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Solid Waste Management Architecture Using WSN Technology

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Abstract – In *many application fields such as home, industry, environment and health, different Wireless Sensor Network (WSN) applications have been developed to solve management problems with smart implementations. This approach can be applied in the field of solid waste management. In this paper a new architecture is proposed with the aim to improve the on-site handling and transfer optimization in the waste management process. Solid waste generated is a ever growing problem at local regions or at global levels. There is proper disposal of solid wastes pollute all the components of the green environment (i.e., air, land and water) at regional and global levels.*

Keywords- solid waste management, ultrasonic sensor, thingspeak, aurdino uno, node mcu.

I - INTRODUCTION

"High population density in large urban areas makes hard the solution of solid waste management problems [1]. To reduce the environment impact of the waste dumping, many municipal corporate are involved in the development of efficient waste management systems. Solid waste management is a complex process that involves many steps: it includes generation, onsite handling and storage, collection, transfer, processing and disposal of solid wastes [1]. All these sub-processes have to be implemented within existing legal, social, regulations which take care of the environment and of the public health. A WSN consists of many autonomous sensor nodes, spatially distributed, capable to monitor physical characteristics (e.g. temperature, humidity, light, vibration, pressure, etc.) and designed to exchange their data through the network. Sensors link the physical with the digital world by capturing and revealing real-world phenomena and converting these into a form that can be processed, stored, and acted upon. A wireless sensor node has not only sensing components, but also on-board processing unit, chip radio and storage units. With these enhancements, a sensor node is often not only responsible for data collection, but also for in-network analysis based on correlation and fusion of its own data with those retrieved from other nodes. Moreover, sensor nodes can differ in their communication capabilities with different data rates and latencies

II- LETURTURE SURVE

S. V. Srikanth [1] tells about the problem due to the rapid increase in the population and as our country is stepping towards developed country, people have improved their life style. Hence there is increase in the number of vehicles in the country. Therefore its becoming difficult in places like restaurants, malls, public places etc. There is a need for effective smart management of the parking in all these places above mentioned. Parking problems are becoming ubiquitous and ever growing at a rate in every major city. All over the world a lot of research and development is being done to implement well-defined and parking mechanisms. Use of wireless technologies is widespread with the new schemas in wireless applications for parking, so that digital data could be the key to solve upcoming parking problems. Wireless Sensor Network (WSN) schema has wide applications in various fields hence it gained increased attention. The paper proposes a Parking Smart (SPARK) System Management based on sensor wireless network which provides advanced facilities like remote monitoring of parking, automatic guidance, and parking reservation mechim. The SPARK overall system architecture from hardware to softwe implement has been explained. Our preliminary test results tells that the performance of the WSN based system can effectively satisfy requirements of existing parking problems therefore reducing the time taken to find vacant parking lot, real-time information gathering, and smart reservation techqunies. With this SPARK system it helps the public people to reserve for their vehicle parking in different locations like mall, hospital, public places etc. It also provides the location of the parked vehicle in huge parking lot places. The parking problem is very big problem faced by the public people in various situations and various places. P. Zhou [2] discuss about the agricultural area in China is leading in the world. Modern technology information of in agriculture with various applications. This helps us to solve some number of questions related to collection of information in large area efficiently with reliability. Information transmission, intelligent system integrating for different needs and environment. The transforming from the traditional farming method to modern farming technique happens. It provides for inventing new mechanisms and services in IOT for farming to help farmers. An IOT based intelligent monitored framework platform and system structure for agriculture ecosystem has been told. The solution is divided into four function layers based on the information exchange and logical handling, i.e the sensor layer is responsible for numerical sensing of physical values required for farming.

L. Liu [3] discusses about a violation approach for the monitoring of regional/urban solid waste management systems under uncertainty, based on a special technique called "interval-parameter fuzzy integer programming" (IPFIP) model. In this approach, given levels of violation system constraints permitted are more tolerable. The decision space of the model is explained using the critical constants called the violation variables. Violation analysing scheme does not satisfy all the models original constraints. This method gives reasonable solutions through this planning. Within the management system a small information regarding expansion of facility and waste flow decision were made generated. The results of modelling generates a series of decisions under system conditioning, allows for more in-depth analysing of tradeoffs between environment and economic things as well as those between system reliability and optimality. This whole model depends on the different decisions taken by the user with the each step in the project. This plays a major role in the system progress.

