SIMATS ENGINEERING
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Comparison of Accuracy on Enhanced Convolutional Neural Network Algorithm and Genetic Algorithm in Location-Based Garbage Management System

INTRODUCTION

- Introduce the concept of location-based garbage management and the importance of accurate prediction in optimizing waste collection and disposal processes.
- It implies that the predictive models or algorithms being compared are intended to improve efficiency, accuracy, or effectiveness in managing waste, particularly with respect to geographic locations..
- In this research study , Convolutional Neural Network algorithm is compared with the algorithm such that Genetic Algorithm to enhance accuracy.
- 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 aim of this study is to might seek to optimize resource allocation by accurately predicting waste generation patterns across different geographic locations. This can help allocate personnel, equipment, and financial resources more efficiently.

Fig.1.Smart Waste Collection Mechanism

MATERIALS AND METHODS

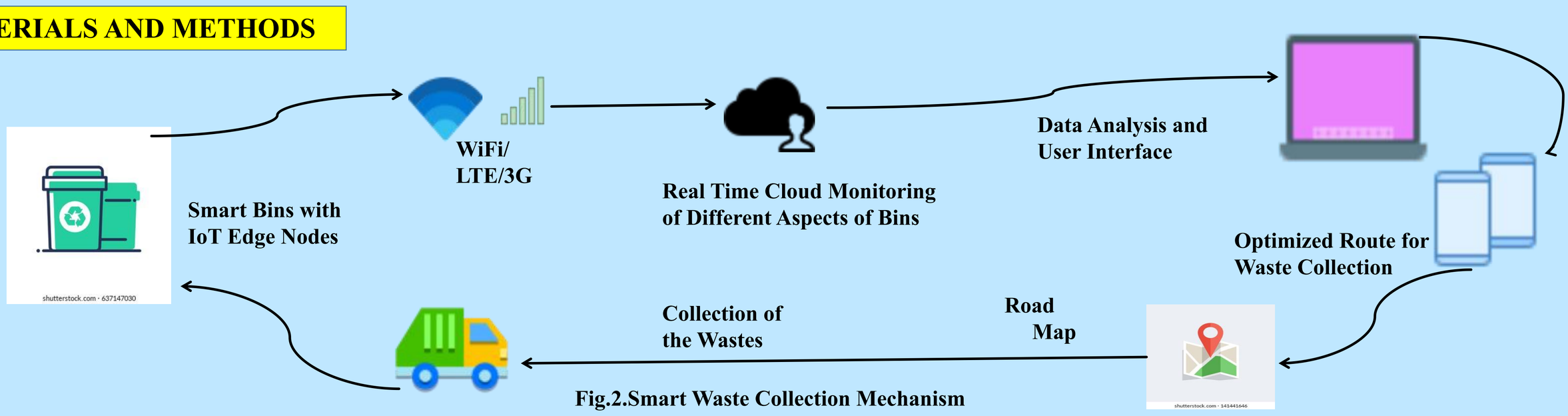

Fig.2.Smart Waste Collection Mechanism

RESULTS

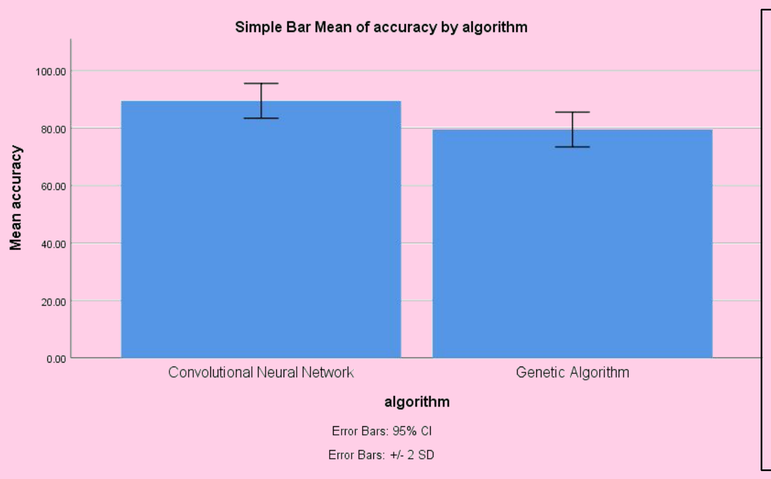

Fig.3.Comparision of CNN and GA using SPSS

	Algorithm	N	Mean	Std. Deviation	Std. Error Mean
Accuracy	CNN	10	89.5000	2.02743	0.95743
	GA	10	79.5000	2.04785	0.92743

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

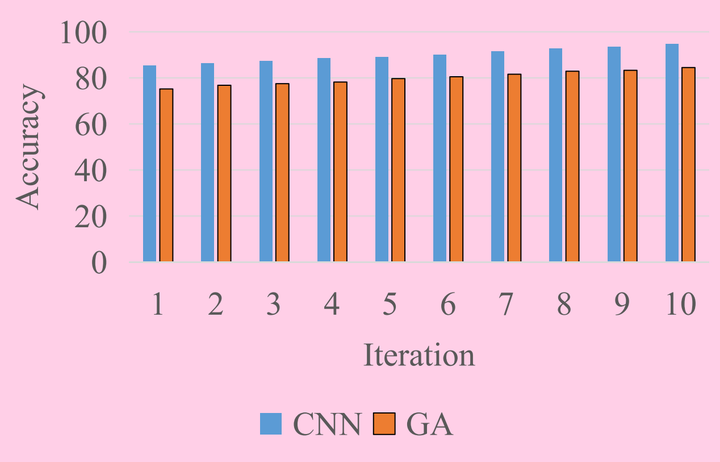

Fig.4.Comparision of CNN vs GA among dataset

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 GA.
- Overall , the accuracy of the Convolutional Neural Network is 97.2 % and it is better than the other algorithm.
  Genetic Algorithm - 94.6%
- 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 Genetic Algorithm.

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