

Sustainable Solid Waste Management using Artificial Intelligence Models

Research Proposal
Nittin Johnson J

Introduction

- The waste management process typically involve numerous technical, climate , environmental, demographic, socio-economic, and legislative Parameters.
- Proper Management of municipal solid waste management is one of the prime concern for metropolitan cities.
- Such complex nonlinear process are challenging to model, predict and optimize using conventional methods.
- Recently, Artificial Intelligence (AI) techniques have gained momentum in offering alternative computational approaches to solve solid waste management problems.

Literature Review

Title	Author	Journal	Findings
Artificial Intelligence Applications in Solid Waste Management: Systematic Research Review	Mohamed abdalla et al., 2020	Waste Management	➤Review about the Analyzing Application of AI various SWM field including forecasting of waste characteristics, waste bin level detection, Process Parameters Prediction, Vehicle routing and SWM Planning. ➤Comprehensive Analysis about the different AI Models and Techniques Applied in SWM.
Land fill area estimation based on ANN Model and final waste disposal options	Hoque et al., 2020	Journal of Clear Production	➤ The innovative proposed method to landfill area estimation by ANN.

Literature Review...

Title	Author	Journal	Findings
Comparative study of predicting hospital solid waste generation using multiple linear regression and artificial intelligence	Golbaz et al., 2019	Journal of Environmental Health Science and Engineering SpringerNature	➤The performance of Neuron- and Kernel-based machine learning methods indicated that both models were satisfactory in predicting HSW.
Solid waste Management: Scope and challenge of Sustainability	Das et al., 2019	Journal of Clear Production	➤Innovative solutions that have been reported for the achievement of smart and sustainable waste management plans.

Problem Motivation

- unscientific treatment , improper collection, and ethical problems are leads to hazards like environmental degradation, water pollution, soil pollution and air pollution.
- Insufficient planning and inadequate operation are major reasons behind poor waste management.
- Waste management industry towards sustainability and profitability by means of advanced technologies and intelligence systems.
- AI has been efficient at tackling ill-defined Problems, learning from experience and handling uncertainty and incomplete data

Objectives

- To compare different models of artificial intelligence and to examine and evaluate their capacity in Municipal Solid Waste Management.
- To forecasting the quantity of municipal solid waste generation.
- To design and operate an smart waste collection system.
- To design the effective vehicle routing using Geographical Information System.
- To design automating the process of garbage sorting and disposal.
- To switching AI for smart recycling and waste management.

CONCLUSION

- A fundamental step in designing of an effective garbage management system is to predict the amount of waste that a city will generate.
- Determination of the volume of waste beforehand will result in proper planning of land fill sites, recycling units, development as operation of garbage collection infrastructure.
- Artificial intelligence based techniques will be successful for forecasting the volume of the waste and for the smart management of municipal solid waste.

ACTION PLAN

- Reconnaissance and Survey
- Site selection
- Data collection- Solid Waste Generation in Municipality and current management practices.
- Site visit for understand about the current municipal solid waste management practices.
- Analyzing the conventional methods of solid waste management and find the drawbacks of system.
- Introduce the Artificial intelligence methods to find the better accuracy in quantifying the solid waste generated.

ACTION PLAN...

- Identify the suitable models after comparing different models of artificial intelligence.
- Forecasting the quantity of solid waste generated using AI models
- Designing the smart waste dustbin for effective collection system and vehicle routing using GIS.
- Implementation of automated sorting system and disposal.
- Introduce smart recycling system with Artificial intelligence technology.

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THANK YOU