Waste management In Smart City

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Abstract—**Waste management is one of the most critical issues faced by city administrations today. Collection, segregation, transportation and proper disposal have become a gigantic task.**

I. INTRODUCTION

The Following management system has to be followed for the smart waste management:

The Upraise of population both in Humans as well as the our Neighboring animals has been seriously posing a threat not only to our natural resources , which are God Gifted to us but also to other aspects, namely Health & Sanitation.

Thus with the ever increasing population is also significantly raising a Serious threat to the situation of Waste Generation. Smart Waste Management, to most of us would generally & usually mean, to collect and disseminate our everyday waste and refuse materials that the Garbage man comes to our house for pick up.

Chief Components of Municipal Solid Waste Management

Source: Energy Information Administration, Office of Coal, Nuclear and Alternate Fuels (1996)

Waste management is not only exclusive of the above definition but also inclusive of other aspects and activities. A Waste Management System includes all the stages right from that of the collection of our waste by the pickup truck to the Recycling of the Waste.

II. METHODOLOGY

Most of us have come across this situation where the Public Garbage Bins sometimes get fully stacked, so much that they start falling apart from them. This indeed poses a very critical and potent treat to the Hygiene, with dogs and pigs just creating a menace not only on those garbage bins but also around them.

These situations are just breeding grounds for not only diseases and epidemics but also for all kinds of unfavorable animal attacks and encounters. There have been several reports of these creatures attacking not only children and teens but also adults and the Aged.

Apart from the above there is also a fear of an epidemic which could arise anytime because of these animals wandering over these garbage bins.
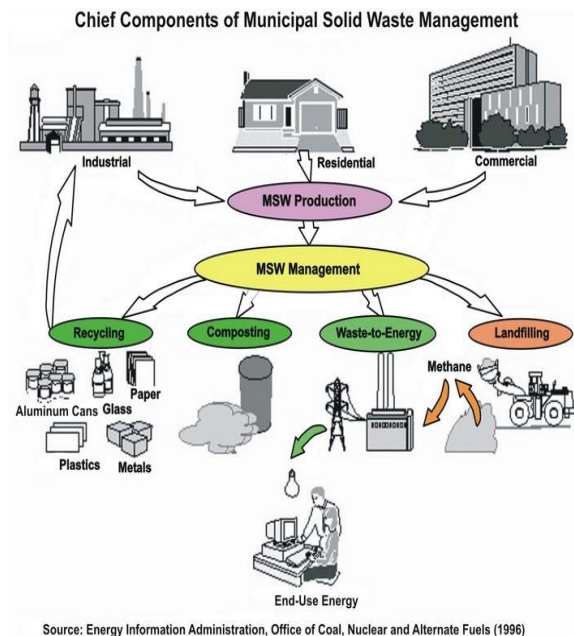
But as every solution has a problem and so does this situation too, and this is where the question of Smart Bins or Smart Garbage Cans come into play. These Smart Bins are fixed with a detecting device, called "Sensors" which are capable of signaling the Pickup centers / trucks with respect to the Garbage Pickup.

This sensors always detect the weight of the garbage fill within them, if these Smart Bins are full of the Waste Materials then these inbuilt sensors would automatically detect the same and would then sent a signal to the Respective centers indicating that the Garbage Bins is Over the Edge or on the Edge.

Then these Garbage centers would sent the Garbage pickup truck for the dissemination of the garbage from the garbage bin thus avoiding the above mentioned Un-sanitized and Unhygienic conditions.

Optimized vs Un-Optimized Garbage Pickup and Collection Routes:
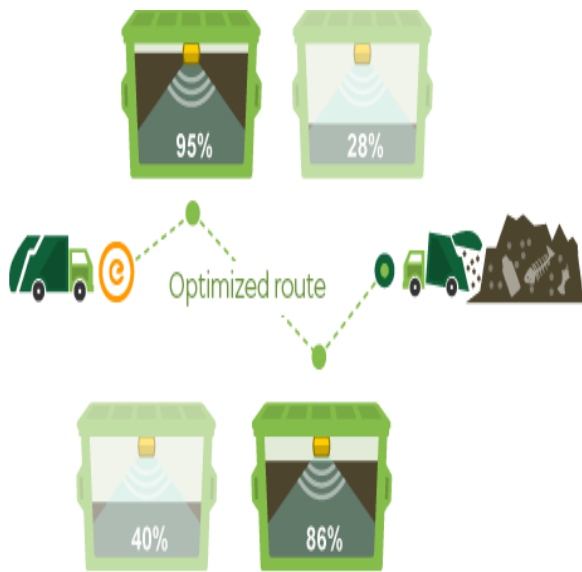
The following figure which has been given above has been clearly indicates the Garbage pickup collection routes which the most optimized both cost wise and Hygiene.

In the above image we can easily see that truck only goes to those garbage cans which are about to be filled and thus it does not go to those that are just partially filled. Thus we see the truck only going to the Garbage cans which are about to be filled, these pickup truck avoid going to those Garbage Bins which don't bleed with Garbage. So this is the most optimized garbage collection pick up route that would not only reduce its costs in the garbage collection rounds / trips but would also prevent those horrible and unfavorable conditions.

Some of the key technologies relevant to smart waste management are:

Online platforms: Online platforms provide options and alternatives to the user to look into reusing old stuff. The existing user is also encouraged to look for options to sell and regain value from the product before discarding the product as waste.

Analytics: Accurate projections on total waste generated, waste type and identification of high waste generation areas enable effective planning and management of solid waste management services. Use of analytics during events with large citizen involvement such as festivals and fairs can ensure smooth collection and transport of waste.

Crowd-sourcing: Citizens can be encouraged to report (web/mobile/social channels) waste-related activities which need urgent attention from the authorities.

Sensor-based waste collection: Sensor-based waste bins to identify status of waste bins if it is empty or filled so as to customise the waste collection schedule accordingly and save costs.

Automated waste collection system: Automated Waste Collection System (ACS) is a long-term solution and can take care the conventional methods like door-to-door, curb-side, block, community bins collections and transportation via chute system from high rise buildings with waste sucked though pipes and minimal human intervention.

GPS devices and sensors on waste truck: GPS technology to route the waste collection trucks to optimise the collection efficiency and ensure contractors dump waste in designated places. It will also give a clear picture of waste generated per ward.

Sensor-based sorting: Sorting waste material with the use of sensor technology helps in smart sorting The sensor technology can recognise materials based on their visible spectrum or colour with infrared/ultraviolet spectra or based on their specific and unique spectral properties of reflected light, or atomic density or conductivity/permeability or atomic characteristics.

Pollution sensors: Leverage the pollution sensors to gauge pollution levels at landfills.

Energy simulation (waste to energy): Use of energy simulation software and analytics can provide accurate projections of waste generation and energy production from waste.

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