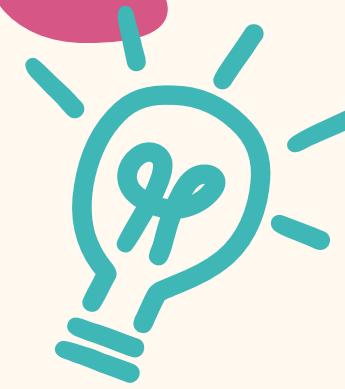
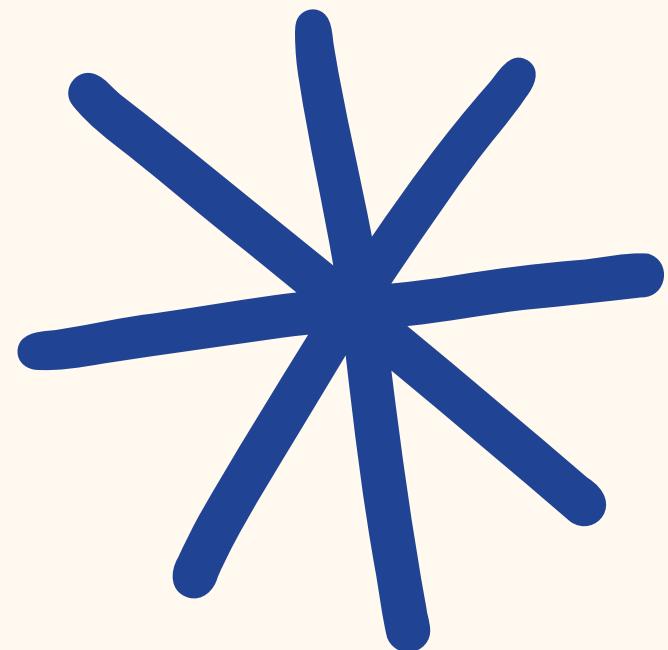


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optimization Technique



presented by Chandirasegaran
(19384102)

