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### TOWARD AUTOMATED FAÇADE TEXTURE GENERATION FOR 3D PHOTOREALISTIC CITY MODELLING WITH SMARTPHONES OR TABLET PCS

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**Abstract.** An automated model-image fitting algorithm is proposed in this paper for generating façade texture image from pictures taken by smartphones or tablet PCs. The façade texture generation requires tremendous labour work and thus, has been the bottleneck of 3D photo-realistic city modelling. With advanced developments of the micro electro mechanical system (MEMS), camera, global positioning system (GPS), and gyroscope (G-sensors) can all be integrated into a smartphone or a table PC. These sensors bring the possibility of direct-georeferencing for the pictures taken by smartphones or tablet PCs. Since the accuracy of these sensors cannot compared to the surveying instruments, the image position and orientation derived from these sensors are not capable of photogrammetric measurements. This paper adopted the least-squares model-image fitting (LSMIF) algorithm to iteratively improve the image's exterior orientation. The image position from GPS and the image orientation from gyroscope are treated as the initial values. By fitting the projection of the wireframe model to the extracted edge pixels on image, the image exterior orientation elements are solved when the optimal fitting achieved. With the exact exterior orientation elements, the wireframe model of the building can be correctly projected on the image and, therefore, the façade texture image can be extracted from the picture.

[Conference Paper](#) (PDF, 2331 KB)

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