Delta Robot Based Waste Segregation at Domestic Level

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Abstract

Background: Improper management and disposal of waste leads to unhygienic surroundings which can give birth to many diseases, illnesses and is a problem faced by approximately 50% of Indian population [1]. Even in urbans areas that are not thoughtfully planned disposal of waste raises an issue [2]. This paper proposes a solution of integrating modern day automation techniques, machine learning algorithms such that the bin itself is capable of segregating waste. The smart bin incorporates a delta robot for waste segregation [5]. The system uses machine vision to monitor the waste in real time, differentiate between the type of waste and give necessary feedback to the delta robot [3][4].

Objective: To make a smart waste bin by integrating delta robot which is capable of segregating waste based on its type (organic or inorganic) by using machine learning algorithms.

Methodology: Integrating a delta robot will make segregating the waste easy and using machine learning algorithms will help the delta robot differentiate between organic and inorganic waste. As the controller raspberry pi will be used which will have pre trained machine learning model. A camera will be placed on the top alongside the delta robot which will monitor the incoming waste, detect the type of waste, and send the necessary feedback to the controller which in turn will send instructions to the delta robot. The delta robot will pick up the waste and deposit it in the appropriate waste bins. **Conclusions and future work:** In this smart waste bin design uses conveyor belt as conventional mechanism and delta bot as advance robotic mechanism. All mechanisms work in a sync and control by a single controller. This smart waste bin uses a machine learning model to detect category of the waste for effective segregation. To make the categorization more accurate, a large data set is used. The dataset can be created using previously seen waste by the smart bin itself. That way frequent usage of the bin can lead to accurate categorization.

References

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