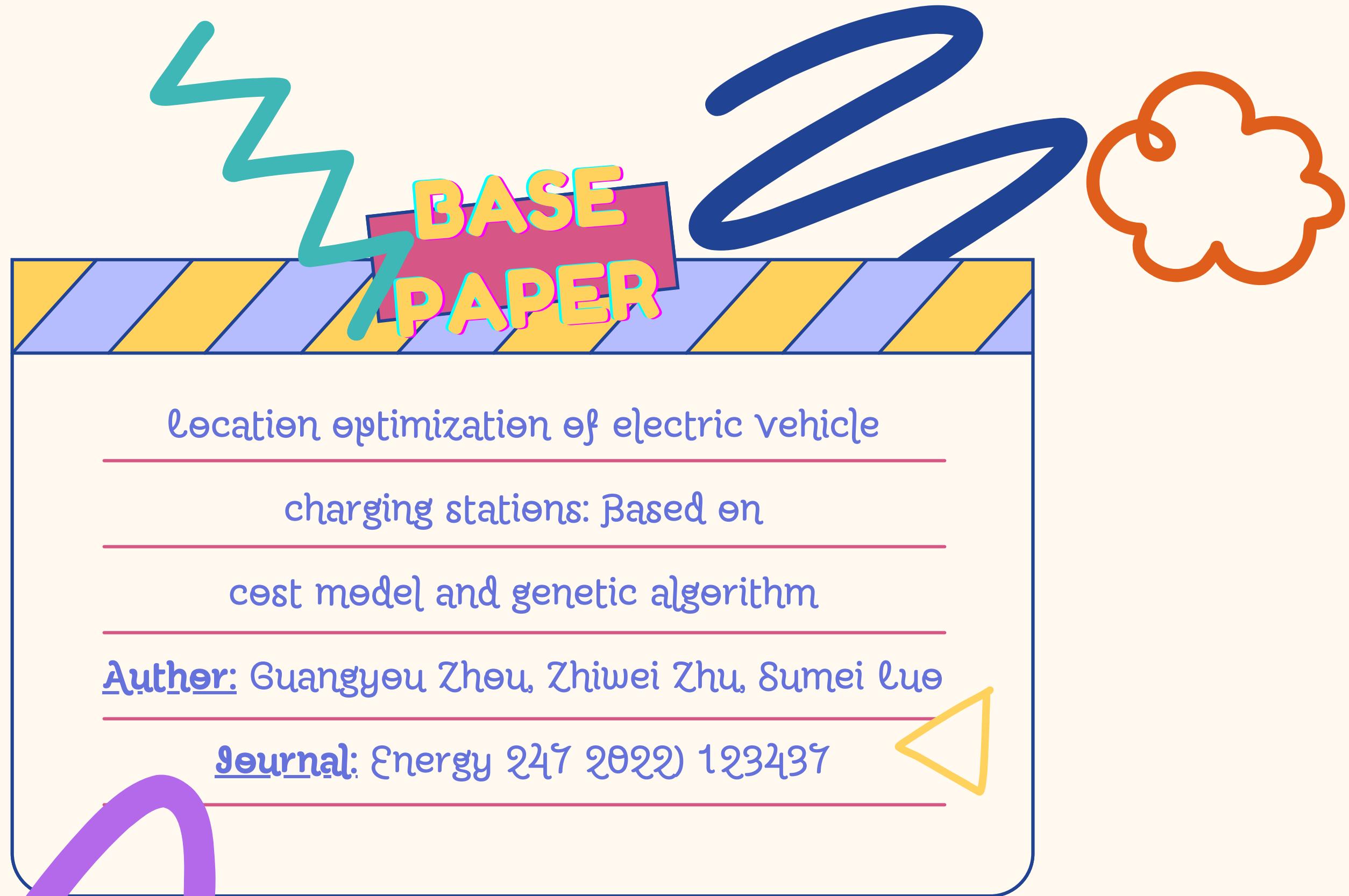
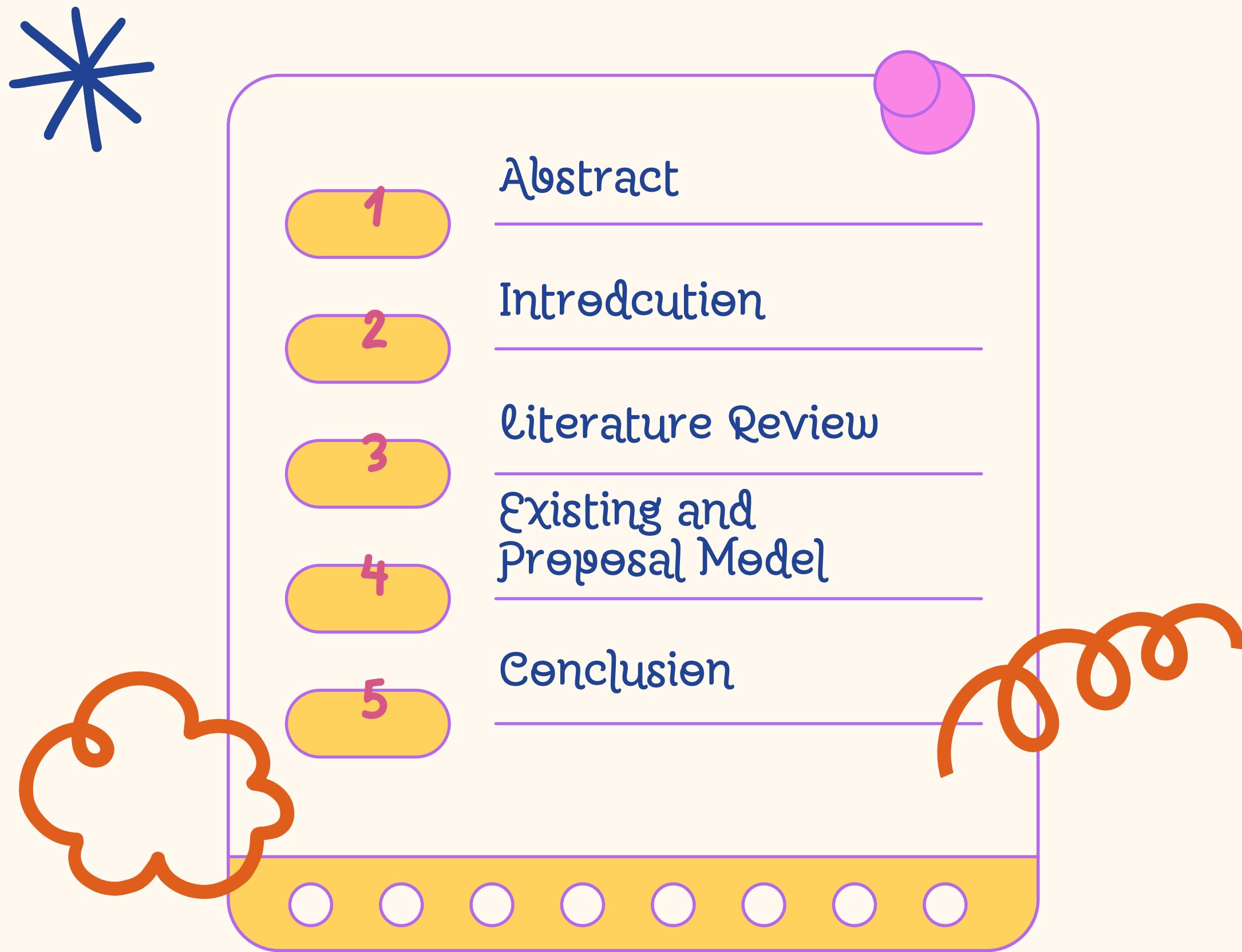
