Project Name – “Anomalous”- A rover with a 3-axis arm and 4 joints.

Problem Statement- To make a small robot capable of replicating the action performed by a human hand.

Project Budget- INR 10,000

Description-

I always wanted to control a bot like wall-e which had an arm and a platform to move around. When over time I worked on various projects I gained insight into metal fabrication. Because mostly till now I had been using either easily bendable aluminium frames or wood or plastic to make my robots with. This was a project I had initially after much struggle built with wood which broke itself apart due to the high torque of the motors.

I started by drawing on a blank paper a to scale design of the chassis and the housing for the motors and circuits. Since I had to cram in more circuit boards, I made it after orienting the circuits to be installed in a layout on the blueprint sketch of the rover to make sure it fit. I took my so called “blueprints” to a local welder for fabrication, they understood nothing. After painstakingly explaining the design, finally the chassis body along with the cover for it was fabricated. Motor mounts were welded into the frame. Spray painted the entire body matt black. Installed the motors and the circuits for the drive train (HC06 Bluetooth module, An Arduino Nano, A electronic relay board 4CH. Power Supply board (Handmade) with a 7805 and 7812 IC voltage regulator to provide stable voltage for the connection to not sever during high fluctuating operating conditions and one 2200mah lipo battery.

After connecting the Bluetooth to an android application, which was an open-source Bluetooth controller for Arduino robots.

I programmed my Arduino to receive Bluetooth signals from the app through the module. And the letters sent by the app could be programmed to various triggers. It is a pretty straightforward process. The base chassis worked.

Now I had to install the arm, as the arm in the previous design caused tilt problems due to bad CG, I had to offset the arm mount location backwards and towards the left as the weight of the arm leaned right.

After asking the welder to cut a few metal strips and drill holes according to the specs, I had the bones of my structure. After mounting and bolting the motors on the only thing left was the wiring and control.

I installed another set of Bluetooth module, Arduino couple along with a 8ch electronic relay board. The power distribution board had extra slots. With this using two devices one person could control the bots base and one could control the arm.

Materials Consumed-

1. Sheet Metal 2mm Thick.
2. Nuts/Bolts/Screws
3. Motor Clamps
4. 1 RPM Motors
5. 150RPM Metal Geared Motors
6. Wheels.
7. Wires
8. Arduino Nano
9. Electronic Relay Boards (4CH/8CH)
10. Ribbon Connectors (MF/MM/FF)
11. Zip Ties
12. Spray Paint (Matt Black)
13. 7805/7812 IC/ Capacitors
14. Pins
15. 4400mah LIPO (2200mah x 2)