

Real-Time Recognition of the Terrain Configuration to Improve Driving Stability for Unmanned Robots

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Abstract : Methods for measuring or estimating of ground shape by a laser range finder and a vision sensor (exteroceptive sensors) have critical weakness in terms that these methods need prior database built to distinguish acquired data as unique surface condition for driving. Also, ground information by exteroceptive sensors does not reflect the deflection of ground surface caused by the movement of UGVs. Therefore, this paper proposes a method of recognizing exact and precise ground shape using Inertial Measurement Unit (IMU) as a proprioceptive sensor. In this paper, firstly this method recognizes attitude of a robot in real-time using IMU and compensates attitude data of a robot with angle errors through analysis of vehicle dynamics. This method is verified by outdoor driving experiments of a real mobile robot.

Keywords : inertial measurement unit, laser range finder, real-time recognition of the ground shape, proprioceptive sensor

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