



TSO - The Smarter One

Project Proposal

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INTRODUCTION:

With the world becoming fast-paced every day which is in the uptrend, we need to get more done in less time, making everything more efficient, and smarter. So in this aspiration to make workspace and home space more efficient and managed, we have identified a solution to the amount of trash, and other waste generated in one simple workspace or a homeroom. The time, cost, resources, and will to maintain cleanliness dealing against plastics and volumes of waste generated in a workspace which comes as dry food wastes, papers, pieces of glass, metals, human dust like hairs, and especially plastics which are way too ignored thus turning harmful for the environment.

To deal with this human calamity, we preset the solution “**The Smarter One - TSO**”. It’s an autonomous robotic waste cleaner with a built-in trash collector. It’s the fusion of a locomotive robot, a waste picker, and a bin, all in one. It moves around in a room by itself and with the built-in ultrasonic sensor, it can navigate through the messiest of workspace and is capable of collecting the plastic and other wastes generated in the workspace. It runs on a battery that is easily replaceable. It solves the problem by cutting down the time and effort of ignorance to clean the workspace or a living room, which makes the workspace more productive and efficient and can even do a better job than a human in comparison, where a human struggles with finer particles of dust that’s where the smarter one thrives.

OBJECTIVE:

- Why are we doing this project?

-> We might be smart for ambitions or breakthroughs but not that smart enough to pick and collect wastes we see in front spoiling our beautiful environment or at some corner of our rooms. Thus, we needed a smarter one who cares for the cleanliness of our rooms, home spaces & workspaces specifically. Henceforth, we are creating TSO; The Smarter One, which is definitely smarter than us because it has chosen to collect wastes from our surroundings, making them clean and restoring their freshness, which we barely do.

In a nutshell, We might be Smart but TSO is The Smarter One.

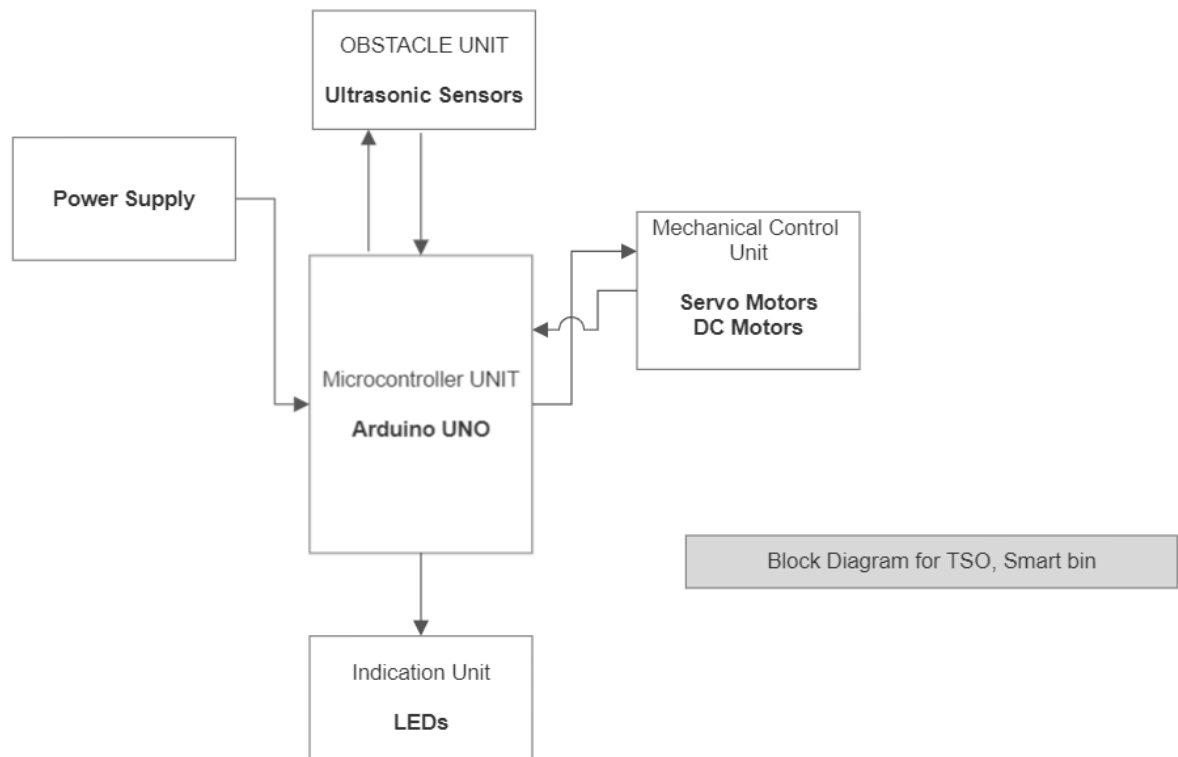
We have specifically chosen the TSO Robot or the smart bin Robot as our project because we are trying to learn, by making it solve a problem, a major problem; conveniently with its autonomous capabilities.

- What will we be doing precisely?

-> We'll be making a smart bin that will be capable of automatic operation with some basic operation abilities like:

- Accident Avoiding Functionality. (Navigating through workspace environment without colliding)
- Automatic opening or closing of the vent as soon as the user gestures (brings hand closer to the vent) for throwing wastes.
- Two LEDs are integrated to indicate whether the bin still has the space remaining to allow waste inside it or is full.
- The TSO Robot will have the minimum clearance between the floor and the base that will allow it to pull or roll in the waste into the bin.

BLOCK DIAGRAM:



METHODOLOGY:

The TSO will contain three main parts:

- **The Controller**
- **The Collector**
- **The bin**

The Controller will consist of an Arduino UNO where 3 or 4 Ultrasonic Sensors & Servo motors as well as four DC motors will be connected along with two LEDs. The Ultrasonic Sensor will help measure the distance of the object by emitting ultrasonic sound waves and converting the reflected sound into an electrical signal. These are the four areas it will be used for TSO:

- Front section (for making the locomotion stop/accident avoiding),
- Surfaced above the Lid (for detecting the User's hand \ for opening or closing the lid of the bin),
- Base (for detecting waste materials to collect it from the clearance part),
- Inside (for detecting if the bin is full or empty to fit more wastes)

Then these signals will help control the movements of DC motors which act for the part of wheels of the Robot, Servo Motors which will rotate the lids in a certain angle to make it open or closed as needed as well as help in pulling the waste. And the final part is done by LEDs; where two LEDs; one red and another green will be added to the frontend of the robot which will act like its eye too and these led will indicate if the bin is full (indicated by Red LED) or still has space to fit in some more wastes (indicated by Green LED).

COMPONENT LIST:

Components	Price per pcs (estimated)	Number of Required Pcs	Total Estimated Amount
Arduino UNO R3 board	1000	1	1000
Ultrasonic Sensor	300	4	1200
Servo Motor	300	4	1200
9 V DC motor	200	4	800
Jumper Wires (1pack= 20 cm, 120 pcs)	200	1	200
Bread Board	100	3	300
Motor Drivers	300	3-4	900

LEDs • Red • Green	30	2	60
Resistors (10 pcs)	35	1	35
9V Battery	50	4	200
(OPT.) LDR	20	3	60