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ULTRASONIC BASED RADAR MAPPING SYSTEM USING MATLAB

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We present an ultrasonic-based radar mapping system using MATLAB by Sending sound waves generated from a piezoelectric transducer, ultrasonic transmitters measure the time taken for the reflected wave to return to the transducer to determine the distance of the object. As the technology shift toward autonomous driving, there is some concern about the safety of the technology being used, but with the integration of different sensor systems, the safety of these autonomous systems increases. With the use of an Arduino board and MATLAB software and mounting an ultrasonic sensor vertically, on a stand connected to the servo motor. The ultrasonic sensor produces a set of polar coordinated(r,ϕ,φ), with distance r, measured by the ultrasonic sensor of the objects, the angle, ϕ swept by the servo motor, and the height covered by the ultrasonic sensor z thus can be represented by cylindrical coordinates (r,ϕ,z). The polar coordinates plot 2D plots of the environment and a 3D plot for the cylindrical coordinates. 3D displays of the environment have more potential applications as they provide accurate and detailed information about the object in the environment in particular the location. This provides a cheaper and more efficient way of a 3D mapping system using an ultrasonic sensor and is used in various fields like anti-collision warning systems, AI input systems interacting with the environment, and robotics. Different sensor fusion in Autonomous vehicles to create more reliable and accurate detection systems is growing exponentially, therefore, a need for these systems. Ultrasonic sensor mapping is still a low-cost and reliable method even with the increasing innovation of other mapping systems.

Keywords: Ultrasonic technology, 3D plots of the environment, Arduino board, and MATLAB software.

Primary authors: Mr GICHURU, Rodgers Mutugi (Maasai Mara University); GWARO, Jared Ombiro (Dr.Ing); Mr OBARE, Brian Osoro (Maasai Mara University); Mr ALUKO, Sankara (Maasai Mara University); Mr YEGO, Eliud (Maasai Mara University)

Presenter: Mr GICHURU, Rodgers Mutugi (Maasai Mara University)

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