

Autonomous Position Control of an Unmanned Aerial Vehicle Based on Accelerometer Response for Indoor Navigation Using Kalman Filtering

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Abstract : Autonomous indoor drone navigation has been posed with various challenges, including the inability to use a Global Positioning System (GPS). As of now, Unmanned Aerial Vehicles (UAVs) either rely on 3D mapping systems or utilize external camera arrays to track the UAV in an enclosed environment. The objective of this paper is to develop an algorithm that utilizes Kalman Filtering to reduce noise, allowing the UAV to be navigated indoors using only the flight controller and an onboard companion computer. In this paper, open-source libraries are used to control the UAV, which will only use the onboard accelerometer on the flight controller to estimate the position through double integration. One of the advantages of such a system is that it allows for low-cost and lightweight UAVs to autonomously navigate indoors without advanced mapping of the environment or the use of expensive high-precision-localization sensors.

Keywords : accelerometer, indoor-navigation, Kalman-filtering, position-control

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