Congestion reduction via personalized incentives Dataset
Datasets available at: https://doi.org/10.5061/dryad.ncjsxkst8

(This dataset supports report **Congestion Reduction via Personalized Incentives**)

This U.S. Department of Transportation-funded dataset is preserved by the University of California in the digital repository Dryad (https://datadryad.org/), and is available at https://doi.org/10.5061/dryad.ncjsxkst8.

The related final report **Congestion Reduction via Personalized Incentives**, is available from the National Transportation Library's Digital Repository at https://rosap.ntl.bts.gov/view/dot/59105.

Metadata from the Dryad Repository record:

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Abstract: The purpose of this research is to develop real-time algorithms to reduce traffic congestion and improve routing efficiency via offering personalized incentives to drivers. The incentives and alternative routes should be chosen smartly in order to maximize the probability of acceptance by drivers and to avoid the creation of new congestion in other areas of the network. To this end, we propose to exploit the wide-accessibility of smart communication devices and develop a real-time look-ahead incentive offering mechanism using individuals' routing and aggregate traffic information. The proposed approach relies on historical data and state-of-the-art traffic prediction methodologies to continually predict congestion and traffic flow of the network. Using this prediction and based on individual preferences, the central controller offers personalized incentives to drivers with the goal of reducing the probability of congestion. The decisions about incentives are made via solving a series of carefully designed large-scale stochastic optimization problems. The performance of the proposed algorithms are evaluated using data from the Los Angeles area. Finally, we evaluate the performance of our method using data from the Los Angeles area. The Los Angeles region is ideally suited for being the validation area since there are a number of dedicated carpool lanes in the region and furthermore, there are portions of the freeway network where congestion pricing is employed with the added feature that ridesharing vehicles can travel on these lanes free of charge (e.g., I-110). Additionally, researchers at USC have developed the Archived Data Management System (ADMS) that collects, archives, and integrates a variety of transportation datasets from Los Angeles, Orange, San Bernardino, Riverside, and Ventura Counties.

Methods: The data is from the traffic data of the Los Angeles area. Researchers at USC have developed the Archived Data Management System (ADMS) that collects, archives, and integrates a variety of transportation datasets from Los Angeles, Orange, San Bernardino, Riverside, and Ventura Counties. ADMS includes access to real-time traffic datasets from i) 9500 highway and arterial loop detectors providing data approximately every 1 minute, and ii) 2500 bus and train GPS location (AVL) data operating throughout Los Angeles County. First, we

export our data from the ADMS systems. Next, we preprocess the data based on our criteria such as the type of sensors, the time interval of data, and region. Also, we extract the graph of the network on Networkx. Finally, we use the data to do OD estimation and solve our optimization model. More details are provided in the readme.txt file.

<u>Usage Notes:</u> Details are provided in the readme.txt file. We can share a sample of our run upon a reasonable request.

Recommended Citation:
Ghafelebashi, Ali; Razaviyayn, Meisam; Dessouky, Maged (2022), Congestion reduction via personalized incentives, Dryad, Dataset, https://doi.org/10.5061/dryad.ncjsxkst8

Dataset description:
This dataset contains 1 .zip file collection below.

doi_10.5061_dryad.ncjsxkst8_v11.zip:
- DRYAD_SyntheticData.zip
  - DRYAD_SyntheticData Folder
    - Region_z.yaml
    - Readme.txt
    - createSyntheticData.py
    - optimization Folder
      - OptModel_linear.py
      - link_capacity.py
      - data_loader.py
      - base.py
      - All_in_one.py
      - Address.py
      - YAML_graph Folder
        - region_z.yaml
      - YAML_BPR Folder
        - region_z.yaml
      - YAML Folder
        - region_z.yaml
      - _pycache_ Folder
        - data_loader.cpython-36.pyc
        - base_DPFE_deprecated.cpython-36.pyc
        - base.cpython-36.pyc
        - address.cpython-36.pyc
    - OD_matrix_py27 Folder
      - run.py
      - pfe.py
      - data_loader.py
      - base.py
      - All_in_one.py
      - YAML_graph Folder

- region_z.yaml
  - YAML Folder
    - region_z.yaml

File Type Descriptions:
- The file type .yaml is commonly related to YAML Ain't Markup Language and used as one of the two typical suffixes for source files written in this language. A .yaml file is typically used for various configuration files (for more information on .yaml files and software, please visit https://www.file-extensions.org/yaml-file-extension).
- The .txt file type is a common text file, which can be opened with a basic text editor. The most common software used to open .txt files are Microsoft Windows Notepad, Sublime Text, Atom, and TextEdit (for more information on .txt files and software, please visit https://www.file-extensions.org/txt-file-extension).
- The .py file extension is commonly used for files containing source code written in Python programming language. Python is a dynamic object-oriented programming language that can be used for many kinds of software development (for more information on .py files and software, please visit https://www.file-extensions.org/py-file-extension).
- The .pyc file type is associated with Python. These .pyc files contain compiled source code of Python programming language scripts (for more information on .pyc files and software, please visit https://www.file-extensions.org/pyc-file-extension).

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://doi.org/10.21949/1503647) 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://doi.org/10.5061/dryad.ncjsxkst8 on 2022-05-02. 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.