شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

بعض الوثائق الاصلية تالفة

بالرسالة صفحات لم ترد بالاصل

MAP UPDATING USING IMAGE POINT TRANSFER TECHNIQUES

by

MOHAMMED AHMED SOLYMAN ALDELGAWY

A Thesis Submitted to the
Faculty of Engineering at Cairo University
For the Degree of
MASTER OF SCIENCE
in
CIVIL ENGINEERING

under the supervision of

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GIZA, EGYPT
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FACULTY OF ENGINEEERING, CAIRO UNIVERSITY

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To my father, mother, brothers, and my dear sister

To every one taught me even

A single litter

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ABSTRACT

Invariance theory has been recently used widely in the field of Image Understanding (IU) and Computer Vision (CV). This research presents the invariance techniques which deal with image point transfer and their applications on map updating. The main advantage of the invariance image transfer techniques is that they are linear with respect to the unknowns. The image transfer process is accomplished by measuring the coordinates in the three images only. Therefore, the process is performed without knowledge of the 3D objects (ground coordinates) nor the camera parameters.

Two tasks, image point transfer from two images to a third one and to a map, are investigated using four different approaches. The first approach is based on the fundamental (F) matrix without applying constraints (linear solution). The second two approaches deal with applying constraints on the fundamental matrix. One of them applies the determinant constraint, and the other applies the determinant and epipolar constraints on the fundamental matrix. The last approach is based on the four trilinearity equations. The mathematical derivation and analysis of these four approaches are provided in the research.

Experimental results are presented in tables and figures for both simulated and real data sets using convergent and normal geometry. Consequently, close range and aerial photographs are used, along with existing maps, for real data map updating experiments. The experiments show that using the fundamental matrix without constraints produces a large amount of error. However, increasing the number of reference points improves the solution. Applying constraints on the fundamental matrix stabilizes the solution. Finally, using trilinearity equations produces the best results of the four used approaches. Conclusions, recommendations and relevant appendices are provided at the end of the research.