

Understanding and Guiding Pedestrian and Crowd Motion Dataset

Dataset available at: <https://github.com/dongfang-stein-yang/vci-dataset-citr>

(This dataset supports report **Understanding and Guiding Pedestrian and Crowd Motion**)

This U.S. Department of Transportation-funded dataset is preserved by Mobility 21 University Transportation Center and Carnegie Mellon University in the GitHub Repository (<https://github.com/>), and is available at <https://github.com/dongfang-stein-yang/vci-dataset-citr>

The related final report **Understanding and Guiding Pedestrian and Crowd Motion**, is available from the National Transportation Library's Digital Repository at <https://rosap.ntl.bts.gov/view/dot/56055>

Metadata from the GitHub Repository record:

About: Top-view trajectory data of pedestrians in groups under vehicle influence in controlled experiments

Below is the attached README, that can be found in the GitHub Repository:

Vehicle-Crowd Interaction (VCI) - CTR Dataset

Top-view trajectory data of pedestrians in groups under vehicle influence in controlled experiments

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Note

A major update was done on Apr 19, 2019. An extended Kalman filter was applied for refining the vehicle trajectory, so that the output vehicle state contains (x, y, heading, speed), which is in accordance with a vehicle model (bicycle model).

A sister dataset of pedestrian trajectories, DUT dataset, which consists of everyday scenarios in university campus, can be accessed at [here](#).

The detailed description of both datasets can be accessed at arXiv preprint: [Top-view Trajectories: A Pedestrian Dataset of Vehicle-Crowd Interaction from Controlled Experiments and Crowded Campus](#).

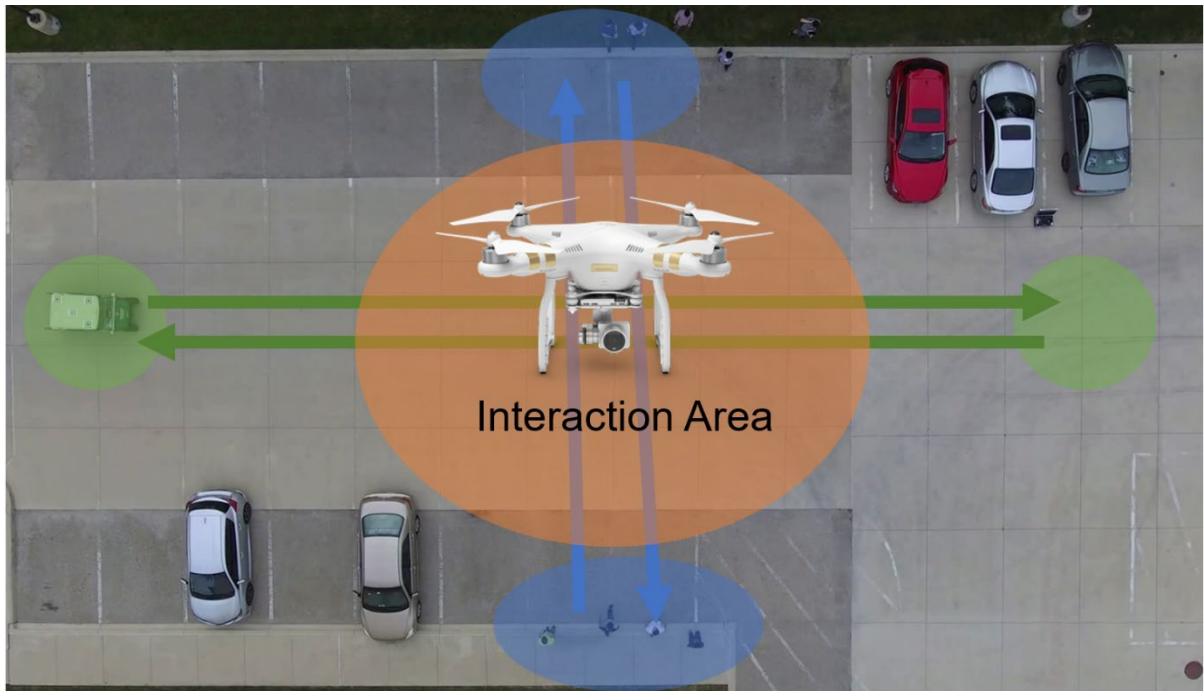
This paper was accepted to [The 30th IEEE Intelligent Vehicles Symposium in Paris](#).

