REUSE
REDUCE
RECYCLE

ELCYCYCLE

Saving The World Just Got Easier...

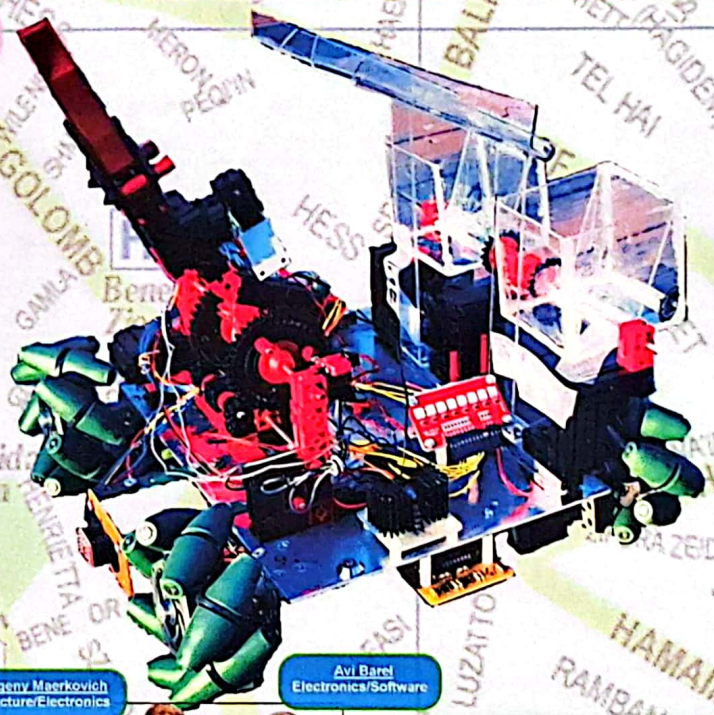
מגמת מכטרוניקה
תיכון עירוני ה'
חיפה
אותנו זה מדליק

Abstract:

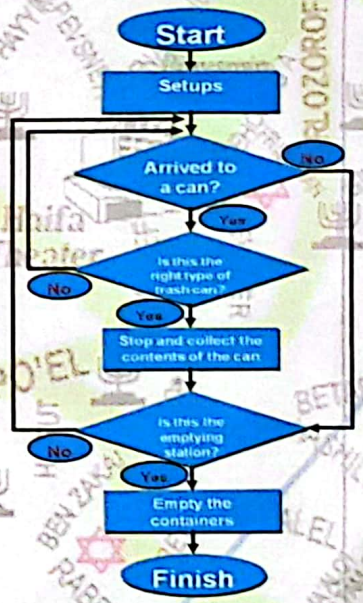
Nowadays the rise in the amount of garbage being produced in the world stresses the importance of dealing with the waste and recycling it. Currently the solutions presented for transporting the garbage and dividing it by its type are not efficient enough.

ELCYCYCLE is a robot that serves as a prototype to a fully autonomous garbage truck that can also sort a few different types of garbage by the type of their bins.

ELCYCYCLE follows a black line forming a circular track while identifying the garbage cans on the way and their type by their color, and then it collects them by order. The robot then drives to the final station for disposal of the different types of the trash, in favor of the following recycling process at the factories.



Algorithm:



Hardware:

- Arduino Mega 2560 - so that ELCYCYCLE will have a brain.
- Mecanum wheels - allowing the robot to maneuver with greater agility, also adding the ability to move sideways using their special mechanical structure.
- Four Vex 269 DC motors - to operate the Mecanum wheels.
- Four Fischertechnik DC motors - so that the gripper and the containers could function.
- Gripper - a custom-made gripper with three degrees of freedom. It is used to grasp the trash cans and empty them.
- Two containers - to store the different types of trash separately.
- LED module - to help following the program and debugging it.
- Line Sensor - to follow a certain path.
- Color Sensor - to detect the different kinds of garbage bins.
- 12 V Li-Po battery and a Voltage Regulator - so that ELCYCYCLE will have enough potential to blow up! ;-)

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Electronics/Software

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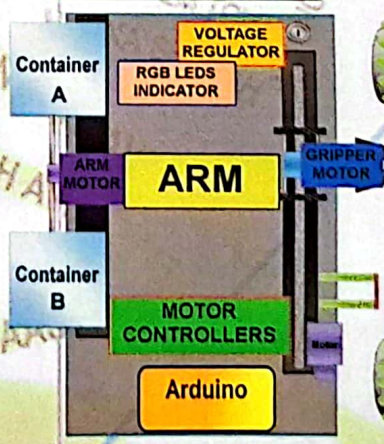
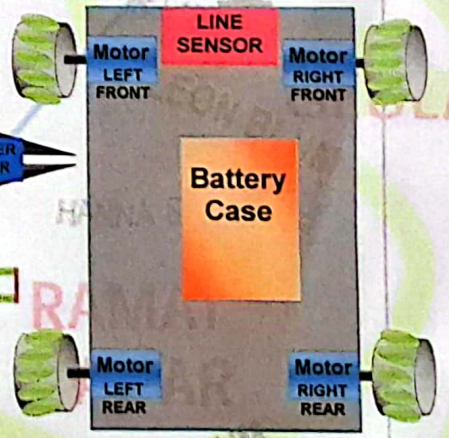
Top structure view:



Bottom structure view:



Results, Conclusions and Future Improvements:

- The robot can collect two different kinds of garbage to demonstrate its purpose. In the future few more types of garbage could be collected at once.
- The finished product will be completely autonomous and will not need the assistance of humans to carry out the job, as opposed to the current garage trucks.
- Without worries for employees, the actual autonomous truck could operate at night time and thus prevent traffic loads during the day.