Gravity-based 3D shape measuring sheet

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Abstract: In this paper, we introduce a novel sensing device named "3-dimensional capture sheet (3DCS)." The cloth-like sheet measures its own 3D configuration. It consists of a lattice structure inside of the sheet, and each link of the structure has a triaxial accelerometer. Though the roll and pitch angles of the link are calculated from the gravity vector measured with the accelerometer, the yaw angle is not determined by the gravity vector alone. Two approaches are proposed to obtain the angle; one approach utilizes constraints originating from the lattice structure, and the other takes the Earth's magnetic field as additional information. The whole shape of the sheet is reconstructed by combining the postures of all the links. © 2007 SICE.
Author Keywords: 3-dimensional configuration; Flexible sensing device; Geomagnetic field; Gravity; Sensor network

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