If you find the dataset useful, please consider citing the above paper.

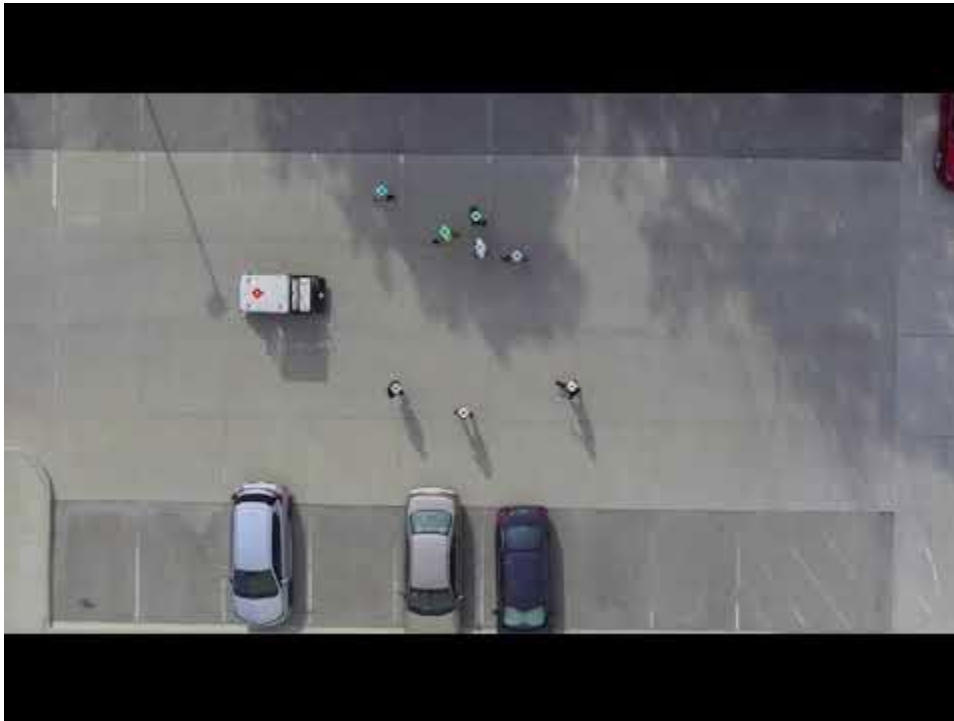
Overview

The CTR dataset was collected in the controlled experiments that were conducted in a parking lot near the facility of Control and Intelligent Transportation Research (CTR) Lab at The Ohio State University (OSU). The controlled experiments consist of a series of fundamental vehicle-crowd interactions in the hope of analyzing interactive pedestrian motion under the vehicle influence. A DJI Phantom 3 SE Drone with a down-facing camera on a gimbal system was used as the recording equipment. Participants are members of CTR Lab at OSU. During the experiments, they were instructed to walk from one small area (starting points) to another small area (destinations). The employed vehicle was an EZ-GO Golf Cart manually driven by a participant. 3 markers were put on top of the vehicle to help vehicle motion tracking, of which the vehicle center position is calculated by geometry.

Below is a figure showing the configuration of the controlled experiment area (a parking lot near CTR Lab at OSU). The vehicle (a golf cart) moves back and forth between two blue areas. Pedestrians move back and forth between two green areas. The interaction happens in the orange area, which is also the central area of the recording.



A video clip with both the pedestrians and the vehicle labeled is shown below:



Or you can download it [here](#)

Download Stabilized Raw Videos

The stabilized raw videos of CTR dataset can be downloaded at following links:

- [Google Drive Download](#).
- [Baidu Yun Download](#). Code: h5kj

Experiment

Scenarios:

There 6 different scenarios in the controlled experiments designed for the purpose of detailed comparison and analysis. They are shown below:

