Design & Development of Advanced Trans Bin

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Abstract: In the recent decades, Urbanization has increased tremendously. At the same phase there is an increase in waste production. Now a day's waste management has been a crucial issue to be considered. Indoor dust bins designated for office spaces use usually consists of dry and solid waste which may include paper-based waste, plastic-based waste and stationaries. According to (United States Environmental Protection Agency, 2016), an average office worker generates an average of 2 pounds of paper and paperboard products waste every day and these wastes must be managed accordingly. Therefore, dust bins are usually placed nearby office workers' desk or on the floor where it is most convenient for workers to dispose of their refuse (Gollagher, Campbell & Bremmer, 2017).The placement of the dustbins is also affected by the types of office space layout. So today we will share some of our ideas to manage waste in an efficient and effective way. As in the growing technology the waste is been generated in huge amount. Thus to make waste collection and avoiding littering of solid waste, this paper deals with collection of the solid waste in a smart way for office users. The main objective of this project is to collect a garbage from every employee's desk. When person press the switch placed at button then dustbin go towards that person. After this the dustbin goes to his own place.

I. INTRODUCTION

From the beginning of the 20th century, generation of waste has rampantly been increased, and one cannot deny that due to tremendous growth in every field has even actually has led to waste generation along with modernization. The main type of the waste created in the office are paper-based waste, plastic-based waste and stationaries. When the bin gets full it is not been emptied on time as well as the waste gets littered in the office. Thus dustbins present at every desk needs to be cleaned from time to time. This leads to consumption of time and more manual working. This paper deals with the collection of waste in a way to achieve the good cause; to monitor the dustbin whether it is filled or empty as well as collecting the waste in an effective way automatically from the employee's desk.

In this paper, smart bin is built for office users, on a microcontroller based platform Arduino Uno board which is interfaced with RF Transreceiver, servo motor and Ultrasonic sensor. Ultrasonic sensor is placed at the top of the dustbin which will measure the stature of the dustbin. The threshold stature is set as 20cm. Arduino is programmed in such a way that when the dustbin is being filled the buzzer will buzz and the bin will be emptied. The main objective of this is to observe the trash can and maintain the surroundings sensible and clean in office in a smart way.

II. PROBLEM DEFINATION

As we see many times the dustbin are get over flown and concern person do not get the information on a time and due to which unconscious condition form in the office surroundings, at the same time bad smell come out from waste and spread out in surrounding. The existing system used for collecting the waste in office in a smart way. The cleaning the dustbin is not effective and which has some disadvantages which as follows-

- Less effective and time consuming
- Estimated cost is very high
- Environment become unhygienic

Thus to overcome this problems we have implemented this system.

III. LITERATURE SURVEY

In **Sharma * et al** [1], since smart cities are becoming center of attraction for the advancement of developing countries and without the removal or solution to the garbage problem these cities will be not that attractive. Therefore, large number of projects and research is going on in the area of smart dustbins for smart offices, cities as well; and to implement such projects typically use microcontroller based real time bin monitoring system, RF module, etc. Yusof et al. [2], presented an Arduino Uno micro controller based smart garbage monitoring system to ascertain the level of waste in the garbage bin in real-time and before there is overflow in garbage bin the system sense out and alert through buzzer for the bin to be emptied and garbage to be collected immediately. Ultrasonic sensor is used to estimate the level of waste while the RF-Trans receiver module is used for communication between employee and the dustbin and Arduino UNO is used to control the system operation.

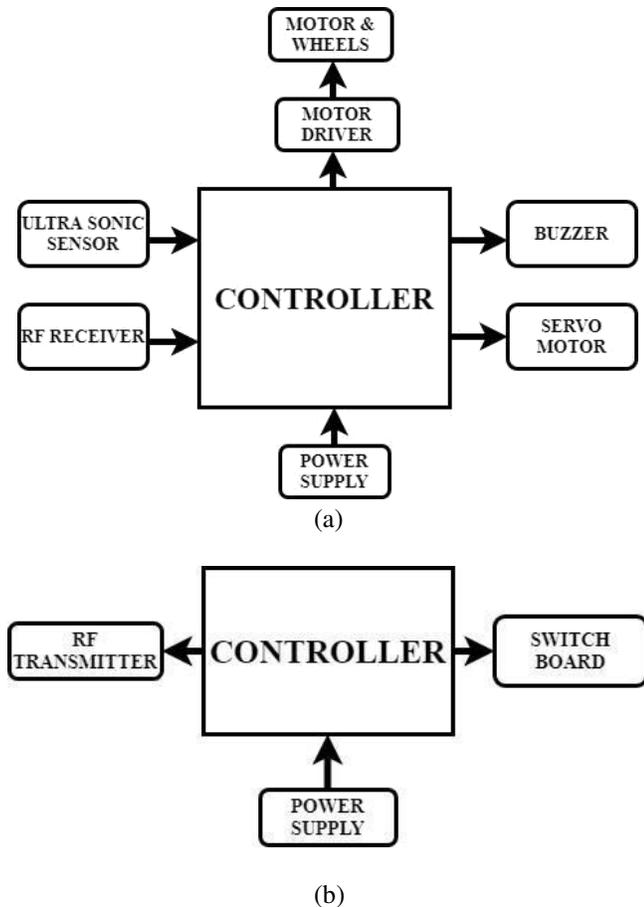## IV.PROPOSED SYSTEM

(a)

(b)

Figure 1. Proposed system block diagram
(a) Receiver side.   (b) Transmitter side.

The Block diagram shows the different component used in the smart dust bin system is power supply, ultrasonic sensor and servo motor. This method is proposed to make the office clean and neat. In this method the ultrasonic sensor senses the level of the garbage in the dustbin and is connected in dustbin it is used to detect the level of dustbin whether it is full or empty. As it reaches alarming levels and the buzzer rings. In our system motor is used for opening and closing of the garbage bin lid. This can be done by forward and reverse direction rotation of motor. For smooth running, good speed regulation and operating of motor drive IC L298N is used. Further it's implemented with an RF trans receiver. The transmitter is placed at the one end whereas the receiver is assembled along with the bin. The bin is placed at one corner of the office. A switch is at the employee's desk. When the employee wants to use the bin, the employee will press the switch provided at the desk. As bin is been coded with the distance calculation for every desk, when the switch is pressed from a particular desk the bin will check for the distance condition a go the specific desk. After it reaches the desk it will open the lid in horizontal direction. For a specific time period the bin remains open and then closes. Further, after collecting the garbage it goes back to its place. Thus, it works in a smart way for garbage collection.

IV. 1. ATmega328P

ATmega328P is a microcontroller that is manufactured by Atmel. It is a high-performance Atmel Pico Power 8-bit AVR RISC-based microcontroller. We have used this controller as the heart of the project. The hardware components used are interfaced the controller. This device operates between 1.8-5.5 volts. The voltage provided to every hardware is 5V from the Arduino.

IV. 2. Ultrasonic Sensor

The ultrasonic sensor echo pin and trigger pin is connected to pin digital pin D7 and D8 respectively. The +VCC pin is connected to +5V supply and GND pin is connected to ground pin of Arduino Uno board. The control (PWM) pin of servo motor is connected to digital pin D9 of Arduino. Hence, servo motor is used to open the cap of dustbin. The distance can be calculated as following: Distance $= 1/2 \times T \times C$

Where T is the time between the emission and reception, and C is the speed.

IV.3. Servo Motor

A Servo Motor is a small device that has an output shaft. This shaft can be positioned to specific angular positions by sending the servo a coded signal. The motor is fixed on the top where the cap of the bin is attached. The motor is controlled by the controller for rotation. Timer 2 of the Arduino is configured for the rotary operation of the motor. It rotates between the angular movements provided to it. This results in opening and closing of the bin when it reaches the destination.

IV. 4. RF Trans Receiver
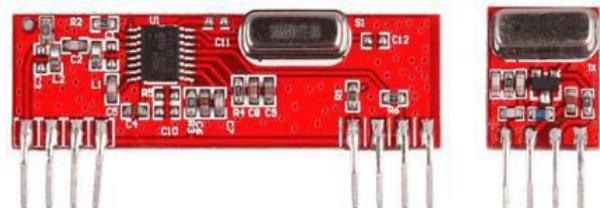
The module consists of a transmitter and a receiver. It

operates on 434 MHz frequency. The transmitter is an ASK Hybrid transmitter module. The power given to transmitter and receiver is 5V. The transmitter is placed at employee's desk; whereas the receiver is attached along with the dustbin. At transmitter end there are switches placed, configured with the pins of the Arduino. When the switched is pressed the logic 0 is send as the pin is given logic 0 i.e. the pins are connected to ground. Thus further it calculates the distance logically from the pressed switch and goes to the calculated distance. The bin waits for a specific interval and closes the cap of the bin and returns to its place back.

IV. 5. Buzzer

A buzzer is an audio signaling device which may be mechanical or electro-mechanical. Uses of buzzer is to indicate the bin is full. We have given 5v supply to buzzer.
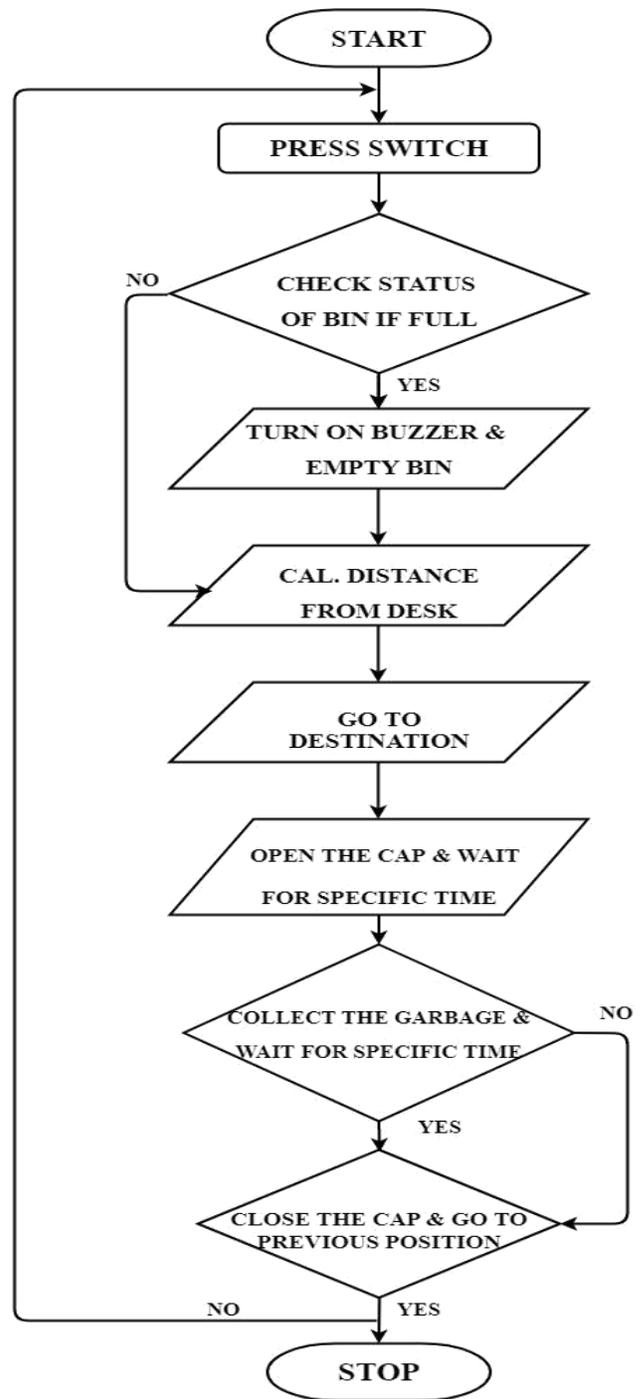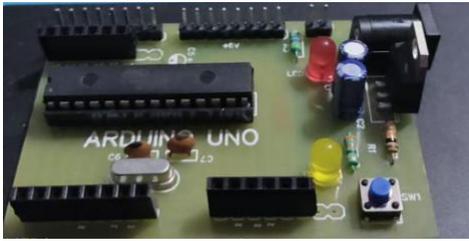
VII. FLOW CHART

Figure 2. Flow Chart for proposed system.

IX. ADVANTAGES

1) The garbage will be collected on time-to-time basis.
2) Less time consumption.
3) Office optimizes management, resources and costs, and makes it a "SMART OFFICE".
4) Maintenance cost of this service reduce up to 30%.

X. RESULTS

1) The results for the designed board are shown below:

3) Closing & opening of the bin:

Figure 1. Receiving of green signal

Figure 2. Receiving of white signal

Figure 3. Opening of Lid.

4) Ultra Sonic sensor for monitoring:

Figure 3. Front view of bin.

XI. CONCLUSION

This paper shows how the smart waste and garbage management can be done. The system will thus provide correct information; increase the efficiency of the system. This bin monitors real-time garbage level with the help of sensors. As compared to the systems developed till now this system has various features such as durability, affordability, accuracy, prevention against damage. This advanced trans bin helps in developing a clean and hygienic environment. After the garbage level reaches the threshold value. The intimation will be done through the buzzer fixed to the bin.

XII. FUTURE WORK

Some areas that we would like to explore in future
Research include:
1. We can use solar based smart dustbin.
2. We can provide WIFI system with GSM.
3. Automatic Garbage Fill Alerting system helps us to reduce the pollution
4. Apart from this we can separate dry wet trash bin collecting dry waste and biodegradable waste respectively.

XIII. REFERANCES

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