



Survey Integration in NREL OpenPATH for Comprehensive Travel Behavior Evaluation



NREL
OpenPATH

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Travel Behavior Data Collection

- Smartphone apps can automatically create travel diaries.
- Automatic sensing for geospatial/temporal data (when and where).
- Manual inputs from users for qualitative data (how and why).
 - These questions range in complexity depending on use case.
 - Deeper questions: How much did your trip cost? How did you spend your time between trips?

The image displays three screenshots of a travel diary application. Each screenshot shows a map with a highlighted route, a time stamp, and trip details. The first screenshot shows a trip starting at Lansing Street, Mendocino County and ending at North Main Street, Fort Bragg, with a duration of 5:42 PM. The second screenshot shows a trip starting at North Main Street, Fort Bragg and ending at North Franklin Street, Fort Bragg, with a duration of 6:45 PM and a distance of 0.912 km in 21 minutes. The third screenshot shows a trip starting at North Franklin Street, Fort Bragg and ending at South Main Street, Fort Bragg, with a duration of 7:07 PM and a distance of 1 km in 7 minutes. Each screenshot includes a map, a time stamp, and a button to 'Add Trip Details'.

Lansing Street, Mendocino County
North Main Street, Fort Bragg
Add Trip Details

5:42 PM

100%

6:45 PM
0.912 km in 21 minutes
North Main Street, Fort Bragg
North Franklin Street, Fort Bragg
Add Trip Details

7:07 PM

100%

7:14 PM
1 km in 7 minutes
North Franklin Street, Fort Bragg
South Main Street, Fort Bragg

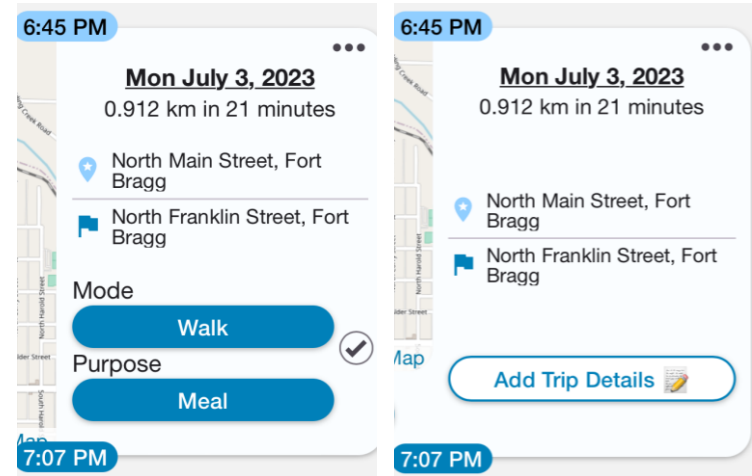
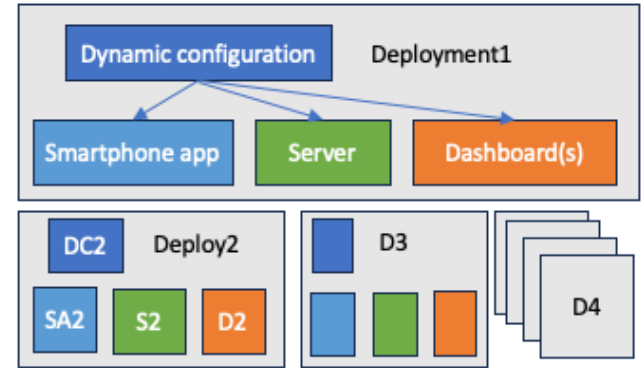
NREL OpenPATH

(Open Platform for Agile Trip Heuristics)

- Open-source platform for travel diaries— anyone can use, modify, and/or contribute.
- Multi-tenant architecture—several ongoing programs under the NREL OpenPATH umbrella.
- Configurable for different use cases.



Any parties interested in using OpenPATH can talk to us afterwards!





