



UNDERGROUND WASTE MANAGEMENT SYSTEM

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Abstract:

This report is about waste management system through underground pipelines. basically, we are dealing with the very big issue called disposal of waste.

Our surrounding environment is polluted in a such way that we can't even breath and it also destroying quality life. so this report gives a brief knowledge on how to manage a different waste in spite of messing it up leads to pollution. By using simple sensors and with the help of pneumatics. It is an intelligent device equipped with RFID, LCD, IR sensor, servo motor and microcontroller.

Introduction:

The utilization of subsurface space is nowadays a key issue towards attaining an environmentally friendly and sustainable development, especially in urban areas. Thus, activities or infrastructures that are difficult, impossible, environmentally undesirable or even less profitable to be installed above ground can be relocated underground releasing valuable surface space for other uses and enhancing urban living conditions.

Hence, the management of waste through underground developed infrastructure can be looked as an important evolution which would allow for the efficient and cost-effective tackling of one of the more pressing needs of modern society.

This report aims at presenting the solutions offered by such infrastructure. at identifying their operational characteristics and specific advantages

as well as at providing insight regarding their cost data. benchmarked against traditional management schemes.

The Project mainly focuses on Open source microcontroller, Wireless communication, Sensors, Motors and Drives, Serial communication, Serial Peripheral interface and many more. The dustbin comprises of Arduino UNO, SIM 900 GSM modules, IR Sensor, Serial LCD, Servo Motor, RFID .IR sensor gives digital input in form of square wave to the controller. RFID uses SPI communication technology, SIM 900 GSM modules works with several serial AT commands, LCD works with serial communication and Servo motor works with Pulse width modulation waves

Background:

Since smart cities are becoming center of attraction for the advancement of developing countries and without the removal or solution to the garbage problem these cities will be not that attractive. Therefore, large number of projects and research is going on in the area of smart dustbins for smart cities and to implement such projects typically use microcontroller based real time bin monitoring system, RFID technology, GPS, GSM, RF module etc.

Yusof et al. [2], presented an Arduino Uno micro controller based smart garbage monitoring system to ascertain the level of waste in the garbage bin in real-time and before there is overflow in garbage bin the system sense out and alert through SMS municipality

for the bin to be emptied and garbage to be collected immediately.

IR sensor is used to estimate the level of waste while the GSM module is used for sending SMS and Arduino UNO is used to control the system operation.

Issacs and Akshai [3], proposed a system called SVASTHA (a Sanskrit word, meaning —be healthy and hygienic), to effectively control the municipal solid waste. This system is based on RFID and GPS in which data is gathered using the RFID reader via Bluetooth and this data is stored on the central server. The main objective of GREENBIN [4] is the segregation of waste at source so that useful electricity can be produced from the individual components of waste. Sensors like capacitive based moisture sensor, inductive based metal sensor, methane sensor and odour sensor are used to achieve this goal.

The world's first waste suction plant was inaugurated in 1961 at the newly built and ultramodern Sollefteå hospital.

Nobody thought that the central vacuum cleaner, which was also to suction waste from the hospital was to become one of Sweden's most well-known environmental technology products 50 years later. Somebody had to blaze a trail. Somebody had to take the risks of introducing a new technology.

In this edition of Envac Concept, we present today's "Envac pioneers". We will write about the City of Oslo's decision to install EnvacOptibag's.

smart optical sorting system based on sorting household waste into different coloured bags. We describe Stockholm's experience of the first self-emptying litter bins installed in an extremely popular park in the centre of the city. The Municipality of Bergen in Norway has also taken a daring and innovative decision - to install Envac throughout the historic old town in parallel with the installation of district heating. Outside Paris the town of Romainville recently inaugurated the first waste vacuum system in France - a pioneering project that has quickly inspired other French towns to take the same course.

Method:

Underground waste management system

Automated vacuum (pneumatic) waste collection systems (AVAC) provide an integrated framework

for the tackling of the waste handling problem. Not only do they provide temporal storage but also the transportation of waste is taking place through underground pipeline network to a waste collection terminal. By doing so, AVAC systems provide an attractive alternative to conventional vehicle-operated waste collection, as they offer advantages in terms of reduced traffic-related problems, such as noise, accidents, CO₂ emissions, congestion and improve overall safety and hygienic levels. This speeds up the whole garbage collection process, especially at difficult cases as overcrowded urban centers, allowing at the same time a smooth operation of the system even at difficult situations either as a result of severe weather conditions (e.g. storms) or external events (e.g. strikes, protests, etc.)



Working:

In this project we are using air compressor to push the waste through air which is collected in the bin. So this smart dustbin we are using microcontroller Arduino no this controls all the signals sent to the controller. We are using IR sensor for the detection of the waste is full in the bin automatically the message is sent to the person. When the bin is full the compressor will be on automatically and all the dust will be forced out from the bottom pipe. This type of project will be helpful in the future aspect. RFID cards for the identification of the person.



Data and results:

IoT software addresses its key areas of networking and action through platforms, embedded systems, partner systems, and middleware. These individual and master applications are responsible for data collection, device integration, real-time analytics, and application and process extension within the IoT network. They exploit integration with critical business systems (e.g., ordering systems, robotics, scheduling, and more) in the execution of related tasks.

Data Collection

This software manages sensing, measurements, light data filtering, light data security, and aggregation of data. It uses certain protocols to aid sensors in connecting with real-time, machine-to-machine networks. Then it collects data from multiple devices and distributes it in accordance with settings. It also works in reverse by distributing data over devices. The system eventually transmits all collected data to a central server.

Device Integration

Software supporting integration binds (dependent relationships) all system devices to create the body of the IoT system. It ensures the necessary cooperation and stable networking between devices. These applications are the defining software technology of the IoT network because without them, it is not an IoT system. They manage the various applications, protocols, and limitations of each device to allow communication.

Real-Time Analytics

These applications take data or input from various devices and convert it into viable actions or clear patterns for human analysis. They analyse information based on various settings and designs in order to perform automation-related tasks or provide the data required by industry.

1. Waste level detection inside the garbage bins. Transmission of the information wirelessly to concerned officials.
2. System can be accessed anytime and from anywhere
3. Real-time data transmission and access
4. Avoids the overflows of garbage bins.
5. Improve environment quality fewer smells-cleaner cities
6. Using this system, waste collection would become effective and reduction in transportation costs can be witnessed.
7. Among the main advantages of the utilization of underground space are the release of space on the surface, that could be used for recreation / social activities, the development housing working industry, Traffic.

Conclusion:

The complete design of the dustbin is given, the circuit for the automation of compressor is successfully simulated and the desired results are obtained. The process to intimate the central hub that the dustbin is full, it is discussed using Arduino Uno. Various features such as durability, affordability, prevention against damage and maintenance issues is kept in mind while designing the dustbin. Implementation these Smart Dustbins can prevent the accumulation of the garbage along the roadside to a great extent thereby controlling the widespread of many diseases. It can prevent pollution and also prevent the consumption of the spread out garbage by the street animals. This Smart Dustbin can contribute a lot.

References:

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Application and advantages:

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