

Predicting the Accuracy of Location-Based Garbage Management by using Convolutional Neural Network with Support Vector Machine

INTRODUCTION

- Introduce the concept of location-based garbage management and the importance of accurate prediction in optimizing waste collection and disposal processes.
- Provide an overview of CNN and SVM algorithms and their potential applications in predictive modeling for waste management.
- The study involves two groups, each with a sample size of 10 patterns, using ‘outdoor_garbage.csv’ data set for Garbage Dtection with deep learning. Prediction settings G-power 90%, CI 95% & $\alpha=5\%$
- In this research study , Convolutional Neural Network algorithm is compared with the algorithm such that Support Vector Machine to enhance accuracy.
- The aim of this study is to minimize the environmental impact of waste collection and disposal by strategically planning routes to reduce fuel consumption, emissions, and overall ecological footprint.

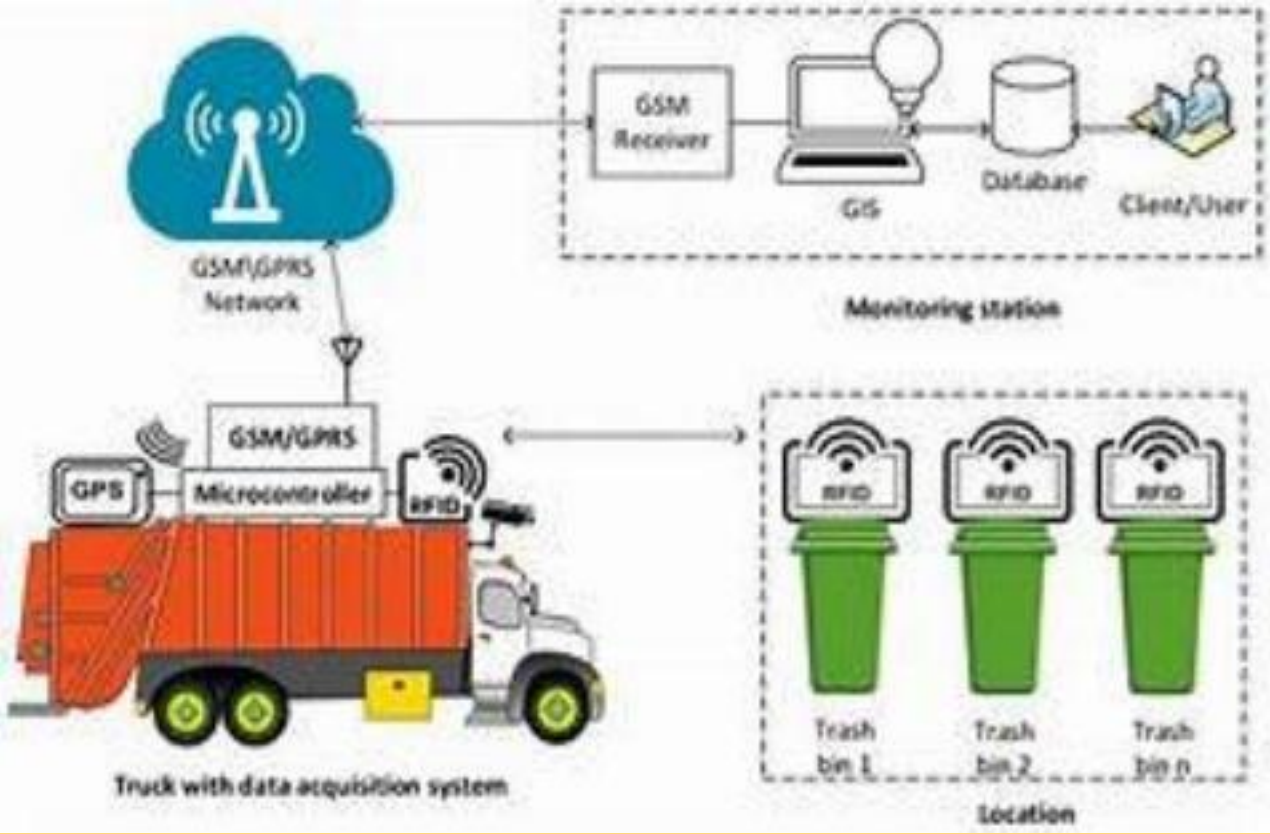


Fig.1.Garbage Monitoring System

MATERIALS AND METHODS

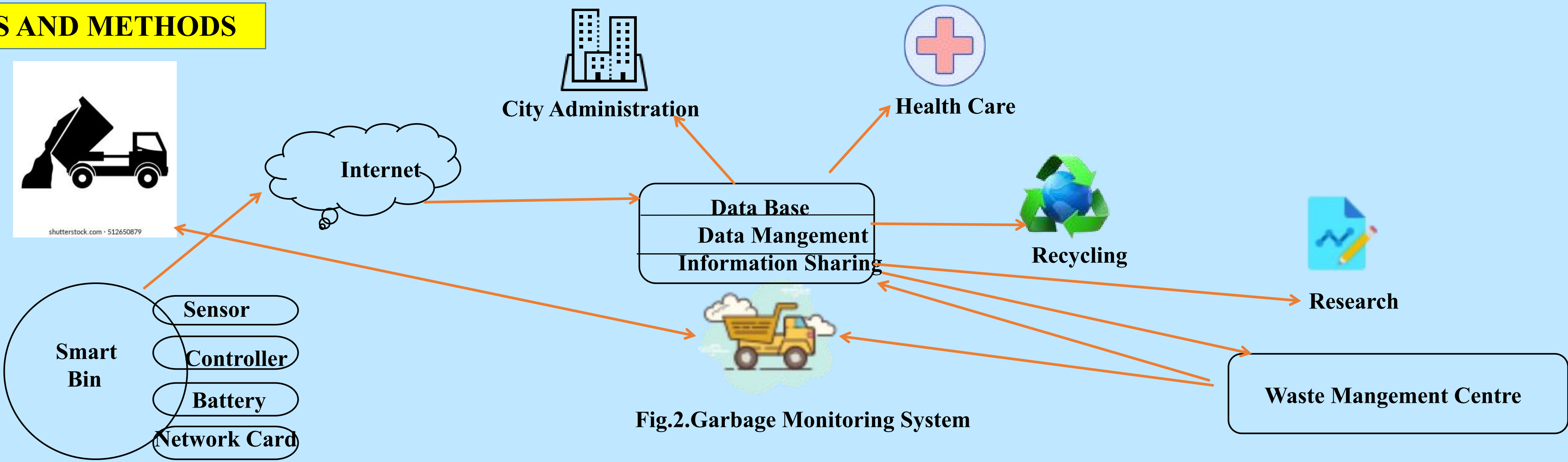


Fig.2.Garbage Monitoring System

RESULTS

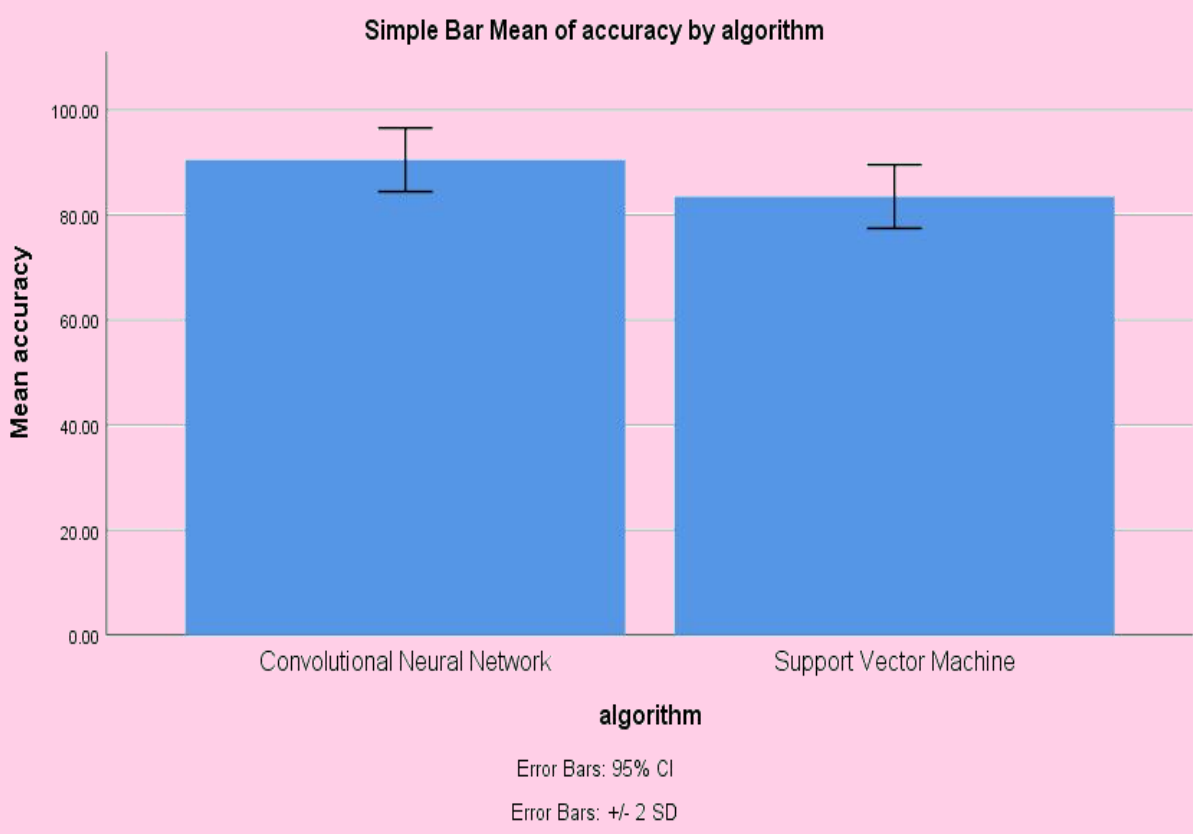


