

SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 3 (2C)

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A METHOD OF CRATER DETECTION AND MATCHING FOR NAVIGATION OF LANDING ON
MOON**Abstract**

Many intending moon exploration plans require precise landing capability. Crater is a kind of terrain with conspicuous shape feature on the lunar surface. Landing precision could be boosted when crater is used as landmark in lander navigation. Aiming at the intention of navigational application, an autonomous method of crater detection and matching is proposed in this paper. The crater detection algorithm is based on assumption that all craters are in the shape of ellipse, which leads to its rapid execution since only edge information is used. An adaptive revision is put forward by using image gray level histogram, which solves the incompatible problem when detection algorithm works on images with different illuminations. The crater matching algorithm is presented based on invariance of ellipse in affine transformation. By using this, same crater in images with different imaging conditions could be well matched, and a re-match strategy is also designed for miss-match situations. Real images of the lunar surface are used to test and analyze this method and results demonstrate its feasibility and validity.