



IoT E-Waste Monitoring System to support Smart City Initiatives

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Abstract: This project introduces the design and development of IoT E-waste monitoring system to support Green City initiatives in real-time. The main objective of this system is to design an IoT-based recycle e-waste monitoring system that will provide an efficient solution to electronics waste collection and generation data. The hazardous chemical components of e-waste have potentially adverse impacts on ecosystems and human health if not managed and monitored properly. Hence, the importance to constantly monitor the condition of the e-waste bin. The system measures and delivers up-to-date information to the system's administrator on the waste level and bin's current temperature in real-time. In case of fire, the system will give notification via its flame indicator. Agile Model is used as the research methodology as it offers an adaptive approach in respect to what features need to be developed. The proposed system consists of HC - SR04 Ultrasonic sensor which measures the waste level, a DS18B20 temperature sensor that detects the temperature in the bin, KY- 026 flame sensor, a Raspberry Pi 3 Model B+ as a microcontroller and ThingSpeak as an IoT web platform. ThingSpeak concurrently stores data for future use and analysis, such as prediction of the peak level of waste bin. This system is expected to increase the usage of e-waste recycle bin, hence supporting the Green City initiatives and creating a greener environment by monitoring and controlling the collection of e-waste smartly through the concept of Internet-of-Things (IoT).

Keywords: IoT (Internet of Things), Raspberry Pi, Recycle E-Waste Monitoring System

1. Introduction

Electronic waste is generated when an electronic product or devices has reached the end of its working time period. After that, the waste is nothing more than the trash that accumulates heavy metals and toxic chemicals into the environment. Waste management is defined as devoted to the presentation and discussion of information on solid waste generation, characterization, minimization, collection, separation, treatment and disposal, as well as manuscripts that address waste management policy, education, and economic and environmental assessments in [1]. The main objective of this project is to design an IoT-based recycle E-Waste Monitoring System that will provide an efficient solution to waste collection and waste generation data in terms of monitoring and controlling the condition of the e-waste bin. The waste level, bin's temperature and risk of fire are monitored regularly. The system implements a waste's level priority scheduling that assures the collection of e-waste as soon as the waste level reaches its maximum filled.

2. Related Works

Smart waste collection solutions on the market that track waste levels and provide route optimization and operational analytics had been explored in [2]. Municipalities and waste service managers are realizing that these solutions can help them meet sustainability goals such as zero waste, improve services for residents and reduce