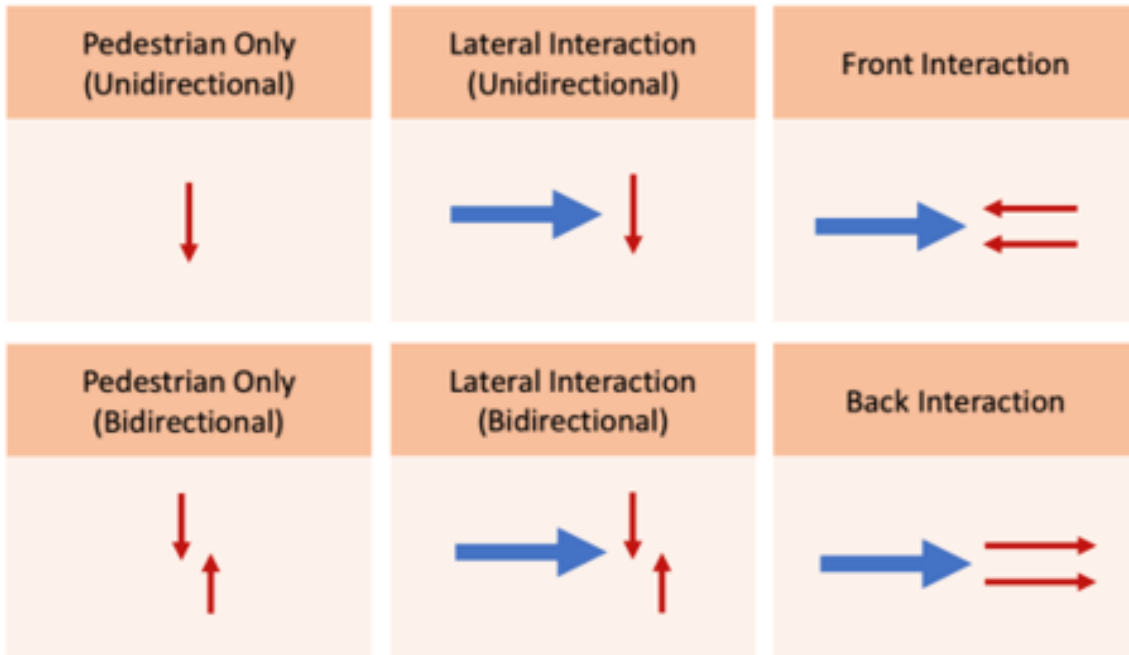


Fig. 3. Designed scenarios of controlled experiments. Red arrows indicate the motion of pedestrians/crowd, while blue arrows indicate vehicle motion.

TABLE I
NUMBER OF CLIPS IN EACH SCENARIO OF CITR DATASET

Scenarios	Num. of clips
Pedestrian only (unidirectional)	4
Pedestrian only (bidirectional)	8
Lateral interaction (unidirectional)	8
Lateral interaction (Bidirectional)	10
Front interaction	4
Back interaction	4

Statistics

- 340 pedestrian trajectories in total
- 38 video clips, with each clip of about 20 seconds

Description of The CITR Repository

Dataset in `\data`

Inside this folder, there are raw `\trajectories` and `\trajectories_filtered`. The above 6 scenarios are grouped by folders.

Filtered Trajectories

We recommend you to use data in `\trajectories_filtered`.

`.txt` is the ratio/scale file that converts between pixel coordinates (1920x1080) and coordinates in meters. All the recorded trajectories have already been converted in meters. If you want to convert back to pixels for visualization, you can simply multiply the numerical value in this file.

`.pdf` is a plot giving you an overview of the trajectories (colored is raw, and black is filtered).

There are two `.csv` files, one for all pedestrians, one for all vehicles. Below is the header description

For pedestrian `.csv`:

```
id: pedestrian id
frame: frame number of the video clip
label: 'ped' means pedestrian
x_est: estimated x position
y_est: estimated y position
xv_est: estimated velocity in x axis
yv_est: estimated velocity in y axis
```

For vehicle `.csv`:

```
id: vehicle id
frame: frame number of the video clip
label: 'veh' means vehicle
x_est: estimated x position
y_est: estimated y position
psi_est: orientation (heading angle) of the vehicle (in rad)
vel_est: longitudinal velocity of the vehicle
```

Raw Trajectories

If you would like to use raw \trajectories, be careful that they are stored in a different format:

Each .csv file corresponds to only 1 object, with the ID on the file name, for example, p3.csv means pedestrian with ID 3, v1.csv means vehicle with ID 1.