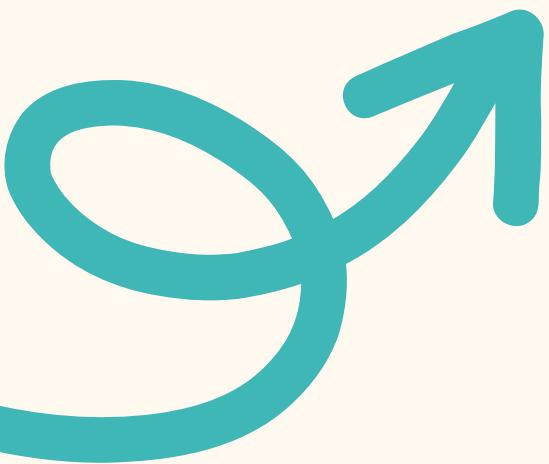
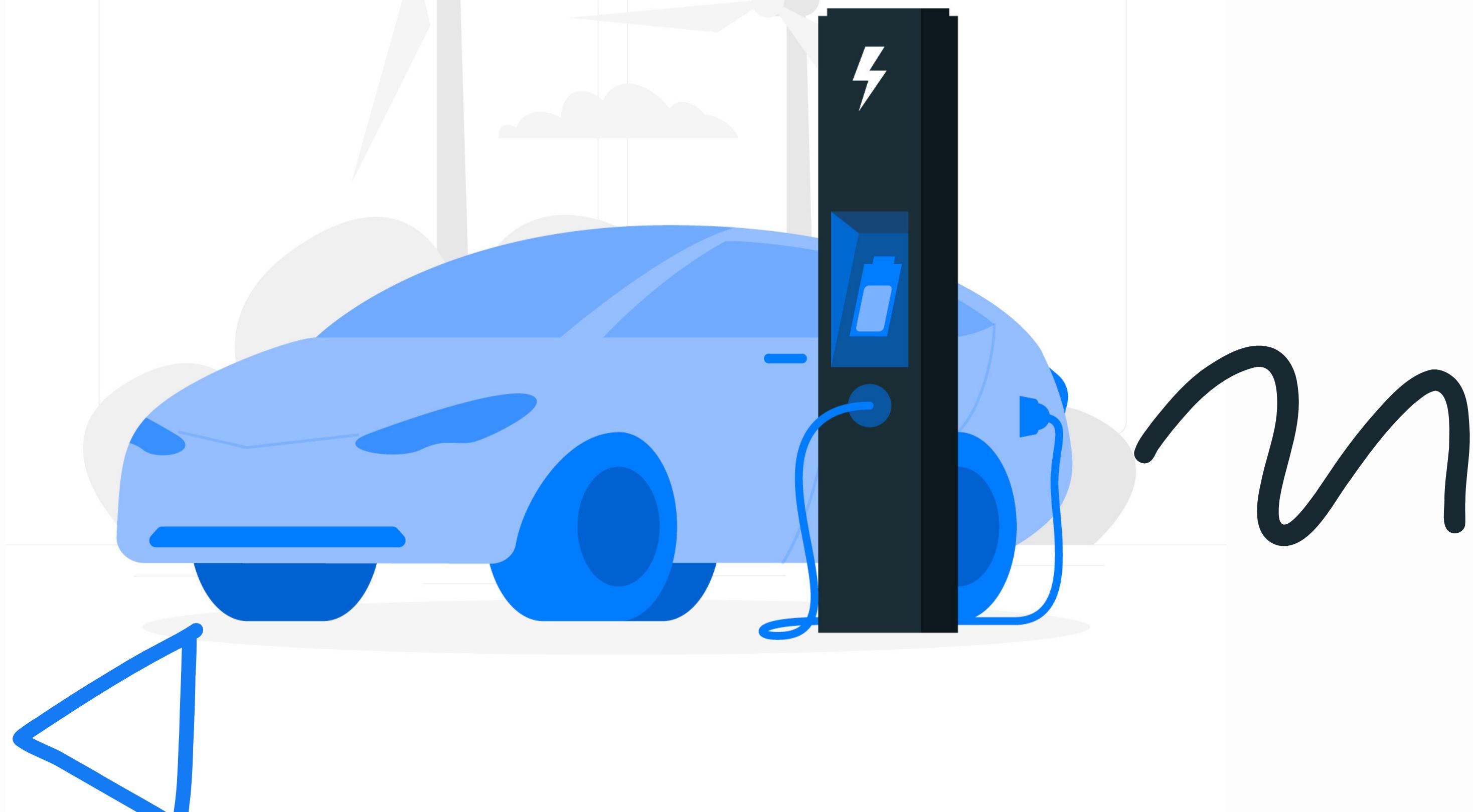