Spectrum of Qualitative User Inputs



Trade-off: user burden vs. richness of data

Simple “mode” and
“purpose” labels

Trip-level
questionnaire

Time use survey

lower user burden 
basic data 

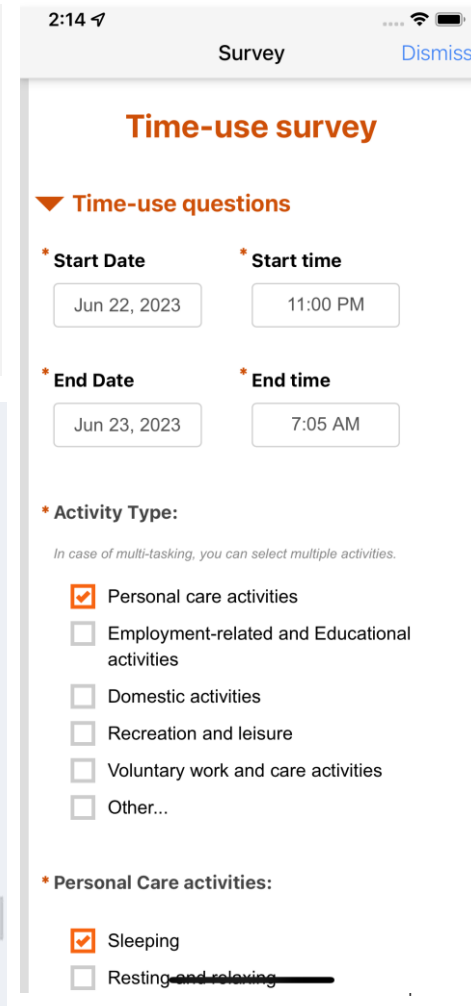
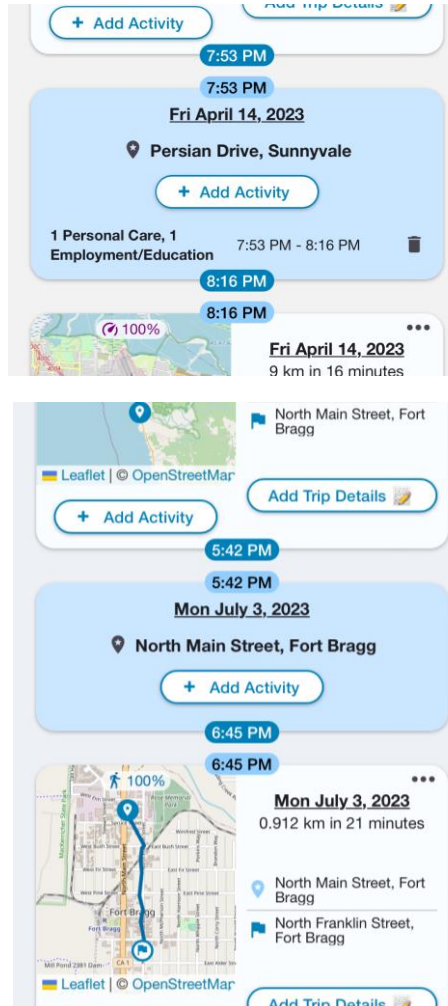
richer data 
higher user burden 

The desired use case depends on the specific goals of the research,
so we aim to support the full spectrum

Time-Based Inputs

- Users specifically record the date and time for each survey response.
- Multiple responses can be recorded, associated with trips or the places in between trips.
- Captures a richer representation of travel behavior.
- Time-use data can be used for activity-based travel demand modeling.^{1,2}

1. K.W. Axhausen and T. Gärling. 1992. "Activity-based approaches to travel analysis: Conceptual frameworks, models, and research problems." *Transport Reviews* 12 (4). <https://doi.org/10.1080/01441649208716826>.
2. R. Kitamura. 1988. "An evaluation of activity-based travel analysis." *Transportation* 15: 9–34. <https://doi.org/10.1007/BF00167973>.



Custom Surveys

- Surveys are in a standard format (ODK) used by other free and open-source tools, so it is easy to create a survey in spreadsheets or an online survey builder.
- Custom surveys integrate into the app without having to change the code.
- Surveys can support different languages, a variety of question types, conditional branching, and form validation.

The image shows the ODK Collect app interface for configuring a survey. The top part displays the 'Time-use Survey' configuration with various activity categories and their XML values. Below that, a 'Settings' dialog box is open, showing a conditional logic rule: 'This question will only be displayed if the following conditions apply' with the condition 'Activity Type: Personal care activities'. The bottom part of the image shows a spreadsheet view of the survey data with columns for type, name, and labels in English, Lao, and Spanish.

	A	B	C	D	E
1	type	name	label::English (en)	label::ລາວ (lao)	label::Spanish (es)
2	start	start		ເລີ່ມອອກເດີນທາງ	
3	end	end		ສິ້ນສຸດການເດີນທາງ	
4	begin_group	group_hg4zz25	Personal Level Information	ຂໍ້ມູນຂອງທ່ານ	Información de nivel personal
5	select_one z	How_old_are_you	How old are you?	ທ່ານອາຍຸຈັກປີ?	¿Cuántos años tienes?
6	select_one z	What_is_your_gender	What is your gender?	ເພດຂອງທ່ານ?	¿Cuál es su género?
7	select_one z	do_you_consider_yourself	Do you consider yourself to be Transgender?	ທ່ານຄິດວ່າທ່ານເອງເປັນ ຄົນຂ້າມເພດ ຫຼື ບໍ່?	¿Te consideras transgénero?
8	select_multi	What_is_your_race_ethni	What is your race/ethnicity?	ທ່ານເປັນຄົນເຊື້ອຊາດ/ຊົນເຜົ່າໃດ?	¿Cuál es su raza/etnicidad?
9	select_one r	Do_you_have_a_driver_li	Do you have a valid drivers licens	ທ່ານມີໃບຂັບຂີ່ບໍ?	¿Tiene una licencia de conduc
10	select_one f	Are_you_a_student	Are you a student?	ທ່ານເປັນນັກສຶກສາບໍ?	¿Eres usted estudiante?
11	select_one i	What_is_the_highest_gra	What is the highest level of educ	ລະດັບການສຶກສາຂອງທ່ານ?	¿Cuál es el grado más alto o el
12	select_one t	Are_you_a_paid_worker	Are you a paid worker?	ທ່ານເປັນພະນັກງານບໍ?	¿Eres un trabajador asalariado
13	select_one j	Which_one_below_descri	Which one below describe you b	ຂໍ້ມູນໃດລຸ່ມນີ້ອະທິບາຍທ່ານ?	¿Cuál de los siguientes te descr
14	end_group				

Questions?

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