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IOT BASED WASTE MANAGEMENT IN SMART CITY USING IR

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ABSTRACT

The Internet of Things (IoT), as expected infrastructure for an envisioned concept of Smart City, brings new possibilities for the city management. IoT vision introduces promising and economical solutions for massive data collection and its analysis which can be applied in many domains and so make them operate more efficiently. In this paper, we are discussing one of the most challenging issues - municipal waste-collection within the Smart City. To optimize the logistical approach of waste collection, we use own algorithm. The solution provides imports of better efficient garbage-truck routes. As an output, we provide a set of simulations focused on the mentioned area. If the dustbin fills, we get some alert via the Buzzer also send the SMS to the authorized person at a particular time they didn't response we will intimate to the higher authorized persons..

Keywords: *Automated Teller Machine, Face Recognition, Security, Performance.*

1. INTRODUCTION

The vast amount on earth population (70%) will move to urban places, thus, forming vast cities. These cities are in need of smart sustainable platform to manage peoples' basic needs, with proposed fundamental and more advancements in existing system. Numerous sensors have opportunity to be part of Wireless Sensory Networks. When wsn's are applied in a locale, they are responsible for accumulating and processing respective information and, thus, to update city infrastructure to the so-called Smart Cities. A definition of the idea of smart city is provided: "The Smart City is a city executing well in a forward-looking way in the following fundamental areas (Smart Growing Economy, Smart Mobility, Smart People, Smart Livingness, and Smart Government rule), built on the 'smart' combination of endowments and activities of self-decisive, independent and aware citizens". This definition incorporates the fundamental component of a smart environment which is mainly adopted for systems dealing with environmental pollution.

The efficient Management of waste has a significant impact on the quality of life of citizens. The reason is that waste disposal has a direct connection with negative impacts in the environment and thus on citizens' health The average costs spent for fuel in one year for waste collection is more than 5 millions US dollars. Finally, the traffic congestion caused by the fleet of waste collection trucks at rush hours is significant due to the narrow roads and small backyards, causing indirect problems in citizens' activities. Absolutely, it is critical to efficiently manage the waste disposed in every location of a SC not only focusing on the collection activities but also on its transport and recycling.

2. LITERATURE SURVEY

2.1 Challenges and Opportunities of Waste Management in IoT-enabled Smart Cities: A Survey

The new era of Web and Internet of Things (IoT) paradigm is being enabled by the proliferation of various devices like RFIDs, sensors, and actuators. smart devices(devices having significant computational capabilities, transforming them to 'smart things')are embedded in the environment to monitor and collect ambient information. In a city, this leads to Smart City

frameworks. Intelligent services could be offered on top of such information related to any aspect of humans' activities. A typical example of services offered in the framework of Smart Cities is IoT-enabled waste management. Waste management involves not only the collection of the waste in the field but also the transport and disposal to the appropriate locations. In this paper, we present a comprehensive and thorough survey of ICT-enabled waste management models. Specifically, we focus on the adoption of smart devices as a key enabling technology in contemporary waste management. We report on the strengths and weaknesses of various models to reveal their characteristics. This survey sets up the basis for delivering new models in the domain as it reveals the needs for defining novel frameworks for waste management.

2.2 Developing Smart Cities using Internet of Things: An Empirical Study

IoT is an emerging technology that creates a massive network of things communicating with one another. It encompasses a broad set of technologies, hardware and software stacks. Data, humans, devices and communication are critical elements of an IoT ecosystem. For a developing country such as India, which has quite limited technology penetration at the national level, an efficient architecture for IoT needs to be based on present technology advances, capabilities that provide affordable and sustainable solution, and entrepreneurial and social value. Smart city is an important concept for the development of any nation. It is crucial for government of India to offer different services to its citizens and IoT helps significantly to achieve this purpose. It will be possible to communicate transparently and seamlessly with large number of homogeneous and heterogeneous systems, while having selected access to data for designing numerous digital services. The primary purpose of this research paper is to study the role of IoT in development of Indian smart cities, understand the India IoT policy, find out the key drives and advantages of IoT based smart city and identify the consumer preferences and demographics of Indian citizens who prefer IoT based smart city solutions.

2.3 Using Genetic Algorithm for Advanced Municipal Waste Collection in Smart City

The Internet of Things (IoT), as expected infrastructure for envisioned concept of Smart City, brings new possibilities for the city management. IoT vision introduces promising and economical solutions for massive data collection and its analysis which can be applied in many domains and so make them operating more efficiently. In this paper, we are discussing one of the most challenging issues - municipal waste-collection within the Smart City. To optimize
the logistic procedure of waste collection, we use own genetic algorithm implementation. The presented solution provides calculation of more efficient garbage-truck routes. As an output, we provide a set of simulations focused on mentioned area. All our algorithms are implemented within the integrated simulation framework which is developed as an open source solution with respect to future modifications.