Table of Contents



EV CHARGING STATIONS

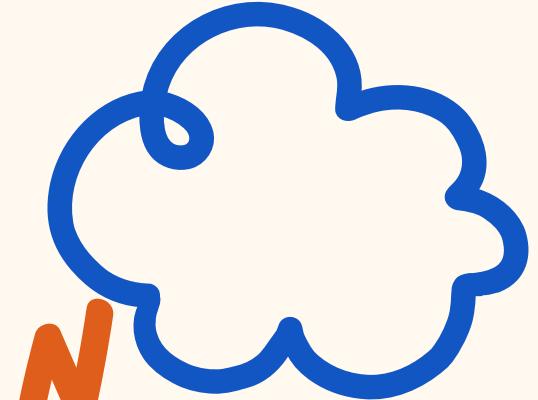
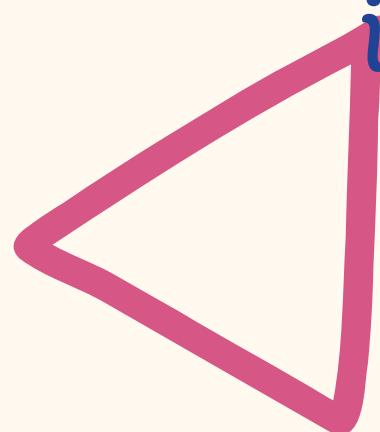


ABSTRACT

This research paper focuses on the optimal distribution of electric vehicle charging stations in Ireland. It proposes a social total cost model and uses a genetic algorithm to optimize the charging station locations. The study emphasizes the importance of factors such as the number of stations and daily charging probability, highlighting the potential for improving the cost-effectiveness of charging infrastructure.

