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Development of 3D Laser Scanner for Robot Navigation

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Abstract : Autonomous robotic systems needs an equipment like a human eye for their movement. Robotic camera systems, distance sensors and 3D laser scanners have been used in the literature. In this study a 3D laser scanner has been produced for those autonomous robotic systems. In general 3D laser scanners are using 2 dimension laser range finders that are moving on one-axis (1D) to generate the model. In this study, the model has been obtained by a one-dimensional laser range finder that is moving in two –axis (2D) and because of this the laser scanner has been produced cheaper. Furthermore for the laser scanner a motor driver, an embedded system control board has been used and at the same time a user interface card has been used to make the communication between those cards and computer. Due to this laser scanner, the density of the objects, the distance between the objects and the necessary path ways for the robot can be calculated. The data collected by the laser scanner system is converted in to cartesian coordinates to be modeled in AutoCAD program. This study shows also the synchronization between the computer user interface, AutoCAD and the embedded systems. As a result it makes the solution cheaper for such systems. The scanning results are enough for an autonomous robot but the scan cycle time should be developed. This study makes also contribution for further studies between the hardware and software needs since it has a powerful performance and a low cost.

Keywords : 3D laser scanner, embedded system, 1D laser range finder, 3D model
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