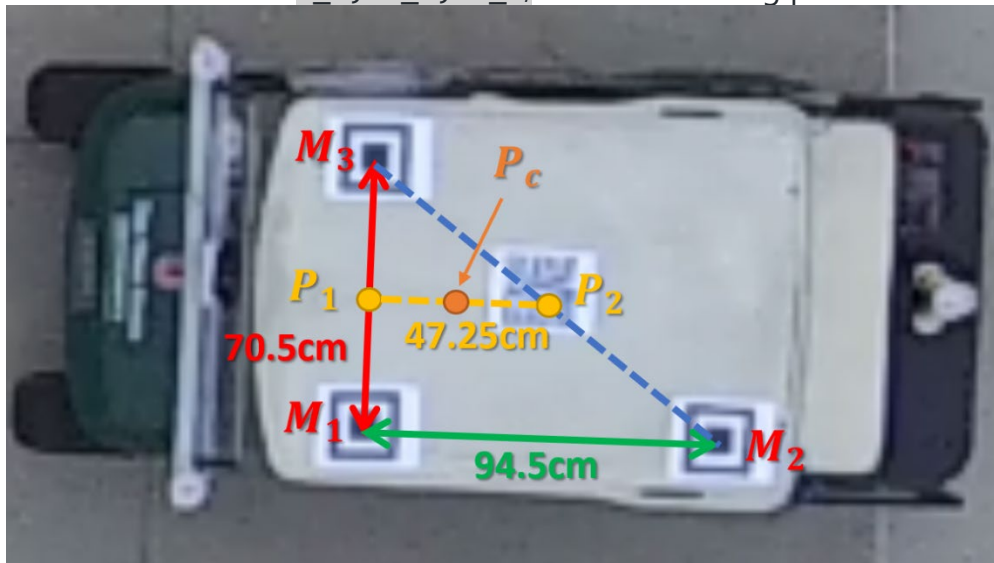
For pedestrian .csv:

```
frame: frame number of the video clip  
id: pedestrian id  
x: tracked x position  
y: tracked y position
```

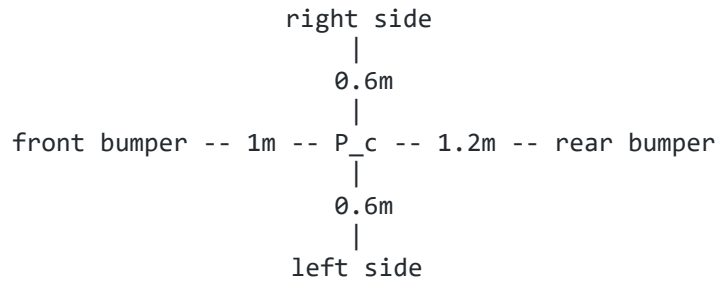
For vehicle .csv:

```
frame: frame number from the video clip  
id: vehicle id  
x_c: x position of P_c  
y_c: y position of P_c  
x_1: x position of P_1  
y_1: y position of P_1  
x_2: x position of P_2  
y_2: y position of P_2
```

For the definition of P_1, P_2, P_c, see the following picture:



Below is a rough measure of the vehicle shape. If you need precision, you can measure it yourself by using the above figure.



Again, there is a `.txt` ratio/scale file that converts between pixel coordinates (1920x1080) and coordinates in meters

Filters and Tools

The data has already been filtered, so you don't have to do it again. We just provide them for your reference.

These are python codes for filtering the raw data `filter_trajectories.py` and generating statistics `statistics.py`. The Kalman filters were implemented in `tools\kalman_filters.py`.

Errors

- If you find any errors, please contact the author.

Recommended citation:

Yang, Dongfang, Redmill, Keith, Ozguner, Umit, 2019, " Understanding and Guiding Pedestrian and Crowd Motion Dataset", <https://github.com/dongfang-steven-yang/vci-dataset-citr>

Dataset description:

This dataset contains 1 .zip file collection described below.

vci-dataset-citr-master.zip:

This collection contains a total of 981 files. In the .zip file collection, the general files can be found in the initial folder, while the rest are broken down until four groups: tools, scripts, legacy, and data. A general explanation of the folders and files within is shown in the above README that was included in the GitHub Repository and with the .zip collection.

National Transportation Library (NTL) Curation Note:

As this dataset is preserved in a repository outside U.S. DOT control, as allowed by the U.S. DOT's Public Access Plan (<https://ntl.bts.gov/public-access>) Section 7.4.2 Data, the NTL staff

has performed *NO* additional curation actions on this dataset. NTL staff last accessed this dataset at <https://github.com/dongfang-stein-yang/vci-dataset-citr> on 2020-06-01. If, in the future, you have trouble accessing this dataset at the host repository, please email NTLDataCurator@dot.gov describing your problem. NTL staff will do its best to assist you at that time.