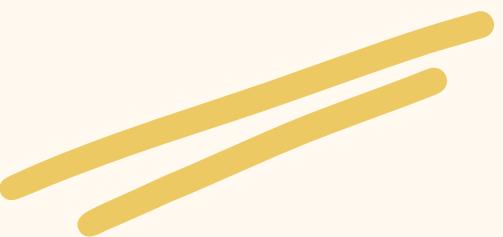
INTRODUCTION

This paper addresses the growing demand for electric vehicle (EV) charging stations and their uneven distribution. Using Ireland as a case study, the research aims to develop an optimized distribution model based on total social cost and genetic algorithm optimization, considering factors such as construction costs, charging demand, and environmental impact.

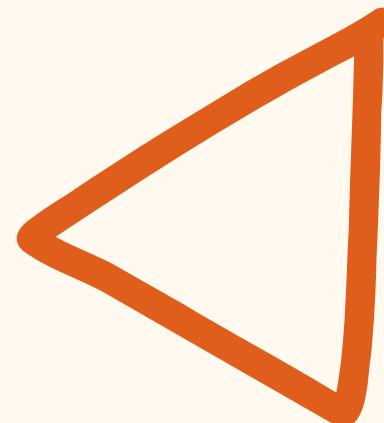




LITERATURE REVIEW



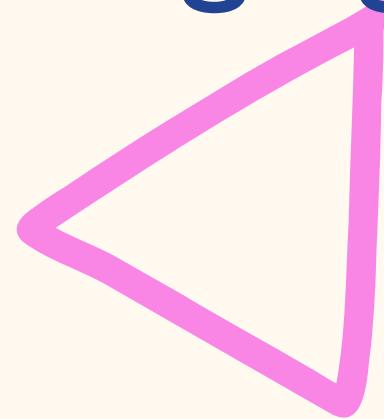
The literature review explores the research on electric vehicle charging station location, focusing on three main areas: influencing factors, model construction, and model solving algorithms.

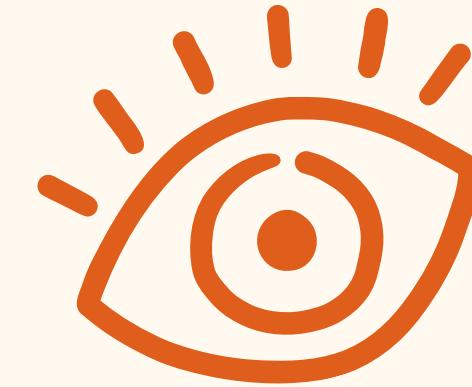




LITERATURE REVIEW

Influencing factors: Various factors such as economic considerations, driver satisfaction, power loss, and transportation system congestion affect the location of charging stations. Studies have analyzed these factors and their impact on charging station placement.





LITERATURE REVIEW

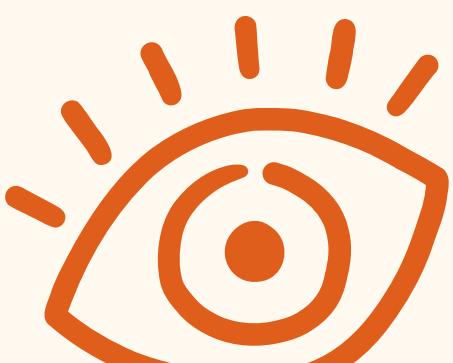
Model construction : Scholars have proposed different models to optimize the distribution and number of charging stations. These models consider factors like driving patterns, service levels, reservation systems, and battery characteristics to determine the optimal location and scale of charging stations.





LITERATURE REVIEW

Model solving algorithms: In addition to model construction, researchers have employed various algorithms such as genetic algorithms, particle swarm optimization, and clustering methods to solve the charging station configuration problem and determine the best location and scale of charging stations.



EXISTING METHOD

- Existing methods focus on analyzing influencing factors such as economic costs, environmental benefits, and user preferences.
- Models are constructed to optimize the location and scale of charging stations using techniques like maximal covering models, mathematical modeling, and stochastic flow capturing location models.
- Different algorithms including genetic algorithm, particle swarm optimization, and clustering methods are used to solve the optimization problems.