3. SOLID WASTE TO ENERGY STRATEGY IN LEBANON

Solid waste management is a big challenge in urban areas for most of the countries throughout the world. An efficient waste management is a pre requisition for maintain a safe and green environment as there are increasing all kinds of waste disposal. There are many technologies used for waste management. A Waste-to-Energy (WTE) facility specifically 4th generation incineration facility is chosen to be the best solution in Lebanon. The placement of a Waste-Fired Power Plant in three sites around Lebanon would process 2.6 million tons of Lebanon's municipal solid wastes (MSW) annually and generate 197.3 MW of electricity plus 470672 Btu/h of heat to be used for adjoining industrial processes or for distribution as district heating. This process would additionally minimize waste volume to < 5% by transporting 7100 tons per day of MSW directly from households and businesses to the WTE facility instead of landfilling most of these wastes. The installation of state-of-the-art emission control technologies at the facility would reduce gaseous emissions well below standards established by the Lebanese Ministry of Environment. Finally the environmental impacts of WTE were quantified.

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3.1 System architecture

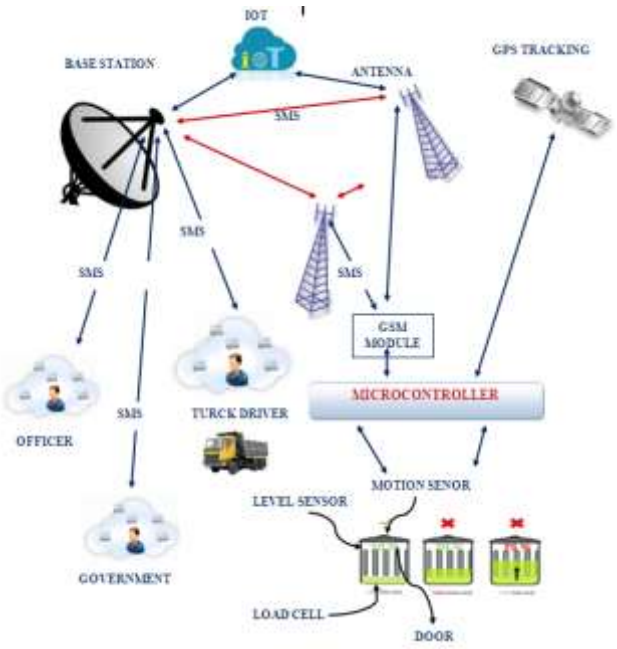

Figure 1: Overview

3.1Raspberry Pi board is a miniature marvel, packing considerable computing power into a footprint no larger than a credit card. It's capable of some amazing things, but there are a few things you're going to need to know before you plunge head-first into the bramble patch.

3.2 Hardware Requirments

- ARM vs. x86
- IR Sensor ,Moisture Sensor
- Rotating ARM
- Raspberry pi

3.3 Software Requirements

- ARMv6 (CM1) or ARMv7 (CM3, CM3L) Instruction Set
- Mature and stable Linux software stack
- Latest Linux Kernel support
- Many drivers upstreamed.
- Stable and well supported userland.
- Full availability of GPU functions using standard APIs.

Kit components

- Essential:
  - Raspberry Pi board
  - Prepared Operating System SD Card
  - USB keyboard
  - Display (with HDMI, DVI, or Composite input)
  - Power Supply
- Highly suggested extras include:
  - USB mouse
  - Internet connectivity - LAN cable
  - Powered USB Hub Case.

4. HARDWARE DESCRIPTION

➢ *Raspberry Pi*

The Raspberry Pi is a acclaim card sized single-board computer with an open-source platform that has a blooming community of its own, parallel to that of the acoustic. It can be used in numerous types of projects from novices perception how to code to design home automation systems. There are a few versions of the Raspberry Pi, but the latest version, has improved upon its predecessor in terms of both form and functionality. The Raspberry Pi Model B features:

- More GPIO
- More USB
- Micro SD
- Lower power consumption
- Better audio
- Neater form factor

Figure 2: Raspberry Pi

➢ The Raspberry Pi is a chains of credit card sized single-board processors developed in the United Kingdom by the Raspberry Pi Underpinning to indorse the education of elementary computer skill in schools and mounting countries.

➢ Raspberry Pi 2 includes a quad-core Cortex-A7 CPU running at 900 MHz and 1 GB RAM. It is described as 4–6 times more powerful than its predecessor. The GPU is identical to the original.

➢ The Raspberry Pi does not have a built-in real time clock, and does not "know" the time of day.

➢ It have many models All models feature a Broadcom system on a chip (SoC), which includes an ARM compatible central processing unit (CPU) and an on chip graphics processing unit (GPU, a Video Core IV).

➢ CPU speed runs from 700 MHz to 1.2 GHz for the Pi 3 and on panel recall sort from 256 MB to 1 GB RAM.