Fig.3.Comparison of CNN and SVM using SPSS

Accuracy	Algorithm	N	Mean	Std. Deviation	Std. Error Mean
	CNN	10	90.5000	2.01287	0.95743
	SVM	10	83.5000	2.04785	0.92743

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

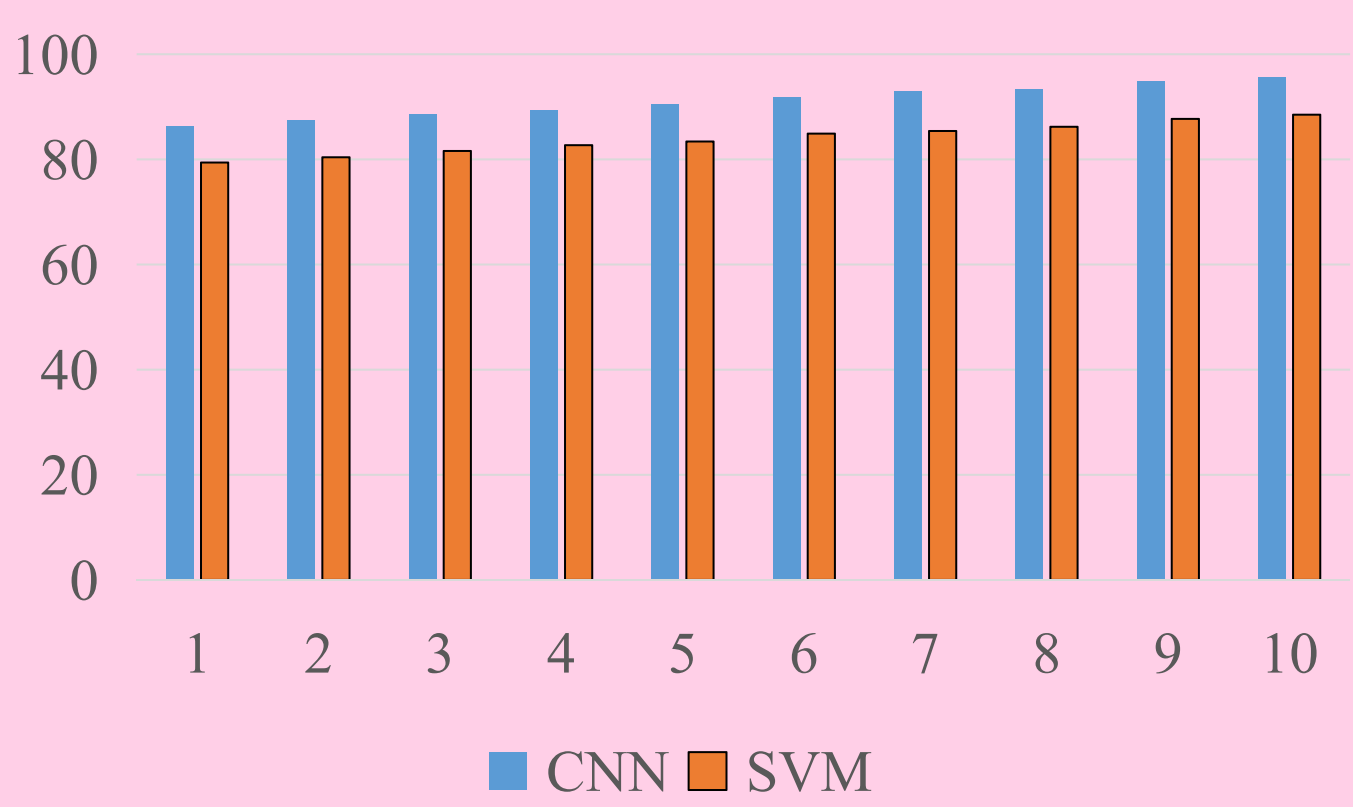


Fig.4.Comparison of CNN vs SVM among dataset

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 SVM.
- Overall , the accuracy of the Convolutional Neural Network is 97.2 % and it is better than the other algorithm.
- Support Vector Machine (SVM) - 93%
- 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 SVM.

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