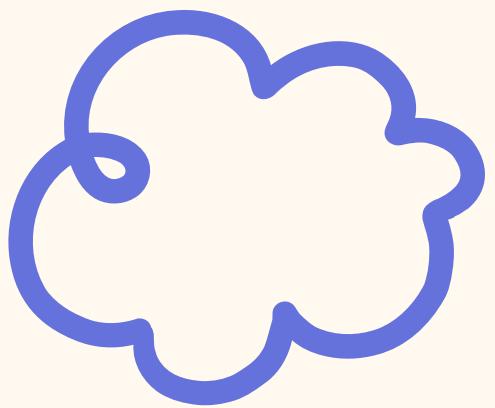
PROPOSAL METHOD

- The proposed method aims to optimize the distribution of charging stations based on total social cost.
- A total social cost model is constructed, considering economic costs (building costs and charging costs) and environmental costs (carbon emissions).
- The model is optimized using a genetic algorithm, chosen for its global search ability.
- Specific parameters such as the number of chargers, depreciation period, power consumption per unit distance, and the probability of EV charging per day are considered in the model.
- Ireland is chosen as a case study, and relevant data from multiple sources are collected and processed.

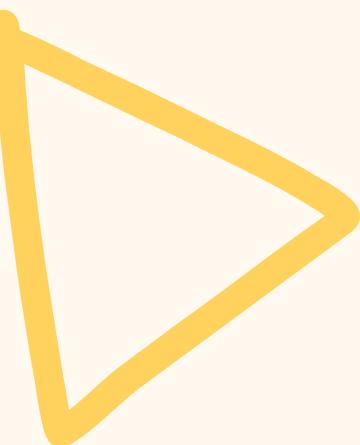
COMPARISON

- Existing methods provide insights into influencing factors and construction of charging station location models.
- The proposed method introduces a novel perspective by considering total social cost and using a recognized genetic algorithm for optimization.
- The proposed method incorporates specific parameters for accurate results and addresses the optimal distribution of charging stations in Ireland.

