**Iot based intelligent route selection of waste segregation for smart cities using solar energy**

**INTRODUCTION**

Smart waste management technologies help minimize the operational cost and solve environmental complications in cities. Automatic intelligent smart bins with features such as automatic sanitation, segregation of dry/wet waste, and alert messaging systems have been developed to make waste management more efficient. Smart bins can also segregate metal and non-metal objects and reduce food wastages through IoT-based systems. Cooperation-based operations and efficient route selection for pickup trucks can further optimize waste management processes. Smart bin technologies can also incorporate voice commands and unique IDs to improve ease of use and efficiency.

It uses various techniques to optimize waste collection and minimize operational costs. These include long-range communication through LoRa technology, feature extraction techniques, RFID tags with ultrasonic sensors, GIS and remote sensing approaches, and intelligent sensing algorithms. Automated solutions are used to segregate waste for recycling and reverse vending machines are implemented to overcome standard recycle bins. Other innovations include smart cards for weighing waste, renewable energy sources for powering smart bus shelters, cloud-based waste management, big data analytics, and blockchain-based security for healthcare data.

**RESULTS AND DISCUSSION:**

The ultrasonic sonic sensor is used to measure the level of the bin which is then compared with the actual level of the bin. If the level is 0 then the bin is empty and if it is about 90-100 then the bin is full which makes the top surface of the bin to close automatically. This in turn prevents the chances of overflowing and littering of bins. The bin is monitored in real-time and an alert message is sent to the garbage collector when the bin is full. Apart from this the bin is separated into two partitions. One partition is to collect dry waste and the other is to collect wet waste. Since the ultrasonic sensor is placed in the middle of the bin, it will alert the garbage collector when either of the partitions is full. Thus, making the efficient usage of bins. This smart bin is powered with a 100W solar panel which produces 800W of energy which is enough to the overall functionality of the bin.

**CONCLUSION:**

The benefits of this smart bin include usage of renewable energy (solar) for the power supply and overall functionality, segregation of the bin into two partitions for collecting dry waste and wet waste separately, level monitoring ,odor control and waste level management. The optimal route to collect waste from bins is computed using the optimal route selection algorithm. About 80% of the bins are disposed of very quickly using this algorithm. Since it uses renewable energy for its power supply, it reduces up to 20% of the main electricity. Future work of this smart bin is to implement an autonomous movable smart bin for every city all over the world.