Focus Group

Inaugural Meeting

June 16, 2017 10:00 a.m. to 2:00 p.m.

Technology Ventures Building  University of Maryland
Welcome / Self-intros

(All)
Agency group members
- David Heller (SJTPO)
- Wenjing Pu (FHWA)
- Peng Xiao (VDOT)
- Keith Miller (NJTPA)
- Terrell Hughes (VDOT; alternate)

CATT Lab participants
- John Allen
- Nikola Ivanov (may call in)
- Jenny Lees
- Catherine Plaisant (if available)
- Mark Franz

Other UMD participants
- Nikola Markovic (CATT)
- Di Yang (NTC)
Meeting Objectives
(Allen)
Our key takeaways for today

› Better understanding of your agency’s vision / priorities (related to O-D data use)

› Your current uses of O-D data

› Specific O-D use cases that are most important to you

› What future O-D uses, and use cases will be important to you

› Features and functions you’d like to see included in the OD Data Suite

› Visualizations, summaries and types of reporting that would be most helpful
Background / Context

(Markovic)
The Case for Use Cases
(Franz)
Trajectory Data Potential

➢ Trajectory data allows for:
   ➢ A new data source for conducting legacy planning and operations analysis
      ➢ historical network analysis (travel times, speeds, etc.)
      ➢ travel pattern analysis (O-D matrices, trip generation and distribution rates)
   ➢ New (and long overdue) travel behavior analysis
      ➢ Trip departure, route choice and travel time evaluation
      ➢ Dynamic O-D matrix analysis
      ➢ Pass through Link/Geography studies

Need to define desired tool functionality and associated use cases...
Potential Functions

› O-D matrices and maps

› Select link/geography analysis

› Performance assessment

› Planning applications
O-D Matrices and Maps

Functionality

› Create customizable O-D Matrices
  – Select time period and geographies of interest
  – Select specific days of weeks and hours of day
  – Select vehicle types (commercial, passenger, all)
  – Travel time and trip distance statistics between O-D pairs

Use Case

› Develop local and high resolution trip generation rates
› Discover high frequency O-D pairs for improving/expanding transit services
Select Link/Geography Analysis

Functionality

- Select segment(s) of interest to create:
  - O-D matrix of all trips that passed through link/geography for the time period of interest
  - Filter by vehicle type
  - O-D Map
  - Map displaying full routes of trips using link of interest
  - Travel time and trip distance statistics between O-D pairs
  - Average departure time and departure time standard deviation

Use Case

- Identify locations to promote/incentivize demand management strategies such as tele-work, flex hours and car-pooling
Performance Assessment

Functionality

› Show change in travel patterns and network performance
  – Delta O-D matrices
  – Change in route usage, travel times, trip distances, etc.

Use Case

– Before-After study of the impacts of a mixed-use development
Planning Applications

Functionality

- Filter by common planning variables such as:
  - Household income/Value of Time
  - Trip Purpose (Mandatory or Non-Mandatory)
  - Vehicle Occupancy
  - Other socio-demographic variables

Use Case

- Assess the impact of proposed installation of HOT lanes on the segment of a major commute interstate segment
I want to…

Key Study Aspects (O-D / Trajectory-related)

Study Analysis Steps

Key Function / Features

Map

Animated Map

Arc Chart

Graph (B, P, L)

O-D Table

Specialized Reports

Etc.

Conduct a Traffic Impact Study

- Trip Distribution
  - Regional
  - Local project (am/pm)
  - Local related projects (am/pm)
- Search for comparable development type (POI function)
- Gather data about the traffic on local nearby roads (define radii of influence)
- Focus on volume on each local road at different day and times
- Select the new proposed location (probably as a small area drawn by hand)
- Gather the local pattern(s) within new proposed location
- Export report on proposed location and comparable
- Export all the data so it can be used in a separate simulation

Search for comparable POI

Select days / time

Define geography (Map draw, other)

Define trajectories for selected geography / day & times

Export to report(s) for proposed locations & comparable

Export all data for use in separate simulations (TDM sub-area)

Example Story

A local land developer is interested in purchasing a parcel of land to develop a shopping center. Before being approved, a traffic impact study must be conducted under the supervision of the local transportation agency. Recent applications of the trip generation and distribution models have underestimated the traffic impact of similar proposed developments as they were based on a national survey conducted eight years ago. To better estimate the trip generation and distribution rates, the local transportation agency will utilize the new CATT Lab OD analysis suite using recent and local data.

