and interactions in real-world conditions. This generates more accurate and meaningful insights compared to controlled laboratory settings.
Customizability: Vans can be outfitted with various sensors, cameras, and monitoring equipment to collect data on human behavior, interaction, and vehicle performance. The larger interior space also enables the integration of advanced technology, such as virtual reality or augmented reality systems, for immersive experiments.
Collaboration Opportunities: The larger capacity of vans enables researchers to include more participants in their studies, fostering collaboration and teamwork. This can help uncover unique insights into group dynamics, decision-making, and communication patterns in AVs.
Accessibility and Inclusion: Vans can be designed to accommodate diverse users, including those with mobility impairments or other special needs. This can help researchers study the impact of AVs on various demographics and ensure that their findings are more inclusive and representative.
Comfort and Familiarity: Vans are a familiar and comfortable mode of transportation for many people. Participants may feel more at ease in a van, leading to more natural behavior and authentic interactions, which in turn can provide valuable insights for researchers.

5.2 Reflections

Using Vanlife as a method to evaluate the long-term effects of AVs has to be adapted based on the underlying RQ. If the interaction between a user and an AV (and possibly arising conflicts) is part of the RQ, multiple researchers must be present during the journey where one is the driver (or playing the part of the AV). Further, geographical context matters. Our trip led us to rather remote parts of Canada with large distances and few settlements. The experience would have been entirely different if we had visited Europe, Africa, or Japan, for instance. Thereby, this method allows for gaining knowledge about the differences in varying geographical conditions. Lastly, based on the RQ, the context, such as the length and purpose of the trip, must be defined. Interactions with and in the vehicle can strongly vary depending on, e.g., whether one is traveling for business or personal reasons or whether the trip already encompasses recreational goals. However, the van is an appropriate possibility to alter depending on one's needs, as Suzuki et al. [45] show.

6 CONCLUSION

In conclusion, this paper presents an autoethnographic approach to understanding NDRAs that will be prevalent in AVs based on a 12-day road trip in British Columbia, Canada. This trip revealed various activities and challenges, which can provide insight into anticipated NDRAs in AVs. Based on those results, RQs and themes were formed and discussed. Additionally, advantages and reflections on using Vanlife as a method to inquire about the long-term effects of AVs were examined. Overall, this paper's contribution is the autoethnographic approach to derive NDRAs in future AVs and the resulting RQs and themes that can guide future work in this area.

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A CASE

In this section, we provide a detailed overview of the adventurous journey undertaken by two colleagues, one male (age 30) and one female (age: 27), following our attendance at the MobileHCI conference in 2022 in Vancouver, Canada. This 12-day excursion across various locations in British Columbia and Alberta offers a unique exploration of natural landscapes, wildlife encounters, and the challenges and joys of travel in a van. We both had no experience with vanlife. Figure 2 shows impressions from the journey.

Post-Conference Exploration: Immediately after the conference, we collected the RV and embarked on our journey to Vancouver Island. The first stop was Victoria, where we indulged in the local delicacy, Poutine, and spent the night by the roadside with a view of the sea.

Vancouver Island to Whistler: Traveling towards Nanaimo, we enjoyed a short hike along railway tracks before embarking on a whale-watching tour with Ocean EcoVentures from Cowichan Bay, a highlight of our trip. After dropping Luca back in Vancouver, we headed towards Whistler. Along the way, we encountered a film set, though we found it unremarkable. In Whistler, we found a camping site where we could finally enjoy a shower and cooked spaghetti, marking a return to some basic comforts.

Nature Trails and Lakes: Our journey continued beyond Whistler, hiking to Wedgemount Lake and visiting Joffre Lakes. The trips to Seton Lake in Lillooet and to Jasper via Kamloops were next, where we stopped at Tim Hortons and passed Moose Lake and Mount Robson. Our encounters with wildlife, including moose, were particularly memorable.

Jasper National Park Adventures: In Jasper, plans to hike the Edith Cavell Meadows Trail were thwarted by a road closure, leading us to explore the Whistlers Trail instead. We also hiked the Valley of the Five Lakes Trail and visited Maligne Canyon and Sulphur Skyline Trail, where we spotted bears and enjoyed the Miette Hot Springs.

Icefield Parkway and Surrounds: The journey along the Icefield Parkway was split into two days, featuring stops at Athabasca Falls, Sunwapta Falls, Athabasca Glacier, and free camping near Lake Abraham. The highlights included wildlife sightings, breathtaking landscapes, and challenging weather conditions.

Lake Louise and Surrounding Trails: Our adventure took us to Lake Louise, where we hiked to Lake Agnes, Big Beehive, and Devil's Thumb. We encountered injured hikers, who required us to provide first aid until a helicopter arrived. We also met pilots who recommended trying ketchup chips, a new Canadian favorite.

Banff National Park and Return: The trip concluded with visits to Stanley Glacier, Sulphur Mountain, and shopping in Banff. Our culinary adventures included tasting Beavertails and more Poutine. The return to Calgary was marked by a nostalgic camper van return, exploring Calgary's 17th Avenue and Stephen Avenue, and a reflective last meal at Pho Hoai Noodle House before flying home.

Figure 2: Pictures of the trip, showing the visited campsites, our RV, weather conditions, wildlife sightings, and hike views.