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Enhancing the Prediction Accuracy of Location-Based Garbage Management by using Convolutional Neural Network Compared with Multilayer Convolutional Neural Network

INTRODUCTION

- In this research study , Convolutional Neural Network algorithm is compared with the algorithm such that Multilayer Convolutional Neural Network to enhance accuracy.
- Location Based Garbage Management System Refers the primary goal is to achieve high accuracy in predicting outcomes related to garbage management, such as the amount of waste generated, optimal routes for waste collection, or the timing of waste collection based on location data.
- The study involves two groups, each with a sample size of 10 patterns, using 'outdoor_garbage.csv' data set for Garbage Detection with deep learning. Prediction settings G-power 90%, CI 95% & α=5%.
- The advantage of Convolutional Algorithm has proven to be faster when compared with other classification models.
- The aim of the study is to develop algorithms or models that optimize garbage collection routes based on real-time data, such as current waste levels, traffic conditions, and geographical features.

Fig.1. Smart Waste Management

MATERIALS AND METHODS

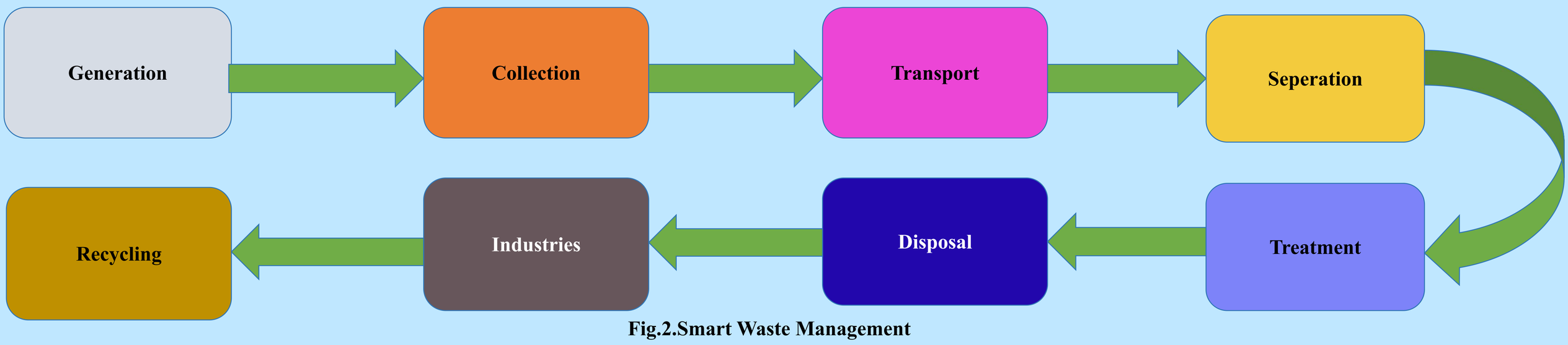

Fig.2.Smart Waste Management

RESULTS

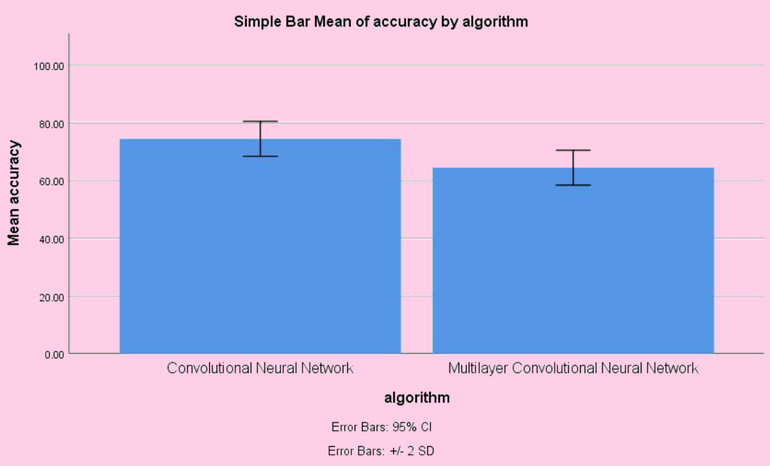

Fig.3.Comparision of CNN and MCNN using SPSS

	Algorithm	N	Mean	Std. Deviation	Std. Error Mean
Accuracy	CNN	10	74.5000	2.02765	0.25745
	MCNN	10	64.5000	2.03765	0.35745

Table1.To implement the garbage detection using CNN and MCNN are used for evaluation

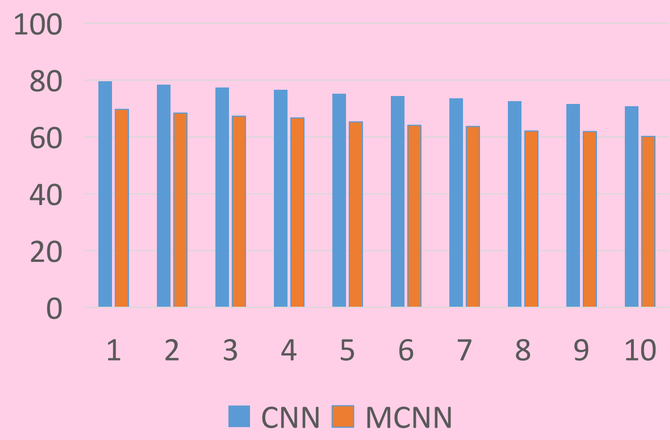

Fig.4.Comparsion of CNN vs MCNN among dataset

DISCUSSION AND CONCLUSION

- Based on t-test Statistical analysis, the significance value of p=<0.002 (independent sample t - test p<0.05) is obtained and shows that there is a statistical significant difference between the CNN and MCNN.
- Overall , the accuracy of the Convolutional Neural Network is 97.2 % and it is better than the other algorithm.

  Multilayer Convolutional Neural Network - 93.5%
- By using GPS and mapping technologies, garbage collection routes can be dynamically optimized based on real-time data such as the location and quantity of waste bins.
- This minimizes fuel consumption, reduces vehicle emissions, and lowers operational costs for waste management authorities.
- From the work , it is concluded that the Convolutional Neural Network algorithm attains the high accuracy when comparing with other Deep Learning Algorithms in Garbage management system using MCNN.

BIBLIOGRAPHY

- Jiang, Zhanjun, Baijing Wu, Long Ma, Huawei Zhang, and Jing Lian. 2023. "APM-YOLOv7 for Small-Target Water-Floating Garbage Detection Based on Multi-Scale Feature Adaptive Weighted Fusion." Sensors 24 (1)[doi.org/10.3390/s24010050].
- Jones, Richard, Antony Hosking, and Eliot Moss. 2016. The Garbage Collection Handbook: The Art of Automatic Memory Management. CRC Press [doi.org/10.1109/ICCSE.2018.8468682].
- Jones, Richard, and Rafael Lins. 1996. Garbage Collection: Algorithms for Automatic Dynamic Memory Management. John Wiley & Sons [doi.org/10.1109/ISS1.2017.8389250].
- Park, Kyungwon, Behnam Golestani, Boo Hyun Nam, Juan Hou, and Jongwan Eun. 2023. "Study on the Combined Effect of Municipal Solid Waste Incineration Bottom Ash and Waste Shingle in Hot Mix Asphalt." Materials 17 (1) [doi.org/10.3390/ma17010046].
- Lindner, Christoph, and Miriam Meissner. 2015. Global Garbage: Urban Imaginaries of Waste, Excess, and Abandonment. Routledge [doi.org/10.1016/0377-2217(93)90229-G].