

School of Engineering

Advanced Mechatronics System Design – MANU2451

Design Project Proposal

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Project Team:

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Abstract:

The team would like to propose an *inspection robot* with HRI system (human-robot interaction) as our chosen project. Where the team believes that the boundaries of current day inspection robots can be surpassed by the addition of path planning. Enabling the robot to make smarter navigation decisions would allow for a more efficient device. Furthermore, through path planning, updated and detailed maps can be generated for hazardous/small spaced areas. The propulsion method utilized by this robot would be mecanum wheels which allow for a more flexible range of motion driven by 4 separate NEMA 17 motors. As for the sensing systems a camera and infrared LIDAR sensors will sense any possible obstructions around it. The movement of the camera will have 2 degrees of freedom where the first joint will allow 360° rotation with respect to the x - y axis (stepper motor) and the second joint would allow for 90° or 180° (servo motor) rotation with respect to the z - y axis. NVIDIA Jetson nano is one of the microprocessors that the team considered as it enables the robot to acquire the ability in computing/processing multiple operations simultaneously (minimum lag).

Keywords: *Mecanum wheel, NEMA 17, Infrared sensors, path planning, servo motor*

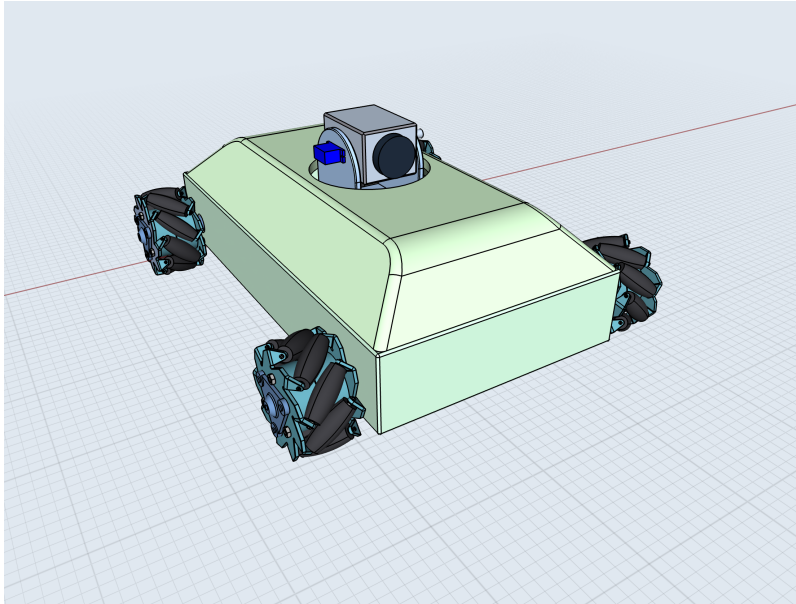


Figure 1. Rough 3D sketch/concept of the inspection robot.

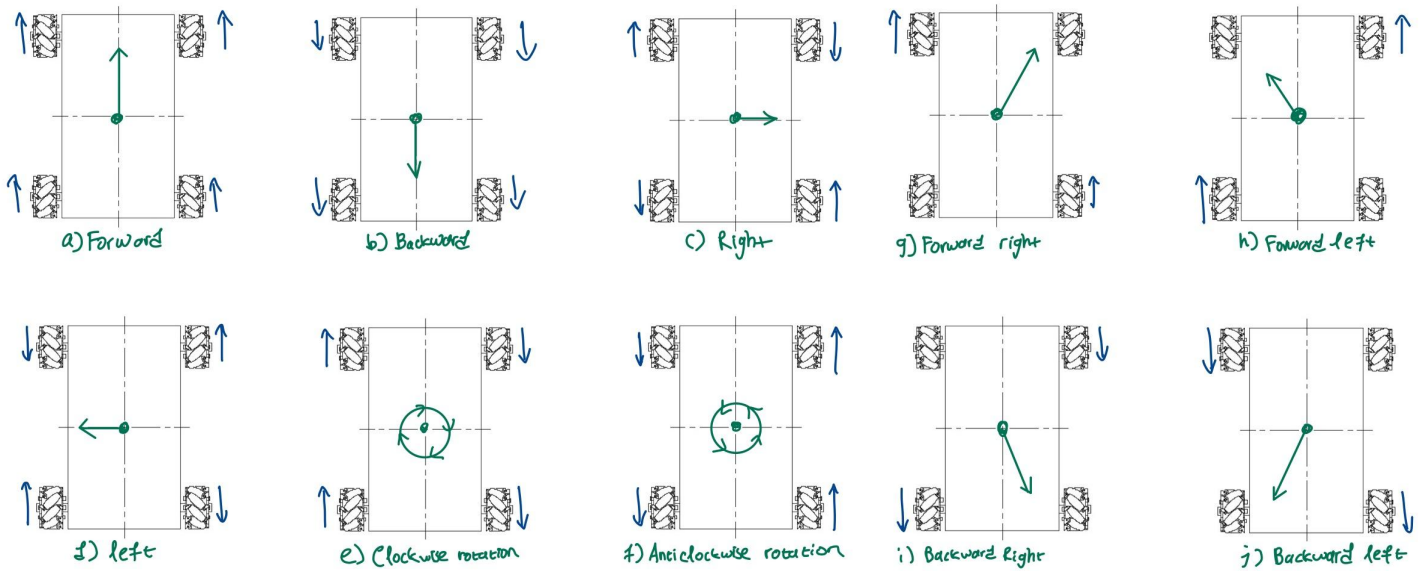


Figure 2. Rough sketches of expected possible movements can be done by the robot.