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FEBRUARY 2023

Project Title: Transit Research

Task Number: 3913

Start Date: March 1, 2022

Completion Date: February 28, 2024

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Digital Mobility Assistant for Disabled Transit Users

Build a working prototype system that would help generate a travel plan for a disabled person using available mobility options that include transit and paratransit.

WHAT IS THE NEED?

Spatial mismatch is the mismatch between where low-income households reside and suitable job opportunities. Disabled people who can and want to work are dramatically affected by the spatial mismatch. Generally, people of lower income have to compromise on choosing where to work or find an appropriate and sustainable means of transportation.

For most of them, public transit and occasionally paratransit, is the only way to get to and from work. The main pain points of the disabled travelers include the inability to get a door-to-door ride; long waiting and travel times; risk of ending up stranded away from home due to changing services or lack of afterhours service; safety concern because of COVID-19 that caused rising crime and riots.

One way to help is to provide an application that would serve as a personalized digital companion to disabled travelers providing information about mobility options in trip planning, given travelers' circumstances.

WHAT ARE WE DOING?

At University of California, Berkeley Partners for Advanced Transportation Technology (PATH), the researchers will focus on working with the disabled community of Contra Costa County through the center for Independent Living Resources of Solano and Contra Costa Counties (ILRSCC). They will build a knowledge graph (KG) of disabled travelers with their needs, restrictions, preferences, and points of interest (POIs); and mobility services including transit, paratransit and private companies such as Uber WAV with their schedules, coverage areas, cost, etc.

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Research Notes

As the KG grows, new relationships between existing entities may be discovered. A knowledge update engine will be a distinguishing feature of the system. A review-like function will be the core feature of the KG built on the semi-automatic collection of feedback, reviews and surveys. This will update user preferences. The information contained in the KG will be accessible through an Application Programming Interface (API) by a functional prototype user interface (UI).

WHAT IS OUR GOAL?

The goal of this research is to build a working prototype system that would help generate a travel plan for a disabled person using available mobility options that include transit and paratransit but is not limited to those. The target community consists of the customers of ILRSCC.

In addition to the prototype, the research team will produce a concept design for the product that will describe how travelers and mobility services are added to the system and a path to deployment.

WHAT IS THE BENEFIT?

The proposed solution will enable personalization of trip planning for disabled populations. It can be readily extended to other geographic regions. It can also be extended to other traveler groups and, in general, it promotes the idea of making public transportation more accessible, more convenient, and friendlier.

This project will help Caltrans to understand how conventional transportation solutions can be adapted for vulnerable users – elderly and disabled. It would give transit providers an opportunity to test a user-centric approach to their ridership and learn more about their customers, even though it concerns a specific customer group.

WHAT IS THE PROGRESS TO DATE?

Work completed from October 1, 2022-December 31, 2022.

Task 2: Database of mobility resources and disabled traveler needs

Interviews with disability resource centers:
• Department of rehabilitation
• Regional independence living center
• World institute on disability
• Schools' disability resources
• Paratransit Coordination Councils

Demand side characteristics:

Disability type	Required assistance level	Needs ADA vehicle	Travel modes used	Stress level when traveling	Stress factors
Low vision / blindness	Need driver's assistance	Yes / No	Bus	No stress, it's routine	Time
Hard hearing / deafness	Travel with assistant		Rail	Generally, it's a routine, but occasionally stressful disturbances happen	Cost
Mobility disability	Travel with service dog		Paratransit	Inconvenient, but used to it	Ease of use
Cognitive disability	No assistance needed		TNC	Anxious about every trip	Safety
Independent living disability			On-demand shuttle	Trying to avoid travel because it's so unpleasant	Lack of adequate assistance
Developmental disability			Personal car		Service area size
			Volunteer transport service		Reliability
					First/last mile without service
					Eligibility requirement

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Research Notes

Mobility Resources:

Agency Name	Transit Mode	Service Area	Routing Type	Schedule Type
	ADA Paratransit	routes based	fixed routes	fixed schedule
	On-demand Shuttle	geographic zone	door-to-door	in-advance reservation
	Community Shuttle		curb-to-curb	real-time reservation
	Commercial Service		fixed pick-up stops	
	Volunteer Driver Program		destination-of-interest	
GTFS	Self-defined	GTFS	GTFS	Self-defined
		GTFS-flex	Self-defined	

Agency Name	Transit Mode	Service Area	Routing Type	Schedule Type
LINK Paratransit	ADA Paratransit	geographic zone	door-to-door	in-advance reservation
	CCCTA	within 1-1/2 mile of a fixed bus route		
WestCAT Paratransit	ADA Paratransit	geographic zone	door-to-door	in-advance reservation
	WCCTA	within ¾ mile of a fixed bus route		1-7 days in advance
Tri-Delta Transit Paratransit	ADA Paratransit	geographic zone	door-to-door	in-advance reservation
	ECCTA	within ¾ mile of a fixed bus route		
East Bay Paratransit	ADA Paratransit	geographic zone	door-to-door	in-advance reservation
	AC Transit			
R-Transit	ADA Paratransit	geographic zone	door-to-door	in-advance reservation
	Richmond City	Richmond, El Cerrito, San Pablo, North Richmond, El Sobrante, Kensington, Pinole		1-10 days in advance, same day with a higher fee
Monument Corridor Shuttle	Community Shuttle	routes based	fixed routes	fixed schedule
		two routes through the Monument Corridor	two routes to key service centers	

San Pablo's Door-to-Door Shuttle	Community Shuttle		door-to-door	in-advance reservation
		El Sobrante, Pinole, Richmond, San Pablo	to medical appointments, grocery, post office, bank	
Rossmoor Bus	Community Shuttle	geographic zone	destination-of-interest	in-advance reservation
		Rossmoor	Community destinations, Rossmoor shopping center, medical centers	at least one hour in advance
Silver Ride	Commercial Service		door-to-door	
Mobility Matters	Volunteer Driver Program	geographic zone	door-to-door	in-advance reservation
		Contra Costa County		