

Dataset of Home Care Scheduling and Routing Problems with Synchronized Visits

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Abstract

The document describes the dataset of the problem instances solved in the article: *A Multistage Optimization Algorithm for the Home Care Scheduling and Routing Problem with Synchronized Visits*, which did not appear in the print version of the article due to the page limit.

The dataset contains anonymized instances of real scheduling and routing problems obtained from a home care provider that operates in a major city in UK. Visits included in the dataset were performed in a single district over the first 2 weeks of October 2017. The number of carers who worked in the area as well as the number of visits to perform vary depending on the day. Overall, during the selected period the area was supported by 47-71 carers who performed 448-511 visits.

The dataset is released on the Open Data Commons Attribution License (ODC-BY) by Glasgow City Council.

Data set

The dataset consists of 3 CSV files containing carers, visits and distance matrix between visits locations. Names and structure of the files are explained below.

carers.csv The file contains a list of time slots in which a given carer works. The content of the file is displayed in Table 1.

visits.csv The file contains a list of visits to be performed. Table 2 explains the content of the file.

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CarerId	Date	Begin	End
36	2017-10-04	2017-10-04T08:00:00	2017-10-04T13:00:00
36	2017-10-05	2017-10-05T08:00:00	2017-10-05T13:00:00
36	2017-10-06	2017-10-06T08:00:00	2017-10-06T13:00:00
36	2017-10-07	2017-10-07T08:00:00	2017-10-07T14:00:00
36	2017-10-07	2017-10-07T16:00:00	2017-10-07T20:00:00
36	2017-10-08	2017-10-08T08:00:00	2017-10-08T14:00:00
36	2017-10-08	2017-10-08T16:00:00	2017-10-08T20:00:00
36	2017-10-09	2017-10-09T08:00:00	2017-10-09T13:00:00
36	2017-10-10	2017-10-10T08:00:00	2017-10-10T13:00:00
36	2017-10-11	2017-10-11T08:00:00	2017-10-11T13:00:00
36	2017-10-12	2017-10-12T08:00:00	2017-10-12T13:00:00
36	2017-10-13	2017-10-13T08:00:00	2017-10-13T13:00:00
⋮	⋮	⋮	⋮
1749	2017-10-02	2017-10-02T16:30:00	2017-10-02T20:30:00
1749	2017-10-03	2017-10-03T16:30:00	2017-10-03T20:30:00
1749	2017-10-04	2017-10-04T16:30:00	2017-10-04T20:30:00
1749	2017-10-10	2017-10-10T16:00:00	2017-10-10T20:30:00
1749	2017-10-13	2017-10-13T16:00:00	2017-10-13T20:30:00

Table 1: A snippet of the carers.csv file. Each row contains a time slot defined by Begin and End columns in which a carer indicated in the CarerId column is available for work on a day given in the Date column.

distances.csv The file contains time required for travel between any two possible visits locations. The structure of the file is presented in Table 3.

VisitId	UserId	Date	Time	Duration	CarerCount
2806455	6819	2017-10-13	11:30:00	1800	1
2806454	6819	2017-10-06	10:00:00	1159	1
2806448	6819	2017-10-11	11:30:00	1800	1
2806450	6819	2017-10-02	10:00:00	1159	1
2806447	6819	2017-10-04	10:00:00	1159	1
2806451	6819	2017-10-09	10:00:00	1159	1
⋮	⋮	⋮	⋮	⋮	⋮
2715231	5068	2017-10-13	09:45:00	1334	2
2715643	5068	2017-10-07	09:45:00	1394	2

Table 2: A snippet of the visits.csv file. Each row contains definition of a visit to be performed. The UserId column indicates a reference location of a visit that is used for travel time estimation. The Date column denotes the day in which a visit should be performed. The Time column defines a preferred start time for a visit. Since respecting the preferred time exactly may be difficult to accomplish a time window in which a visit can be started is defined. The preferred start time for a visit is in the middle of the time window. The Duration column contains the estimated length of a visit in seconds. The CarerCount column indicates the number of carers required to perform a visit.

UserId	4	38	...	8507	8545
4	0	1280	...	1025	1017
38	1280	0	...	1515	1433
⋮	⋮	⋮	⋮	⋮	⋮
8507	1025	1515	...	0	82
8545	1017	1433	...	82	0

Table 3: A snippet of the distances.csv file. The file contains a square symmetric matrix in which each element indicates travel time in seconds between two possible visit locations. The header as well as the first column of the file refer to the UserID index which links visits and locations.