GLOBAL OPTIMAL SOLUTION

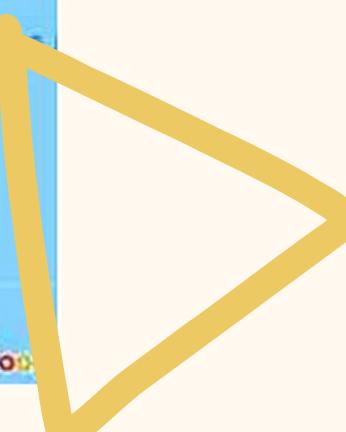
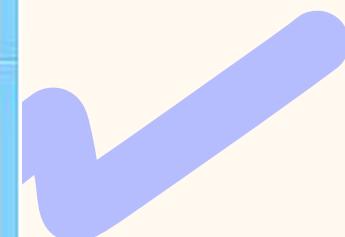
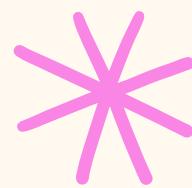
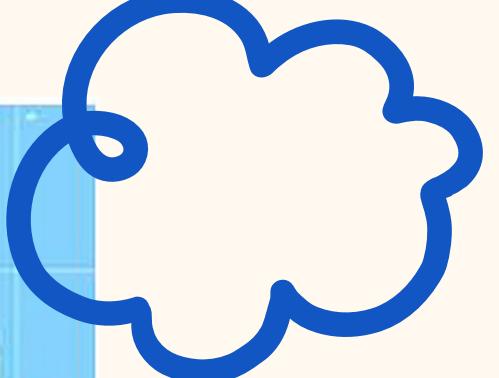
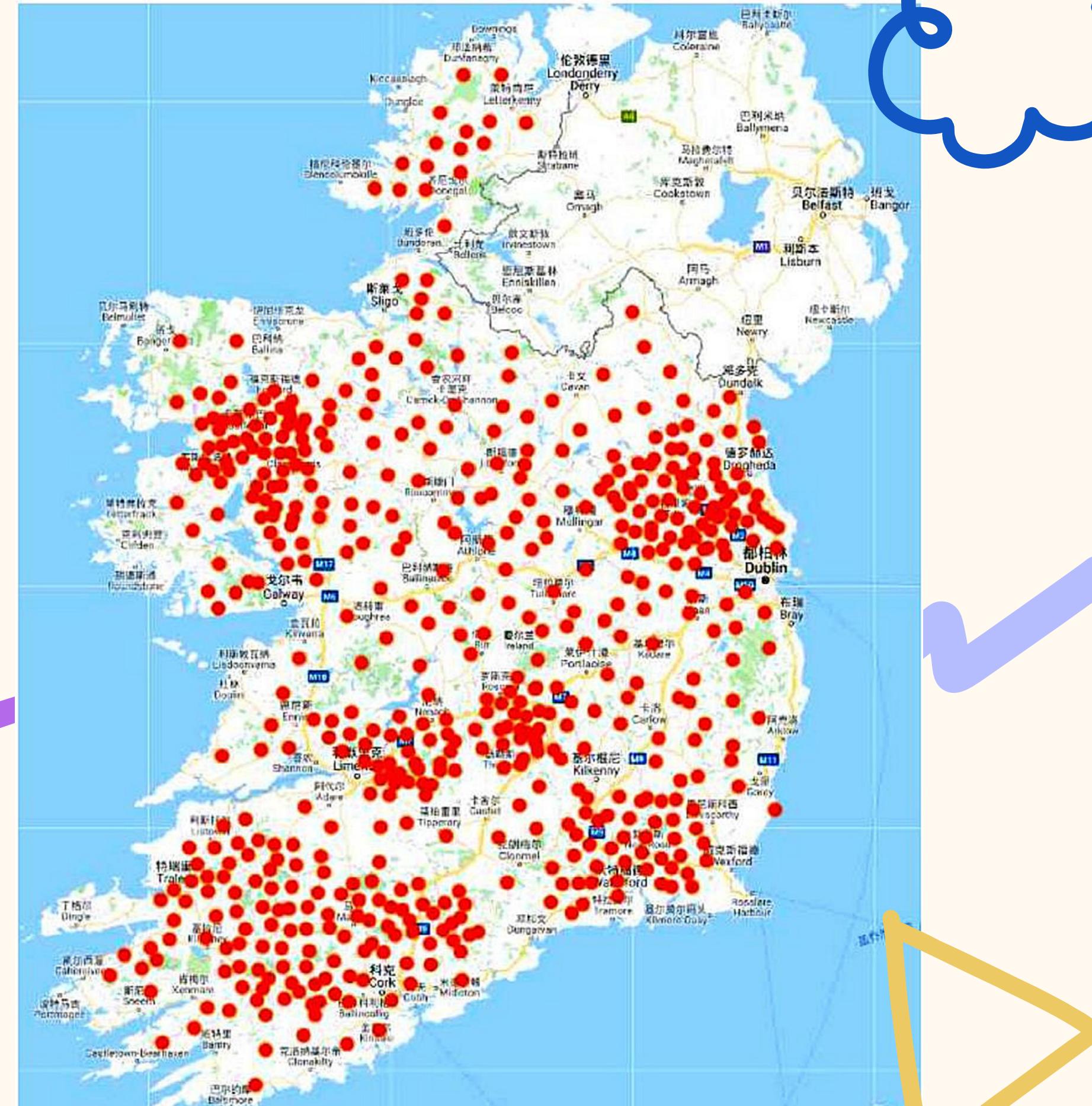


- A global optimal solution is the best possible solution that satisfies all constraints and provides the lowest or highest objective function value across the entire feasible solution space. It represents the optimal outcome without any better alternatives within the problem domain.



