

How can the use of computational text analysis methods (Topic Modeling) help in identifying the predominant topics, trends, and research themes of interest within the Environmental Science and Engineering (ESE) discipline?



DATA COLLECTION

ABSTRACT & Supplementary Metadata
(Year, name of journal, country of the corresponding author, etc.)

JOURNAL: *Journal of Cleaner Production*

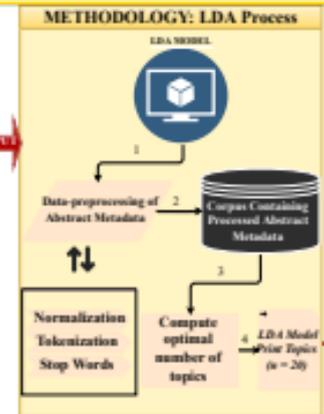
YEAR OF PUBLICATION: 2010

TITLE OF PUBLICATION: Route optimization of an electric garbage truck fleet for sustainable environmental and energy management
DOI: <https://doi.org/10.1016/j.jclepro.2010.09.029>

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ABSTRACT: The **waste collection process** is an issue where numerous studies have already been conducted in the existing literature especially based on finding the optimal routes for the **garbage trucks** assigned in this service process. In this manner, A **Mixed-Integer Linear Programming (MILP)** based route optimization model has been conducted as the first attempt for waste collection-oriented **electric garbage trucks** routing across in this study. Even different studies exist in the literature for the route optimization of commercial **fuel-based garbage trucks** as mentioned above, no studies devote to considering the **electric garbage trucks** to the best of our knowledge. Besides, it is not easy to reach the detailed **garbage collection area information** in the literature. In this manner, data have been obtained by real field measurements in a region within the service area of **Bağcılar Municipality, Istanbul, Turkey**. A real energy consumption value that can be considered as a reference in the future has also been obtained using real data. Besides, real road information data have been integrated to the data used as input while assessing the optimization approach and the system analyses have been conducted in a more realistic concept. The proposed concept has led to an increased reality of nearly 38% for the analysis of the results under conditions closer to real-time, and a decrement of nearly 32% has been obtained. It is expected that this study may lead a conceptual input to an enhanced and **greener waste collection process**.

KEYWORDS: **Electric vehicles, Garbage trucks, Route optimization, Solid waste management**



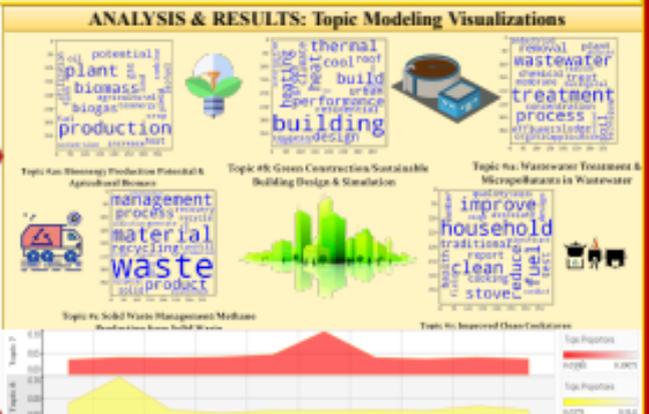
POST PROCESSING

List of Topics & Frequencies of Keywords

Topic 1 Waste 0.516 Material 0.202 Management 0.228 Incineration 0.224 Landfill 0.216	Topic 2 Clean 0.245 Cooking 0.242 Stove 0.228 Wastewater 0.221 Health 0.222	Topic 3 Renew 0.279 Construction 0.207 Building 0.207 Design 0.218 Sustainable 0.214	Topic 4 Wastewater 0.282 Treatment 0.262 Process 0.247 Wastewater 0.228 Effluent 0.222	Topic 5 Agricultural 0.285 Biomass 0.275 Biomethane 0.221 Fuel 0.248 Conversion 0.232
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Expected Topic Proportions (avg) Amongst Representative Journals

Journal	topic_1	topic_2	topic_3	topic_4	topic_5	topic_7
Appl Energ	0.05251	0.06375	0.06827	0.05328	0.05208	0.05763
Buld Environ	0.05108	0.05226	0.05007	0.03821	0.04617	0.05298
Clean Technol Envir	0.06281	0.05628	0.0432	0.05429	0.04779	0.04796
Crit Rev Env Soc Tec	0.06852	0.03916	0.02789	0.03721	0.03968	0.03871
Energy Policy	0.02734	0.04298	0.06668	0.06281	0.03946	0.05366
Energy Sustain Dev	0.02934	0.03188	0.07204	0.04456	0.04841	0.05209
J Clean Prod	0.05327	0.04885	0.04734	0.05741	0.04346	0.04623
J Environ Manag	0.06806	0.05122	0.03834	0.05025	0.04914	0.03536
Renew Energ	0.05507	0.05185	0.08256	0.04303	0.06361	0.05486
Resour Conserv Recy	0.03053	0.04712	0.03075	0.05551	0.05519	0.04554



Conclusion

Results of the study demonstrate the hidden potential of topic modeling as a viable methodology for offering perspicacious-observational insights into the conceptual and dynamic structure of ESE research from academic literature, as well as visualizing foundational and interconnected subfields of importance. Temporal behavior of topics over time revealed the emergence of trends pertaining to **bioenergy production potential & agricultural biomass**, **lead pollution**, **rainwater harvesting**, **improved clean cookstoves**, and so on. When aggregating topic distribution results on a per-journal basis, it was found that most journals essentially cover a diverse range of topics. However, in certain cases, some journals displayed specific and well-defined scopes by focusing on niche topic areas of interest. Moreover, when aggregating topic distributions using correspondence addresses, regional topic distribution analysis experiments revealed that certain countries tend to pay special attention to various sub-fields in ESE research. As an example, researchers from China expressed interest in the topics of **air pollution** and **green construction/sustainable building design**, whereas research communities from Brazil, India, and Sweden, were more interested in topics concerning **rainwater quality supply and demand**, **wastewater treatment**, and **bioenergy production potential** respectively. Results could benefit a variety of different members of the academic community. Namely, academicians and conference organizers in ESE, journal editorial managers, and international environmental funding agencies in terms of identifying promising topics of interest in the discipline of ESE, assessing critical gaps in research areas, and prioritizing funding support on selective topics given the established research needs across various regional contexts.

