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Smart Arrival Notification System for ADA Passenger Paratransit Service Using Smartphone

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Introduction and Problem Statement

- ADA paratransit provides door-to-door service for registered users who reserve a ride.
- Most paratransit services have pick-up time windows ranging from 20 to 40 minutes.
- Limited dwell times at the pick-up locations.
- Problems:
 - Long wait times
 - 'No-shows'
 - Unreliable and unpredictable transit times

Pick-up Time Window

Transportation Agency	ADA Service	Pickup Time Window
New York	Access-a-Ride	30
San Francisco	San Francisco Access	20
North Carolina	SCAT	30
Chicago	Pace	20
New Jersey	Access Link	40

Solution:

Smart Arrival Notification System



Smart Arrival Notification System

- Provides personalized ride arrival notification through a telephone call or SMS to each ADA passenger individually
- Passenger can request advance notification time that meets their own needs (usually 5-10 minutes prior to vehicle arrival)
- Utilizes Google Traffic API and GPS positioning to provide estimated time of arrival

System Architecture

Mobile Application



Service Manager



Automated
Phone Call
Message

ADA Customer





- 1) Google Distance and Traffic Matrix API
- 2) Guidance Display



Paratransit user database:

- 1) Personal data for users
- 2) Pick-up location (geocode) and Time
- 3) Preferred Advance Notification (e.g., 5,10,15 min)
- 4) Automated voice call generation using Twilio API



