

Visual Odometry and Trajectory Reconstruction for UAVs

Authors : Sandro Bartolini, Alessandro Mecocci, Alessio Medaglini

Abstract : The growing popularity of systems based on unmanned aerial vehicles (UAVs) is highlighting their vulnerability, particularly in relation to the positioning system used. Typically, UAV architectures use the civilian GPS, which is exposed to a number of different attacks, such as jamming or spoofing. This is why it is important to develop alternative methodologies to accurately estimate the actual UAV position without relying on GPS measurements only. In this paper, we propose a position estimate method for UAVs based on monocular visual odometry. We have developed a flight control system capable of keeping track of the entire trajectory travelled, with a reduced dependency on the availability of GPS signals. Moreover, the simplicity of the developed solution makes it applicable to a wide range of commercial drones. The final goal is to allow for safer flights in all conditions, even under cyber-attacks trying to deceive the drone.

Keywords : visual odometry, autonomous uav, position measurement, autonomous outdoor flight

Conference Title : ICDTDAO 2021 : International Conference on Drone Technology, Drones and Aerial Observation

Conference Location : Rome, Italy

Conference Dates : July 22-23, 2021