Clustering district heat exchange stations using smart meter consumption data - DTU Orbit
(23/11/2018)

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Contrary to electricity smart meter data analysis, little research regarding district heat smart meter data has been published. Previous papers on smart meter data analytics have not investigated autocorrelation in smart meter data. This paper examines district heat smart meter data from the largest district heat supplier in Denmark and autocorrelation is identified in the data. The K-Means algorithm is not able to take autocorrelation into account when clustering. We propose different data transformation methods to enable K-Means to account for this autocorrelation information in the data by using wavelet transformation and autocorrelation features. Our results show that the K-Means yield acceptable clustering results for district heat data when clustering normalized data, inclusion of autocorrelation improves the clustering. The clusters on normalized data are similar to the wavelet transformed clusters, where the autocorrelation has been accounted for. The clustering achieved with the autocorrelation transformation yields finer clusters through accounting for autocorrelation. We are not able to statistically show a difference between the transformations. All transformations result in shadowing clusters, but the autocorrelation transformation generates fewer shadow clusters and reduce the number of dimensions from 744 to 24, resulting in a dramatic reduction in K-Means runtime.

General information
State: Published
Organisations: Systems Analysis, Department of Management Engineering, Dynamical Systems, Department of Applied Mathematics and Computer Science, Affald Varme Aarhus
Contributors: Tureczek, A. M., Nielsen, P. S., Madsen, H., Brun, A.
Pages: 144-158
Publication date: 2019
Peer-reviewed: Yes

Publication information
Journal: Energy and Buildings
Volume: 182
ISSN (Print): 0378-7788
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 4.96 SJR 2.061 SNIP 2.12
Web of Science (2017): Impact factor 4.457
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.64 SJR 2.055 SNIP 1.968
Web of Science (2016): Impact factor 4.067
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 4.07 SJR 2.04 SNIP 2.146
Web of Science (2015): Impact factor 2.973
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 4.21 SJR 2.079 SNIP 2.875
Web of Science (2014): Impact factor 2.884
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 3.79 SJR 1.852 SNIP 2.404
Web of Science (2013): Impact factor 2.465
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 3.36 SJR 1.745 SNIP 2.696
Web of Science (2012): Impact factor 2.679
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes