

# Automatic Mosaic and Real-time Measuring System for UAV Images

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In a preceding project about red tide monitoring, there was a lack of reliable open data of red tide water area. Besides, the red tide mostly occurs alongside the mudflat hardly accessible for manual measuring. Thus, the idea of developing a measuring system based on low-altitude remote sensing images by UAV (unmanned aerial vehicle) was proposed. To increase the measuring area, precision and speed, the project mainly focused on image distortion correction, image mosaicking and measuring system. First, the multiple-rotor UAV was selected for image collection. Second, based on the hardware of flight attitude parameters collection, a correction model was designed using the parameters such as yaw angle, pitch angle, roll angle and flight height to correct the image deformation generated by the deflections of UAV during photo collection. Then bilinear interpolation method was applied to rebuild the aerial images. Moreover, automatic SURF-based image registration algorithm was realized, capable of interest point selection, description and matching. Finally the measuring system based on android mobile terminal was developed, leading to accurate measurement of the area of interest in real time on site. The system has undergone trials in different environments, including aquiculture area as well as mangrove reserve around Zhangpu county and Xiamen city. The results indicated that the current system with high measuring precision, speed and mobility, expands the application scope significantly, which can be applied to assessment of contamination area by environmental protection agency, measurement of deforestation area by government, etc.