

DEVELOPMENT OF A SMART, AUTOMATED WASTE MANAGEMENT SYSTEM

Nkolika O. Nwazor (PhD)

Electrical/Electronic
Engineering Department,
University of Port Harcourt,
Rivers State
NIGERIA
nkolika.nwazor@uniport.edu.ng

Nafiu Ibrahim

Electrical/Electronic
Engineering Department,
University of Port Harcourt,
Rivers State
NIGERIA
naftalks@yahoo.com

Olanrewaju K. Seun

Electrical/Electronic
Engineering Department,
University of Port Harcourt,
Rivers State
NIGERIA
olanseun@yahoo.co.uk

ABSTRACT

Indiscriminate dumping of refuse is a very big challenge in our societies today. It comes with the challenges of environmental pollution and degradation, wasting of scarce land, disease outbreaks and destruction of aquatic life to mention a few. Efficient waste management is therefore a very important factor if a country will have sustainable ecological development. The Smart Waste Management System proposed in this work seeks to address this. The system comprises the Power Supply, the State Sensors, the output display, the load driver, the load, the communication module and the control unit. The power supply supplies 12V dc to the relay and 5V dc to the microcontroller and its electronics components. The state sensors sense the state of the system and send the information to the control unit. The state sensors was implemented using limit switches, Light Emitting Diode and Light Dependent Resistor. The Output Display helps the users and the operators to know the state of the system and to take instructions on the actions required of them. Liquid Crystal Display was used to implement the output display. The Load Driver was used to drive the load and was implemented using relays interfaced to the controller via ULN2003. The Load represents the motor that drives the door mechanism of the smart waste bin. The Communication Module informs the operator when the waste system is filled up. This was implemented using SIM 900 module. The Control module coordinates the activities of the entire system and was implemented using Atmel microcontroller. If the system is implemented, it will contribute immensely to the ultimate goal of making our cities litter free and can also serve as a source of revenue generation.

Keywords: Smart, Waste management, control.