Supporting Story UX (Mockups, etc.)

Usability matrix concept to organize and track various use cases and applicable features, functions and results
Questionnaire Results
(Allen)
Agency Vision / Transportation Priorities (as it relates to using OD data)

› **NTC**
  - Provide travel demand model users with a *more intuitive understanding of model results* by visualizing OD tables and showing travel patterns

› **SJTPO**
  - Desire quality O-D data to: validate the Travel Demand Model; general roadway trip type (e.g.; resident vs visitor); major event prep (Atlantic City Air Show); large corridor studies (conducted/funded); support mandated Federal processes (e.g.; Congestion Management Process)

**Bottom Line**: clear understanding and depiction of travel (patterns, trip type, etc.) for planning & project development
Current O-D use

- **NTC**
  - We obtain OD data from activity-based travel demand models and *use OD tables for assignment* (both static and dynamic assignment)

- **SJTPO**
  - *Model calibration* (OD data gleaned from a Regional Household Travel Survey, specifically for trip purpose), *supplement major corridor planning studies*

**Bottom Line:** primary focus is on travel demand modeling (calibration, assignment, etc.)
Current O-D use cases (priorities ◦ benefits ◦ challenges)

› **NTC**
  - Regarding activity-based travel demand models, the major challenge is to develop tools that allow users to display customized OD tables based on vehicle class, trip purpose, time of day, etc.

› **SJTPO**
  - Priorities include *SJ Model Recalibration & Validation*, the major challenge is compiling this data into a package that is easily manageable, and where staff members can make some solid conclusions without spending inordinate amounts of time.

**Bottom Line:** quick and easy way agencies can manage data and develop robust, customized output
Future O-D use / use cases

> **NTC**
  - We plan to use *OD data as an indicator of travel patterns* which aids in understanding impacts of different policy scenarios on travel patterns.

> **SJTPO**
  - Creating *visually appealing & informative maps for planning studies and reports*, conducting some *before/after analysis of major improvement projects*, help to show *regional external vs internal traffic* to possibly *leverage additional federal funding*, *demonstrate the level of tourism of the region* (*FAST Act planning factor*)

**Bottom Line**: quality visuals (maps) for reports, major project assessment, and travel type and pattern results (to leverage funding, meet requirements, etc.)
Features & functions; visualization, summaries & reporting

- **NTC**
  - **Function**: customizing/filtering OD data based on different travel characteristics (e.g. vehicle class, trip purposes, etc.).
  - **Visualization**: *show OD data for a selected link/corridor* to understand the origin and destination of vehicles that use this link/corridor.

**Bottom Line**: travel characteristic custom filtering; select link analysis visuals
Misc.

› **SJTPO**
  - More than ever, need to *tell a story and be visually appealing*, without getting into a lot of technical jargon.

**Bottom Line:** quick and easy way agencies can manage data and develop robust, customized output
O-D data uses (as reported in a recent “Instant Poll” by PDA Suite User Group members)

Most likely uses of O-D data:

- Modeling (calibration / validation): 83%
- Studies (e.g. - Traffic Impact Studies): 78%
- Reports / Communication with various audiences: 78%
- Project/ Program Development & Assessment: 67%
- Mapping / Graphics: 61%
- I Don’t use O-D data: 0%

(taken during the 05.11.2017 PDA Suite User Group Meeting)
Our Concepts

(Lees • Franz • Allen)
Choosing an O-D data set
Welcome to the OD Data Suite User@email.com!

