

Study on Position Control of A Quad-rotor for Infrastructure Inspection Using UWB Communication and An Optical Flow Sensor

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Abstract

In recent years, the aging of infrastructure has been regarded as a problem in Japan, however, the local governments that manage them have a shortage of financial resources and inspectors. Therefore, I focused on the inspection method using UAV (Unmanned Aerial Vehicle). To replace special work vehicle with UAVs in inspection brings to workers safe, and cost reduction. Because UAVs require the technique to operate them, autonomous flight by GPS is generally used, although radio waves from satellites are blocked on bridges and cannot be used. To solve this problem, this presents an estimation method of the position of the UAV using the UWB (Ultra-Wide Band) module which is a ranging device and the optical flow sensor which can measure the speed, and the method for autonomous flight was shown. Next, the experiment showed that the accuracy of the estimated position was sufficiently high. In addition, position holding control with only one point as the target value and autonomous flight control with multiple points as the target values were performed. As a result, it was confirmed that position control was possible without deviating from the target point.