G.J. Manderson [4] discuss about the amount of solid waste produced from industries in developing countries that can no longer be ignored. The safe disposal that is urgently required as the quantity is increasing day by day. Reducing the volume of solid waste produced in the cities and towns is the first step of measure. However volume reduction is only one measure to the problem. We need to convert of solid waste to non-harmful waste that is not harmful to environment. Different methods of decomposing both the agricultural and industrial waste have been discussed. One of them is the cleaner technology where the production of waste in industries can be minimized. Cleaner technology includes five steps namely planning and organization, pre-assessment, assessment, feasibility study and implementation. Re-cycling of waste is the key activity of cleaner technology. The waste collection is required to be done on a daily basis as the dirt cannot be left without treatment in open space [5].

III - EXISTING METHODS

Over the last decade, Life Cycle Assessment (LCA), initially developed as life cycle evaluation, has been extended to environmental impacts evaluation in order to quantify the emissions generated with the aim to provide support tools that simplify the choice among different solid waste management policies [4], [5]. This important choice should be taken, considering both economic efficiency and social acceptability. Thus, a solid waste management system can be summarized into two main steps: 1) solid waste collection and transport; 2) recycling and final disposal. Until now, in solid waste management problems, LCA has been mainly applied on the second step, by defining cost comparison indexes, collection techniques (Kerberside collection) or specifying the materials that should be collected because their great environmental impact. In addition, some people have focused their attention on the realization of logistic models with the aim to predict the behavior of a city in terms of number of vehicles, mileage, costs and pollution, but without concerning of transport optimization problems [6]. Previous studies, referred to Province of Varese, evaluated how the vehicles employed in the solid waste management process influence the environmental impacts. The studies estimated that truck emissions are proportional to the product between the cargo and half the mileage (t km), except for compactors, whose emissions are proportional to the press working time. The evaluation of the environmental impacts generated during the solid waste collection and transport processes is briefly shown in Figure 1, with reference to the recycling and final disposal process [7]. The figure shows the overall impacts generated, sorted by 11 categories, highlighting the need to improve the collection and transport processes handling. Several efforts are needed to improve the planning of vehicles paths in order to make lower the fossil fuel consumption. Smart paths choices can provide benefits for local administrations, for example by reducing maintenance costs and fuel demand. Two of the main approaches followed in the transport process optimization are the following: 1) shortest path searching; 2) best path searching in terms of garbage bins filling's prediction. In this paper an innovative solution for the second approach is described. It represents the main results of Smart Ecologic Area (SEA) project, where several efforts have been done in order to create a system architecture easily adaptable to the different scenarios of the solid waste management (e.g. cities, small town, mountain resorts, isolated areas, etc.). The next chapter will address with these issues into detail.

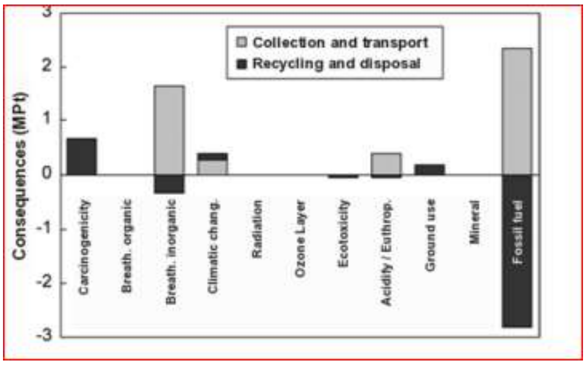

Fig.1-PPGR impacts registered in Varese city (Source:[7], p. 5)