Please choose one of the available data sets to explore:

<table>
<thead>
<tr>
<th>DATA SETS</th>
<th>DATA PROVIDER</th>
<th>DATE RANGE</th>
<th>DETAILS</th>
</tr>
</thead>
</table>
| Maryland Data Set                     | INRIX         | February, June, July, October 2015 | Temporal Data Granularity: 1 Second  
Spatial Data Granularity:  
Vehicle Types Included: Cars and Trucks (separated or aggregated)  
Waypoints Included: Yes |
| Washington DC Data Set                | INRIX         | 2015                | Temporal Data Granularity: 1 Second  
Spatial Data Granularity:  
Vehicle Types Included: Cars and Trucks (separated or aggregated)  
Waypoints Included: Yes |
| Washington DC Metropolitan            | HERE          | January through July 2016 | Temporal Data Granularity:  
Spatial Data Granularity:  
Vehicle Types Included:  
Waypoints Included: No |
| Statistical Area Data Set             |               |                     |                                                                                                                                 |

More Information...
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</thead>
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<td>INRIX</td>
<td>February, June, July, October 2015</td>
<td>Temporal Data Granularity: 1 Second</td>
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<td>Waypoints Included: Yes</td>
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<td>Trip Types Included:</td>
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<td></td>
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<td>- Internal (trips starting and ending in MD)</td>
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<tr>
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<td>- From - To (trips starting in MD and ending outside of MD)</td>
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<tr>
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<td></td>
<td></td>
<td>- To - From (trips starting outside of MD and ending in MD)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Pass Through (trips starting and ending outside of MD that have at least one waypoint in MD)</td>
</tr>
<tr>
<td>Washington DC Data Set</td>
<td>INRIX</td>
<td>2015</td>
<td>Temporal Data Granularity: 1 Second</td>
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<td></td>
<td>Waypoints Included: Yes</td>
</tr>
</tbody>
</table>

More information...
Building an Origin – Destination Matrix
Set Up Your Origin and Destination Matrix

Choose Your Matrix Layout

- Matching axes: Both axes, origins, and destinations, will show the same geographies.
- Custom axes: Both axes, origins, and destinations, can show different geographies.

Set Up Matrix
Set Up Your Origin and Destination Matrix

Select geography from map

Use the controls on the map to define your geography. Controls with a ‘+’ allow you to add space, while controls with a ‘-’ allow you to remove space from your selection.
Set Up Your Origin and Destination Matrix

Select geography from map

Use the controls on the map to define your geography. Controls with a '+' allow you to add space while controls with a '-' allow you to remove space from your selection.

When you are finished making your selection click the done button.

[Map Image]

[Button] Done

[Button] Back to Query Page
Focus Group

Set Up Your Origin and Destination Matrix

Select geography from map

Use the controls on the map to define your geography. Controls with a '+' allow you to add space while controls with a '-' allow you to remove space from your selection.

Selected geography

Geography 1

Back to Query Page
Set Up Your Origin and Destination Matrix

Select geography from map

Use the controls on the map to define your geography. Controls with a ‘+’ allow you to add space while controls with a ‘−’ allow you to remove space from your selection.

Selected geography

- Geography 1
- Geography 2

Back to Query Page
OD Data Suite

Origin and Destination Matrix

Selected date range: June and July 2015 and March 2016 All Days of Week

Legend:
- 0% of Trips
- 10% of Trips

Matrix controls
Display options

Destinations

Maryland

<table>
<thead>
<tr>
<th>Origins</th>
<th>Frederick County</th>
<th>Howard County</th>
<th>Baltimore County</th>
<th>Montgomery County</th>
<th>Total trips from selected geographies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maryland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frederick County</td>
<td>6%</td>
<td>5%</td>
<td>5%</td>
<td>4%</td>
<td>20%</td>
</tr>
<tr>
<td>Howard County</td>
<td>4%</td>
<td>6%</td>
<td>3%</td>
<td>7%</td>
<td>22%</td>
</tr>
<tr>
<td>Baltimore County</td>
<td>7%</td>
<td>4%</td>
<td>8%</td>
<td></td>
<td>25%</td>
</tr>
<tr>
<td>Montgomery County</td>
<td>7%</td>
<td>12%</td>
<td>8%</td>
<td>10%</td>
<td>33%</td>
</tr>
<tr>
<td>Total trips into selected geographies</td>
<td>24%</td>
<td>29%</td>
<td>19%</td>
<td>28%</td>
<td>100%</td>
</tr>
</tbody>
</table>