MAP - IRELAND

2



PROCESS OF GENETIC ALGORITHM

27

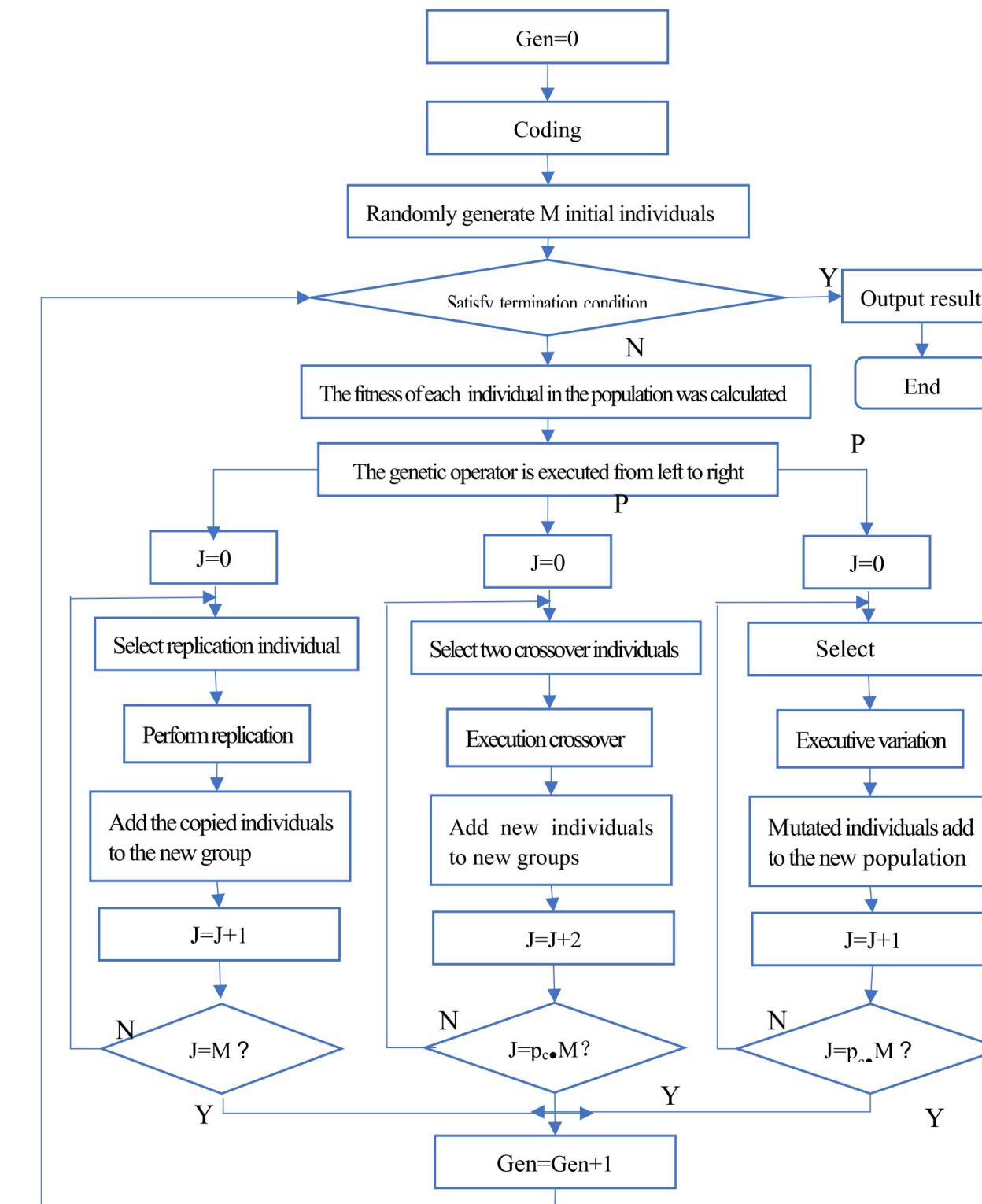
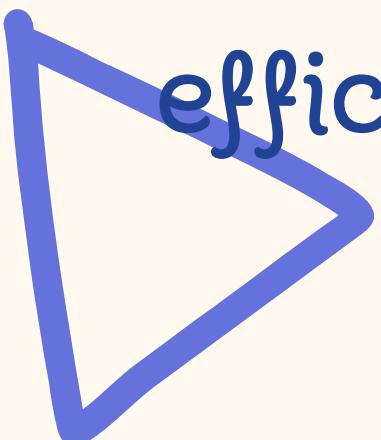


Fig. 1. Process of GA.

CONCLUSION

In conclusion, this paper successfully constructed a social total cost model for electric vehicle charging station distribution in Ireland. The utilization of a genetic algorithm enabled the identification of optimal charging station locations, considering economic and environmental costs. The findings emphasize the significance of balancing station count and daily charging probability to enhance the efficiency and sustainability of charging infrastructure.



Thank You!

Q&A TIME