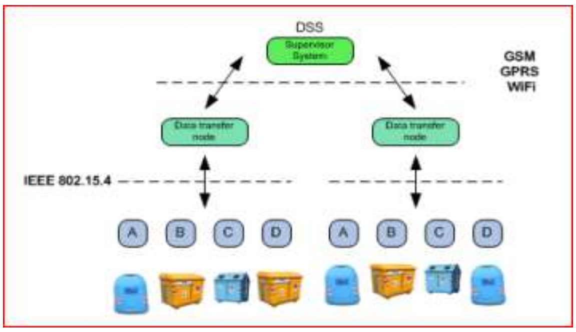

Fig. 2.-SEA project system architecture

IV - PROPOSE METHODOLOGY

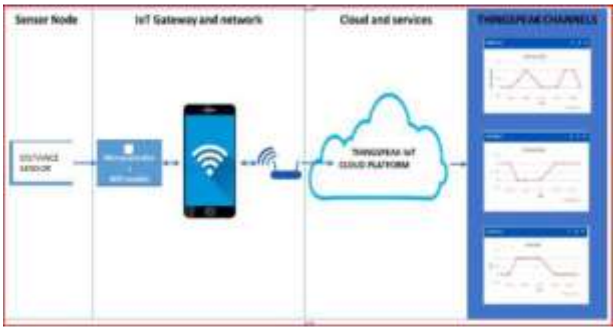

Fig. 3. Receiver

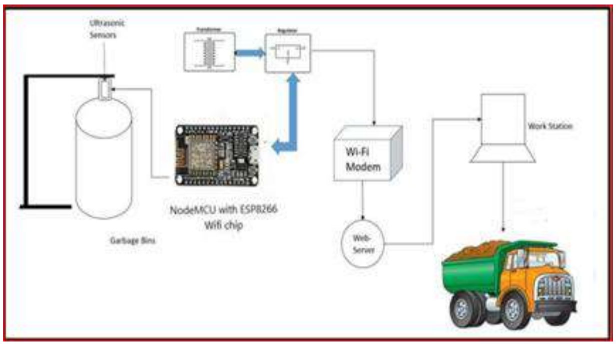

Fig. 4. Process of flow diagram

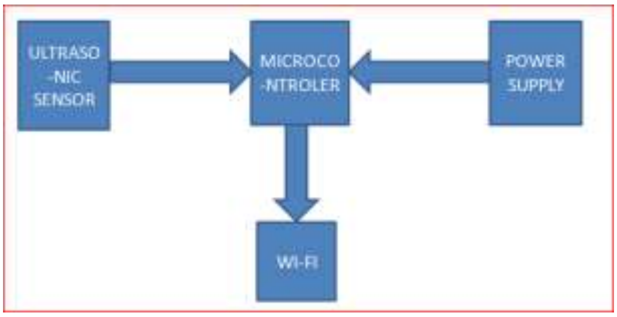

Fig. 5. Node

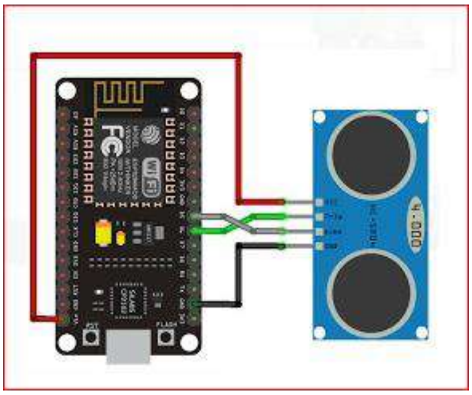

Fig. 6. Circuit Diagram

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REFERENCES

[1] *P. Shrivastava, S. Mishra and S. K. Katiyar, "A Review of Solid Waste Management Techniques Using GIS and Other Technologies," 2015 International Conference on Computational Intelligence and Communication Networks (CICN), 2015, pp. 1456-1459, doi: 10.1109/CICN.2015.281.*

[2] *C. Raghumani Singh and M. Dey, "Solid waste management of Thoubal Municipality, Manipur- a case study," International Conference on Green technology and environmental Conservation (GTEC-2011), 2011, pp. 21-24, doi: 10.1109/GTEC.2011.6167636.*

[3] *A. A. Popov and A. O. Kuzmina, "Justification of the Common Information Space Components for the Solid Waste Management," 2018 IEEE International Conference"Management of Municipal Waste as an Important Factor of Sustainable Urban Development" (WASTE), 2018, pp. 25-27, doi: 10.1109/WASTE.2018.8554138.*

[4] *E. V. Korchagina and O. A. Shvetsova, "Analysis of Environmental Consequences of Tourism Activity in Baikal Lake Area: Regional Practice of Solid Waste Management," 2018 IEEE International Conference"Management of Municipal Waste as an Important Factor of Sustainable Urban Development" (WASTE), 2018, pp. 19-21, doi: 10.1109/WASTE.2018.8554177.*

[5] *@article{Longhi2012SolidWM, title={Solid Waste Management Architecture Using Wireless Sensor Network Technology}, author={Sauro Longhi and Davide Marzioni and Emanuele Alidori and Gianluca Di Buo and Mariorosario Prist and Massimo Grisostomi and Matteo Pirro}, journal={2012 5th International Conference on New Technologies, Mobility and Security (NTMS)}, year={2012}, pages={1-5} } .*