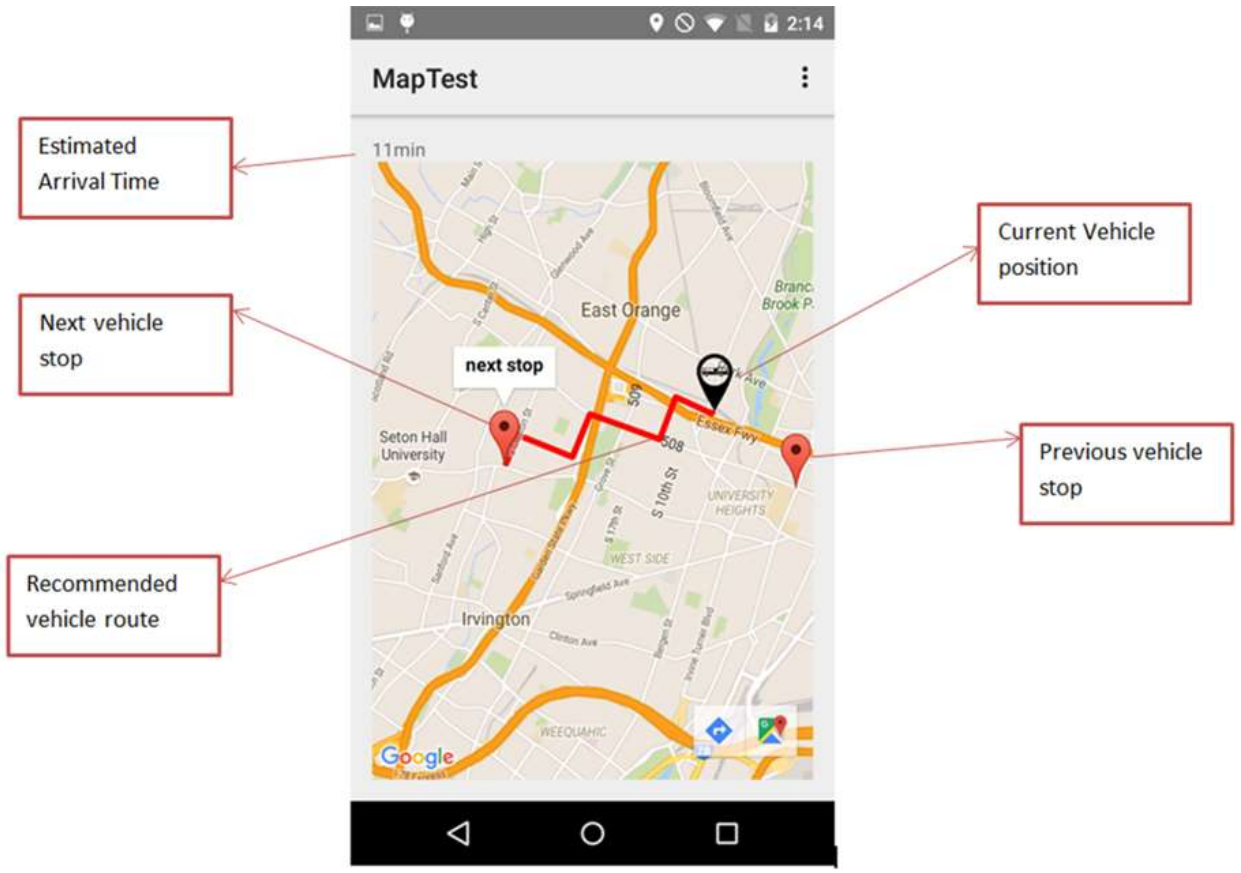
Voice Call

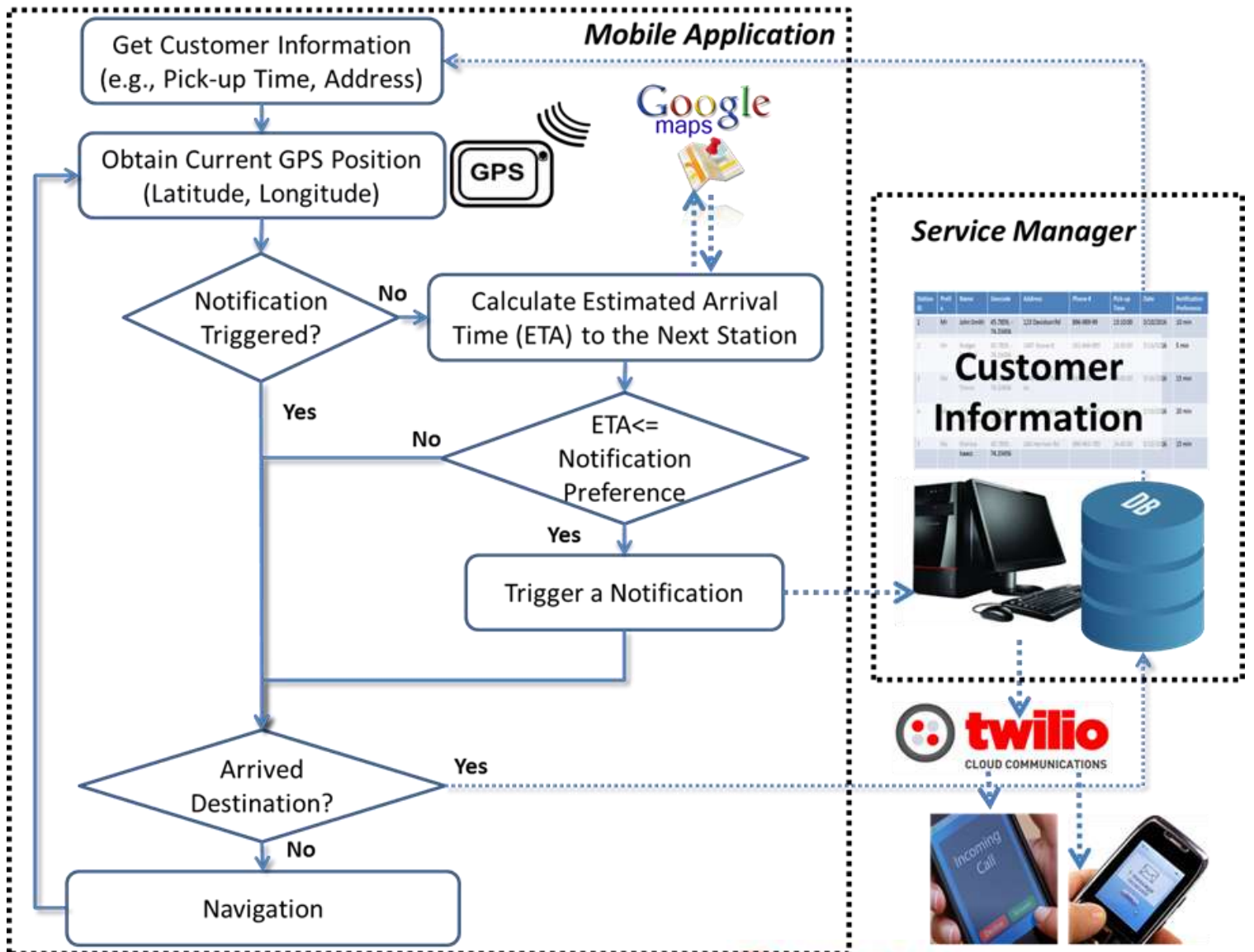


Text Message



In-vehicle Mobile Application

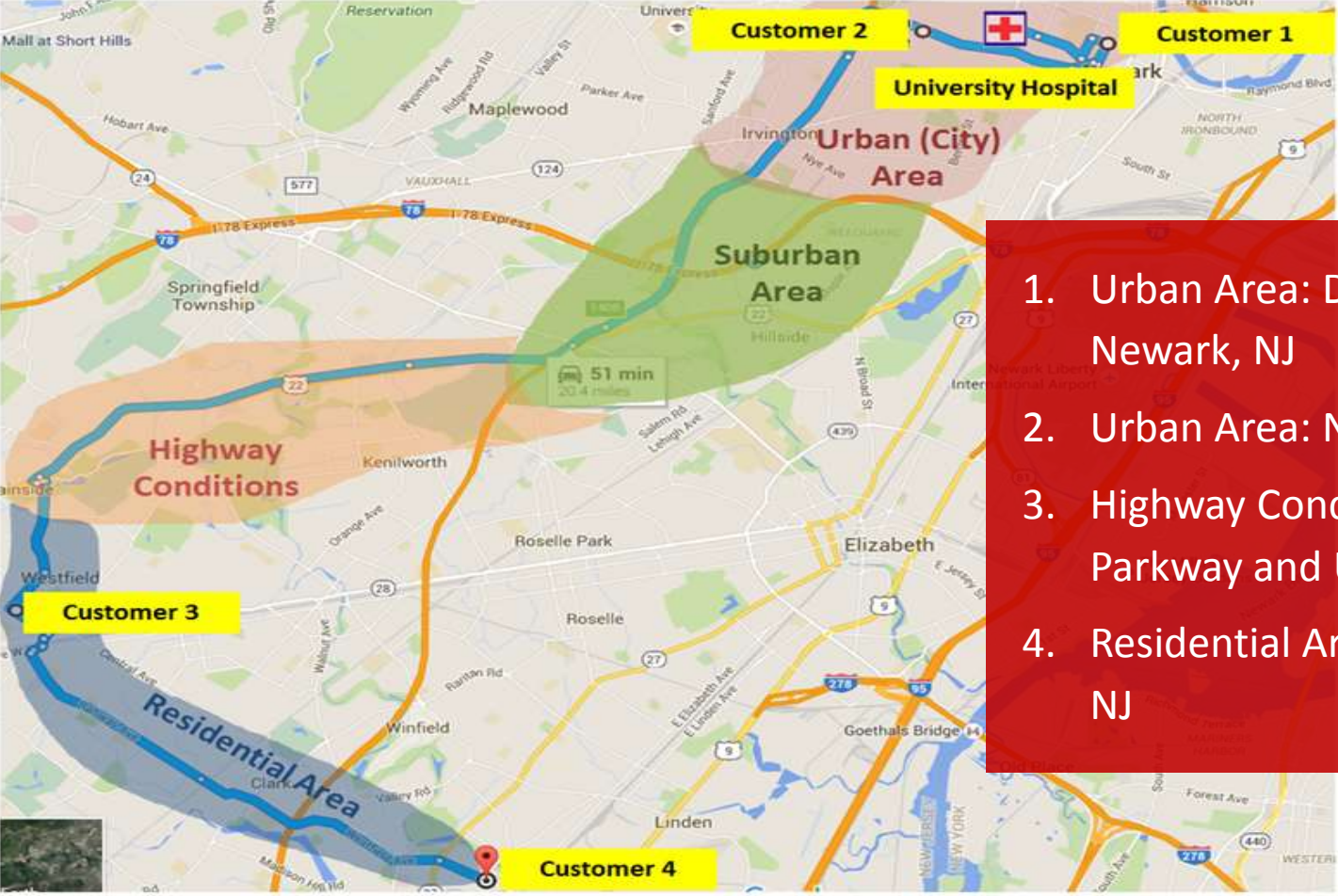




Phone Notification



Preliminary Field Evaluation

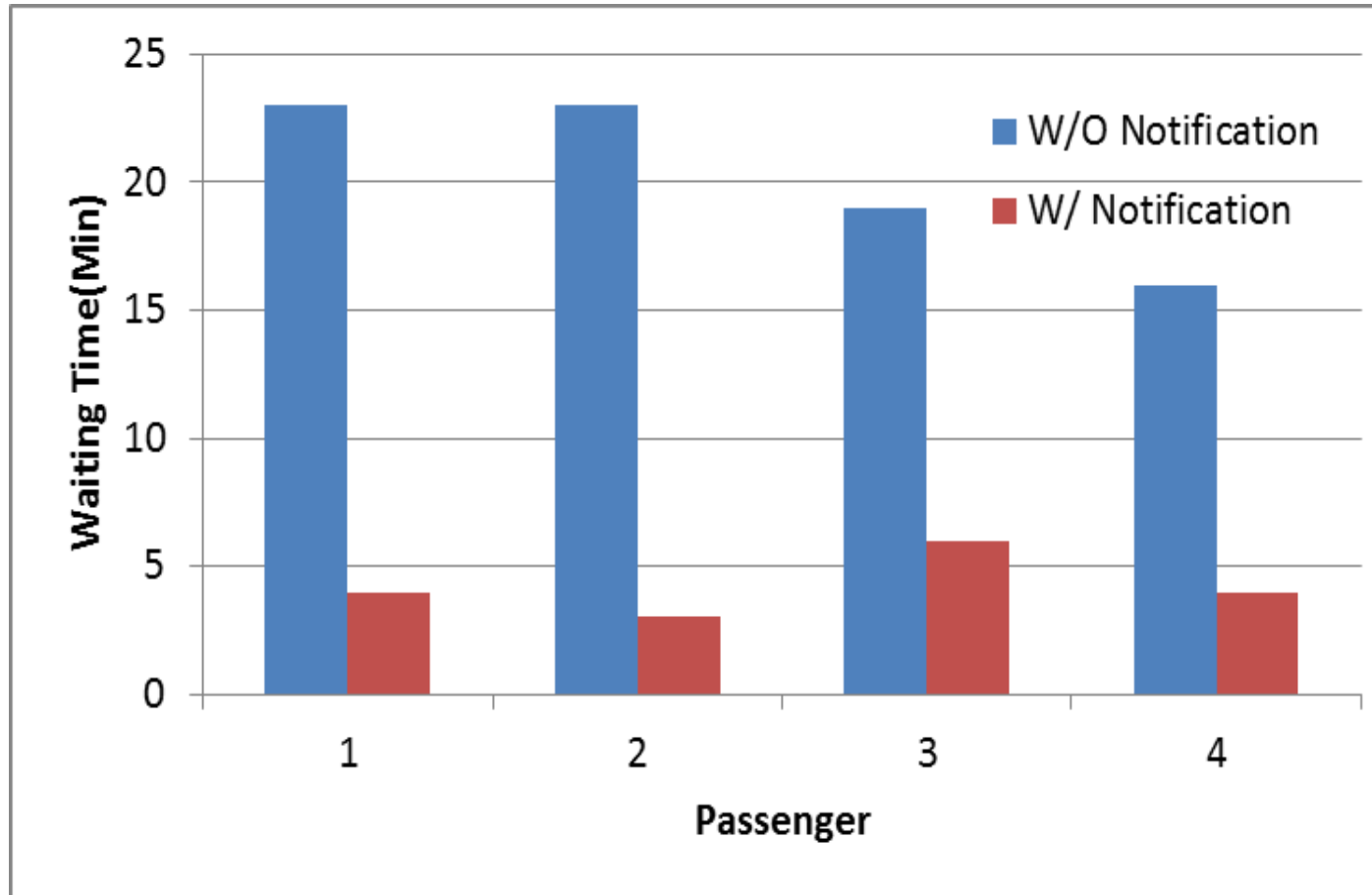


- 1. Urban Area: Downtown Newark, NJ
- 2. Urban Area: Newark, NJ
- 3. Highway Conditions: GS Parkway and US 22
- 4. Residential Area: Westfield NJ

Preliminary Results

Customer	Scheduled Pick-up Time	Notification Time	ETA	Actual Arrival	Time Difference
1	11:50 AM	11:44 AM	11:55 PM	11:53 AM	-2/+3 min
2	12:05 PM	12:00 PM	12:10 PM	12:08 AM	-2/+3 min
3	12:35 PM	12:23 PM	12:33 PM	12:34 PM	+1/-1 min
4	12:55 PM	12:42 PM	12:52 PM	12:51 PM	-1/-4 min

Waiting Time



Benefits

- Customers
 - Improved comfort and accessibility
 - Reduced wait times and 'no shows'
 - Time management aspect
 - Better customer satisfaction
- Operators
 - Increased service level (more customers served)
 - Improved efficiency

Project Team

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Questions