4.1 Ultrasonic Sensor

Ultrasonic sensors service the market by providing a cost effective sensing method with unique properties not possessed by other sensing technologies. By using a wide variety of ultrasonic transducers and several different frequency ranges, an ultrasonic sensor can be designed to solve many application problems that are cost prohibitive or simply cannot be solved by other sensors. Long range detection: In industrial sensing, more and more applications require detection over distance. Ultrasonic sensors detect over long ranges up to forty feet, while limit switches and inductive sensors do not.

Broad area detection: While some photo electric sensors can detect over long distances they lack the ability to detect over a wide area without using a large number of sensors. The advantage of Migatron's ultrasonic sensors is that both wide and narrow areas can be covered. All it takes is the proper ultrasonic transducer selection. Widest range of target materials :Only ultrasonic sensors are impervious to target material composition. The target material can be clear, solid, liquid, porous, soft, wood and any color because all can be detected.

4.2 Soil Moisture Sensors

This sensor can be used to test the moisture of soil, when the soil is having water shortage, the module output is at high level, else the output is at low level. By using this sensor one can automatically water the flower plant, or any other plants requiring automatic watering technique. Module triple output mode, digital output is simple, analog output more accurate, serial output with exact readings.

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4.3 GPS MODULE

The Global Positioning System (GPS) comprises three segments:

- The space segment (all functional satellites)
- The control segment (all ground stations involved in the monitoring of the system master control station, Monitor stations, and ground control stations)
- The user segment (all civil and military GPS users).

GPS Was developed by the U.S. Department of Defense (DOD) and can be used both by civilians and military Personnel. The civil signal SPS (Standard Positioning Service) can be used freely by the general public, whilst the Military signal PPS (Precise Positioning Service) can only is used by authorized government agencies. The first Satellite was placed in orbit on 22nd February 1978, and there are currently 28 operational satellites orbiting the Earth at a height of 20,180 km on 6 different orbital planes. Their orbits are inclined at 55° to the equator, ensuring that at least 4 satellites are in radio communication with any point on the planet.

During the development of the GPS system, particular emphasis was placed on the following three aspects:

- It had to provide users with the capability of determining position, speed and time, whether in motion at rest.
- It had to have a continuous, global, 3-dimensional positioning capability with a high degree of accuracy, Irrespective of the weather.
- It had to offer potential for civilian use.

V . SOFTWARE DESCRIPTION

The Python encoding linguistic essentially initiated as a scripting language for Linux. Python programs are similar to shell scripts in that the files contain a series of commands that the computer executes from top to bottom. Python is a very beneficial and adaptable high level programming language, with tranquil to recite composition that allows computer operator to use scarcer lines of code than would be probable in languages such as assembly, C, or Java.

Python programs don't need to be compiled before running them, as you do with C programs. However, you will need to mount the Python transcriber on computer to route them. The interpreter is the program that reads the Python file and executes the code. There are programs like or r that can package Python code into stand-alone executable programs so you can run Python programs on computers without the Python interpreter installed.

Like shell scripts, Python can computerize errands like group rechristening and stirring huge volumes of files. Using IDLE, Python's REPL (read, eval, print, loop) function can be used just like a command line. However, there are more useful things you can create with Python. Programmers use Python to create things like:

- Web applications
- Desktop applications and utilities
- Special GUIs
- Small databases
- 2D games

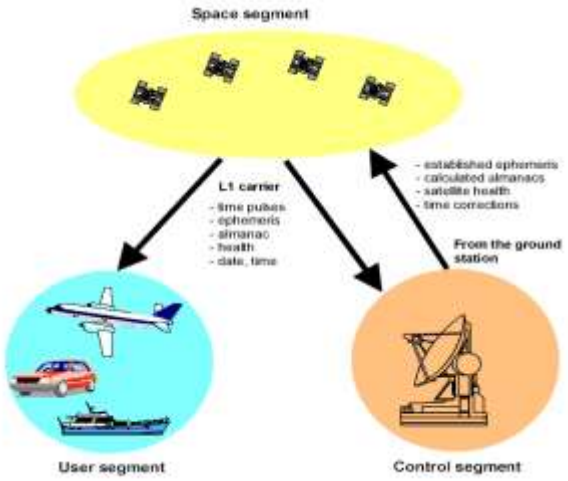

Figure 3 . GPS Segments

5. CONCLUSION

IoT as an enabler of various applications including waste management. Specifically, itaims to present a large set of models dealing with the efficient waste management. Special attention is paid on the waste collection. The article introduced the upcoming IoT infrastructure for smart cities and putted it in the context of municipal waste management. We provided the summary on municipal waste collection management methods and showed the examples of solutions introduced by recent research in this area. Given overview showed that it is not yet enough discussed the possibility of using genetic algorithms as a optimization method for waste collection. Our solution is based on the idea of IoT infrastructure, which should provide enough information to handle this Smart City issue more efficiently.

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