

## Methodology for the Multi-Objective Analysis of Data Sets in Freight Delivery

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**Abstract :** Data flow and the purpose of reporting the data are different and dependent on business needs. Different parameters are reported and transferred regularly during freight delivery. This business practices form the dataset constructed for each time point and contain all required information for freight moving decisions. As a significant amount of these data is used for various purposes, an integrating methodological approach must be developed to respond to the indicated problem. The proposed methodology contains several steps: (1) collecting context data sets and data validation; (2) multi-objective analysis for optimizing freight transfer services. For data validation, the study involves Grubbs outliers analysis, particularly for data cleaning and the identification of statistical significance of data reporting event cases. The Grubbs test is often used as it measures one external value at a time exceeding the boundaries of standard normal distribution. In the study area, the test was not widely applied by authors, except when the Grubbs test for outlier detection was used to identify outsiders in fuel consumption data. In the study, the authors applied the method with a confidence level of 99%. For the multi-objective analysis, the authors would like to select the forms of construction of the genetic algorithms, which have more possibilities to extract the best solution. For freight delivery management, the schemas of genetic algorithms' structure are used as a more effective technique. Due to that, the adaptable genetic algorithm is applied for the description of choosing process of the effective transportation corridor. In this study, the multi-objective genetic algorithm methods are used to optimize the data evaluation and select the appropriate transport corridor. The authors suggest a methodology for the multi-objective analysis, which evaluates collected context data sets and uses this evaluation to determine a delivery corridor for freight transfer service in the multi-modal transportation network. In the multi-objective analysis, authors include safety components, the number of accidents a year, and freight delivery time in the multi-modal transportation network. The proposed methodology has practical value in the management of multi-modal transportation processes.

**Keywords :** multi-objective, analysis, data flow, freight delivery, methodology

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