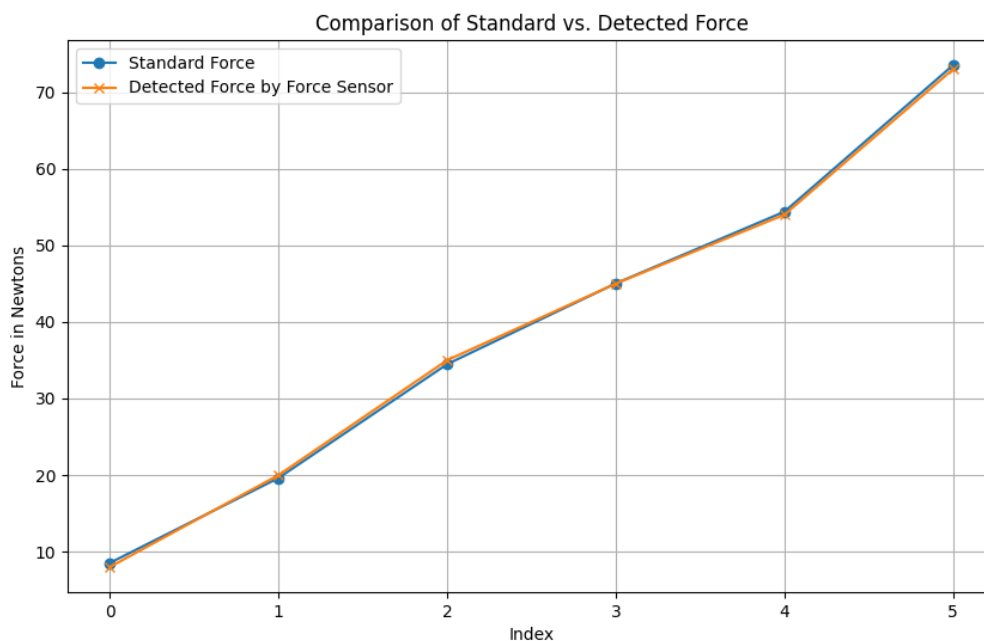# Group 12

High-Level Requirements

- Maximum penetration depth of 50 cm.

- The probe can move horizontally, with a minimum displacement of at least 30cm along both the x and y axes.

- The software can record information for all detection points, including depth and the magnitude of pressure applied.

- Users can control the entire system via Bluetooth.

- The error of the horizontal motor should be controlled within 5%, while the error of the vertical motor should be controlled within 2%.

- The relative error of force sensor should be controlled within 5%.

- The precision of the force sensor is 1N, and probe will return if the force exceeds 90N.

- The software will be able to provide a 3D visualization of the data results, allowing users to have a more intuitive understanding of the detected terrain.

Error of Force Sensor

Mean Relative Error: 0.01868284356593596