Landmine Detection Robot

· In many war-torn countries in the world, various unexploded ammunition and landmines are scattered all over the place.

· To improve demining performance and enhance the safety of deminers, we plan to design an efficient and humanitarian mine action device, which will be more accurate and reliable detection of mines in an area and also will be critical to clearance and successful demining.

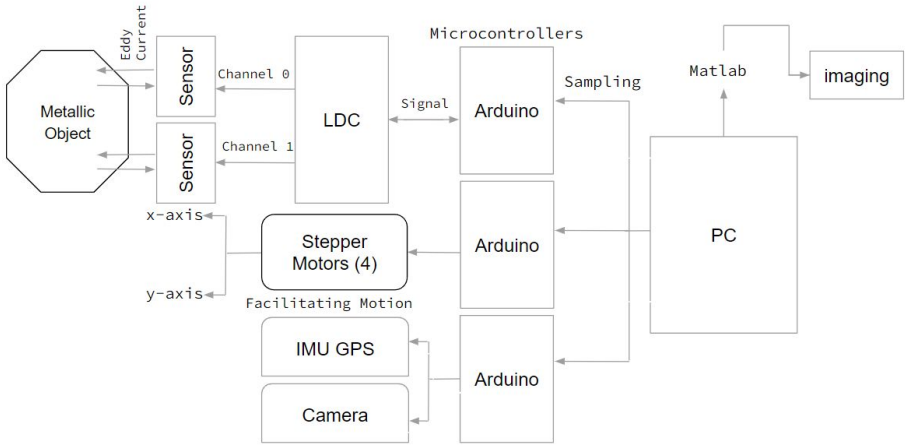
· Landmine Detection robots can uses Arduino uno Rev3 (microprocessor) to operate sensors such as imu, LDC, camera, etc., and drives the stepper-motor at the same time, so that the robot can move around the area

Navigation

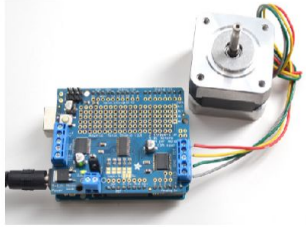
· Eddy Currents are loops of electrical current caused by a changin magnetic field in a conductor, in this way we can detect metal landmin underground

· Cameras are used for safety considerations as a collision between the robo and any living thing, and the cameras' feedback also helps monitor an manage the robot speed and path.

· Filtered IMU with Camera IMU used as measurements for the Kalma filter, with wheel encoders providing odometry predictions. Which is use to localize the base frame in the generated depth map and calculat trajectories to the landmine position.



Arduino Uno R3



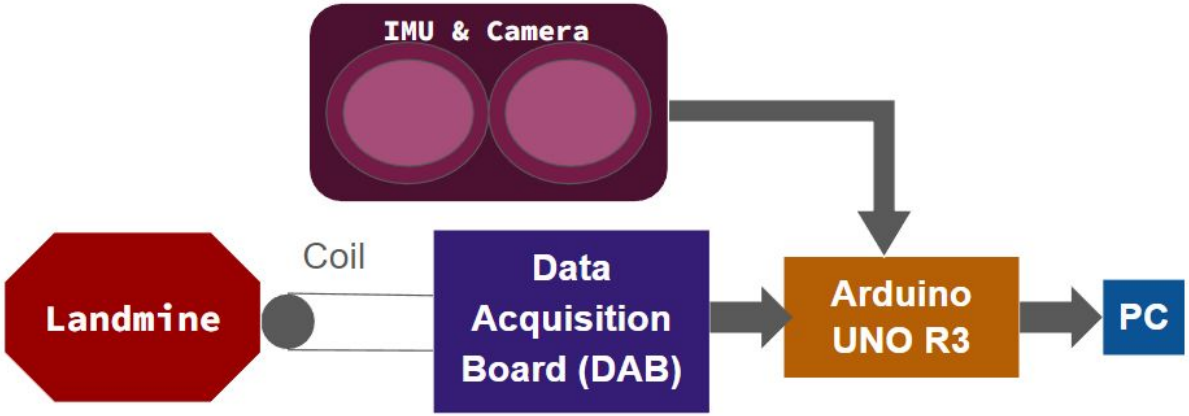
Adafruit Motor/Stepper/Servo Shield for Arduino v2

LDC coils

NEMA-17 Bipolar

LDC1612 EVM

Sensor



· DAB sensor - (Including Eddy current sensor) which is used to detect metal object position

· GPS sensor - which is ussed to identify robot position

· Camera - which is used to read signs, signal and avoid collision with living objects

· IMU - which is used to measure robot acceleration and heading

Power & Budget

· Cost and power Consumption Analysis

Component	Unit Price	Operating Current/Voltage	Average Power(mW)
Arduino UNO R3s(×3)	$18	20mA / 7-12V	200
Stepper Motor（×4）	$22	5000-7500mA / 24V	120000
Data Acquisition Board	$99	100mA / 10V	10000
RGB Camera	$35	100mA / 5V	500
VN-100s(IMU)	$450	40mA / 5V	200
Jetson Nano	$100	2000-4000mA / 5V	21500
Copper Foil Tape (30cmx20cmx0.025mm)	5pc for $12		
Total	$730		152400

· Battery Runtime duration

Component	Max Discharge Current / Voltage	Run Time
Gel Type Lead Acid	289.2 A / 36V	1.6 Hours with Max rate speed and max rated incline