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Determination of the solid urban waste generation in megacities using artificial neural networks

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Some complex environmental problems are caused by the increase in the generation of solid urban waste in megacities. This work analyses the case of the city of Bogotá (Colombia) where the urban waste management is currently done by disposing the waste in a sanitary landfill while maximizing the recovery of re-usable materials. Some projects have been formulated for the implementation of different technologies to be used to define alternative management strategies. Unfortunately, these are not easy to implement given the current conditions of the city.

Therefore, as a preliminary step to implement new technologies which may lead to more efficient management systems, it is necessary to perform a comprehensive analysis of current data and the behavior of the generation of the waste in order to be able to determine a projection that allows for the selection of the most appropriate urban solid waste management alternative based on reliable data and understanding the relationships between the variables that can influence the waste generation.

Artificial neural networks are presented as an alternative for the realization of an accurate prediction of the generation of urban solid waste. They are an important tool for the development of algorithms and models within the area of artificial intelligence, which allows formulating solutions to complex problems as well as to determine a possible strategic decision making in a real situation. When analyzing the problems in the city induced by the generation of urban waste, solutions for the improvement of the life quality of the population near the current landfill are required. Besides, an efficient waste collecting and transport system and an adequate disposal for the final waste produced by the current and future population of the city are required.

The model developed in this paper considers as main variables the total amount of urban solid waste collected, the population and the socio-economic stratification of each district in the city.