Human Trajectory Sampling at the City-Day Scale Version 2

John Palmer

Abstract

This is a protocol for sampling people in order to understand patterns of mobility and activity-space segregation at the scale of city-days. The goal is to obtain a representative sample of the space-time paths that exist in a given city. Sampling points and times are choosen and then used to recruit participants. If participants consent to be part of the study, they (1) respond anonymously to a survey about their activity-spaces, and/or (2) use a mobile phone application to track themselves during a 1-week period and share their anonymized trajectory information with the research team. This protocol has been developed thanks to funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 657956.

Citation: John Palmer Human Trajectory Sampling at the City-Day Scale. **protocols.io**
dx.doi.org/10.17504/protocols.io.nj5dcq6
Published: 01 Mar 2018

Guidelines

Ethics guidelines:

- Volunteers should be accepted into the study only if they provide informed consent
- Volunteers should be accepted into the study only if they are adults and are not incarcerated, elderly, pregnant, mentally disabled or otherwise in a position that would put them at particular risk or add additional bases of vulnerability.
- The sampling method should be designed to produce gender balance in the sample.
- No personally-identifying information should be collected from participants.
- All location information collected by the survey and mobile phone tracking application is placed into a predefined grid of 4 hectare cells. Only the cell identifier, not the exact location, is recorded.
- All time information collected by the survey and mobile phone tracking application is rounded down to the nearest 15 minute interval. No exact times are recorded.

Protocol

Select Sampling Points

Step 1.

Select a set of points at which sampling will be done. These should be chosen randomly within the boundaries of the census tracts of the city being studied, with probabilities of choosing points within each census tract given by the proportion of the population residing in that tract and adjusted to

This is an open access protocol distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited

oversample tracts in which small populations of interest are believed to reside. The selection can be done using R and the sp package for R, or with QGIS, or any other software that allows for random selection of points in polygons.

Select Sampling Point Times

Step 2.

For each sampling point, select the hour at which it will be visited. These hours should be drawn randomly from a uniform distribution of times at which sampling is feasible and safe. Theoretically this could be between 0 and 24, but there are many considerations weighing against approacing people on the street during the night to ask them to participate in a study by tracking their own locations. Standard working hours (e.g. 9-5) are probably more realistic, even if this means that some activity-spaces will have no chance of being part of the sample as a result.

Snap Sampling Points to Streets

Step 3.

The randomly-selected sampling points will not necessarily be in accessible locations. Each point should therefore be moved to the closest public street.

Visit Sampling Points and Recruit Participants

Step 4.

Stand at the selected sampling points during the selected hours and ask people who pass by if they would like to participate in the study. Materials needed here are:

- Study information sheets and consent forms
- Paper-based mobility survey
- Cards with URL and QR code for data-collection app.
- Mobile phone for demonstrating app.

The sampling point should be visualized on the ground with a buffer f approximately 10 meters. The first person to cross the buffer who appears to be between the ages of 21 and 65 and not pregnant should be approached to see if they will participate in the survey. If they say 'no', the the next person who crosses the buffer should be approached. When someone gives initial agreement to participate, the researcher explains the project, checks if they meet the participation criteria (see ethics guidelines) and, if so, gives them a written information sheet and the consent form. If they consent and sign the form, they are then asked to complete the short survey. (It is made clear that they may decline at any point along the way.) Each survey has a unique alphanumeric code at the top, and this unique code is also on one of the app information cards. At the end of the survey, they are asked if they would consider using the app to track their locations. If they say yes, they are given the card and asked to download the app and enter the unique code.

SOFTWARE PACKAGE (Android)

SpaceMapper, 3

John R.B. Palmer
https://github.com/JohnPalmer/SpaceMapper

This is an open access protocol distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited

Warnings

This protocol involves recruiting volunteers at points and times selected randomly throughout a city. Consideration should be paid to potential environmental or human risks at the sampling sites and sampling sites or times may need to be adjusted accordingly. Sampling during nighttime, for example, is theoretically useful but not advisable due to the risk of crime as well as the likelihood that potential subjects will be suspicious of someone they encounter on the street trying to recruite them into a study at odd hours.

This is an open access protocol distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited