Self Transforming Robot

Motivation: The major expected requirement of a mobile robot is it should have replaced the human in performing the dangerous and repetitive tasks like in the army.
https://youtu.be/6tD3dsDzbeg

Problem statement:

To make robot transform and then crawl it on a rough surface.

About:

Self transforming robot is a robot which transfoms its shape according to the hinderance occurring in the path where robot is being moved. Like in case of smooth surface it will use wheels to translate but in case of rough surface it will crawl using its hands and legs.

Implementation Theory:

We will first design the frame in solid works, after which we will make chassis. Then we will attach servo motors.The servo motor provides the proper angular and linear transformations. Our robot deign is based on "electrical drive system". The servo motors are controlled by a fuzzy logic controller according to the constraints of the obstacle. Then we will use an ultrasonic sensor to access the environmental information. A sensor is used to observe the current position of the each wheel which is achieved by accelerometer and gyroscope. The orientation of the present object is changed by processing the same information in the fuzzy controller unit.

Timeline:

1st week: We will make solid work model for the robot and its design.Components purchasing and LabVIEW/Matlab software learning
2nd week & 3rd week: Configuration of servos, microcontroller, main body.

4th week: Coding of sensors using LabVIEW/Matlab software and coding AVR microcontroller.
5th week: Testing
6th week: Debugging and improvements

Components & cost estimate:

- Axon Microcontroller- Rs.500
- 6V 3200mAh Re/ch. SMF/VRLA BatteryS -Rs.700
- 1 Infrared Sensor(IR Proximity Sensor)- Rs. 50
- 2 Light Sensors(VEEROBOT Photoresistor light sensor for Arduino Boards) Rs. 450
- 1 Ultrasonic sensor(Simple lab Ultrasonic Distance Sensor- HC-SRO4) Rs. 150
- 21 Hitec Servos Rs. 8400
- Acrylic Brackets 20 & Acrylic Sheet- Rs.1000
- Wheels- Rs. 120
- Accelerometer & Gyroscope - Rs. 700

Total Cost- Rs. 12,070

Learning:

- LabVIEW software/Matlab software
- Arduino

Members:

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