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ABSTRACT

A smart waste bin when combined with an efficient routing algorithm and a good central management helps to create a very well organised, effective dynamic waste management system. This project introduces an innovative way of using out a smart integrated sensing system that will help to automate the waste management process that includes the collection. Major problem in the system is to plan the pickup the bins that are ready. In this project, a heuristic algorithm is developed to solve this capacitated arc routing problem (CARP) considering multiple trips for the available vehicles, capacity of the vehicle, capacity of the bins to be collected and crew's working time. The objective function of the proposed model aims to minimize total traversed distance and total usage cost of vehicles. This information can be linked with municipality web server for immediate action. The waste bins are tracked by a unique number which represents its location. This proposed model gives all information related to physical condition of a particular bin and can easily reach the corresponding authority. The whole information is interconnected with a server-based web-information system at the host server. Also a central management helps the admin to authorize the drivers the routes and all other admin capabilities. The best route proposed by this system once approved by the admin will be sent to the assigned drivers for pickup.

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LIST OF ABBREVIATIONS

| | |
|------|-------------------------------------|
| CARP | Capacitated Arc Routing Problem |
| CVRP | Capacitated Vehicle Routing Problem |
| TSP | Travelling Salesman Problem |
| UI | User Interface |

CHAPTER 1

INTRODUCTION

Internet of Things (IoT) has taken priority in research among the technical communities due to the advances and popularity in sensing, propulsion, exchange of information and control. IoT is a broad domain providing many services, such as smart waste collection system for making a city smart, healthcare observation, transportation facility, logistics department to find vehicles or packages, etc.

IoT comprises very large number of devices interconnected to the internet. IoT is an integrated system comprising different physical entities such as various components, transportation system, constructions and other things—fixed with electronics, software, detectors, and network connectivity that make them capable to gather the information and exchange data. It allows to operate remotely through network framework, generating new opening for more direct incorporation of the physical world into computer-based systems, and enhances perfection, accurateness and financial benefits. With IoT, the technology (sensors and actuators) has become sophisticated to create smart and intelligent systems. Every object is separately identified is capable to work within the existing internet architecture. It is estimated that by 2020 nearly 50 billion components will be integrated into IoT.

Constant rise in population has lead to difficulty in maintaining the cleanliness of public areas and has also made garbage management to degrade staggeringly. This leads towards an unhygienic environment and is responsible for various types of disease in the locality. To eliminate the healthcare issues and improve the cleanliness, an 'IoT-based garbage management system' is proposed in this paper. Internet of Things (IoT) has brought a chance to build a smarter and a healthy city.

IoT has evolved from the convergence of wireless technologies, micro-electromechanical systems (MEMS) and the Internet. The concept may also be referred to as the Internet of Everything. The internet of things (IoT) is the internetworking of physical devices, vehicles, buildings and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. A thing, in the Internet of Things, can be