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Origin and Destination Matrix

- Selected date range: June and July 2015 and March 2016 All Days of Week
- Matrix controls
- Display options

Legend:
- 0% of Trips
- 2%
- 4%
- 6%
- 8%

Destinations:
- 28 of 264 geographies

Origins:
- 14 of 264 geographies
Visualizing roadway segment trip O-Ds
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Trips that traveled on the selected road segments

I-270 Southbound between Sam Elg Hwy and Montrose Rd

Matrix Controls Time Range

Geographic resolution
Sub-county

Show the...
- Origins of trips passing through the selected road segment
- Destinations of trips passing through the selected road segment
- Net totals of trips traveling through the selected road segment

Number of trip origins
1 to 2 3 to 5 6 to 10 11 to 15 16 to 20 21 to 25 26 to 30 31 to 35

Pass through segment

District of Columbia 4
- Sub-county A 17
- Sub-county B 30
- Sub-county C 150
- Sub-county D 1
- Sub-county E 4
- Sub-county F 17
- Sub-county G 4
- Sub-county H 4
- Sub-county I 4
- Sub-county J 1
- Sub-county K 17
- Sub-county L 4
- Sub-county M 4
- Sub-county N 17
- Sub-county O 4
- Sub-county P 1
- Sub-county Q 30
- Sub-county R 100

19 of 32 geographies

View Map
Other potential visuals

- Map displaying routes used with line thickness representing route use frequency
- Filter for segments with:
  - top XX% of routes
  - YYY trips or greater
Other potential visuals

Display Average Trip Departure Stats

View O-D Pair Trip Duration Histograms
Building a new store X. Research other store X to see OD trends and export a report for review.

- Find Store X
  - Find actual stores: POI
  - Find geography around stores

- Long loading period?
  - Pick all parameters before results?

**REPORT**

- Store X at 123 Fake St
  - 2 mile radius
  - Total inbound trips for time period: 500
  - Inbound Trips
  - Outbound Trips
  - Trips Through
  - Internal Trips

**Heat Map**

- OR -

User could export a similar report for the proposed build site to compare travel patterns.
(2) Track peak hour trips between Suburbx to Cityx to see what kind of impact telework options for employees would have on rush hour.

- Select Suburbx and Cityx
- View trips between
- View two different rush hours
- Pick non-workdays to view compared to workdays
- Show highest and lowest travel times on map for selected TOD?
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Want to develop a commuter rail between 3 cities (connected by interstates currently). Help determine which of the 3 phases (city to city to city) would be most beneficial in what order.

- Select 3 different cities
- May want to look at different highlighted combos
  - City A + B
  - City B + C
  - City A
- Look at different on days and duration of week
- See trips between all 3 cities
- Or specifically, interstates between them.
- 10 top routes between cities somewhere.
- Rank them?
Road work or DMS impact on normal routes.

- Pick an area around Road with Rw/DMS
- By picking just the Road seems like it won’t yield much info
- Compare a time period during and before Rw/DMS
- See where traffic moves to.

Difference dates to compare:
- 01.23.17
- 01.04.17

Maybe color code these?
So easier to see with each other.
Wrap-up & Next Steps (All)
Wrap-up / Next Steps

> **For the group**
  - Summarize the meeting discussion
  - Send minutes out to group members for review, comment and approval
  - Share highlights with the PDA User Group at the next meeting

> **For the Lab**
  - Consider any suggestions to help refine features, functions and results (visuals, tables, etc.)
  - Use additional insight to help define and prioritize future tool development and deploy
Thanks for participating!

For more information, please contact:

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