

Signal Averaging for Noise Reduction in Mobile Robot 3D Measurement System

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Abstract: Accurate information from sensors plays an important role in precision measurement. In such measurement small component of a noise can leads to a large variation in the output of the system. For the applications like multi-sensor data integration, sequences of observations from a number of different sensors are used to integrate into a single best estimate of the state of the environment. For integration of sensory information, sensor registration is considered as an important step. This research work is focused upon reduction of a noise from the repetitive motion of the pan tilt unit. The outcome of this paper is implemented on 3D feature extraction of the mobile robot's environment using a laser range finder. In the proposed work averaging technique is implemented on the Pan Tilt Unit (PTU) of the system where laser range finder is fixed upon the PTU to extract the 3D feature of the target objects. Registration of the angular displacement of PTU and laser range finder is an essential element of the 3D feature extraction. An experimental result of sensor registration shows a substantial improvement in signal to noise (S/N) ratio and quality of 3D feature extraction is also found improved.

Keywords: Noise reduction; Signal averaging; S/N ratio; Sensor registration; 3D feature extraction etc.