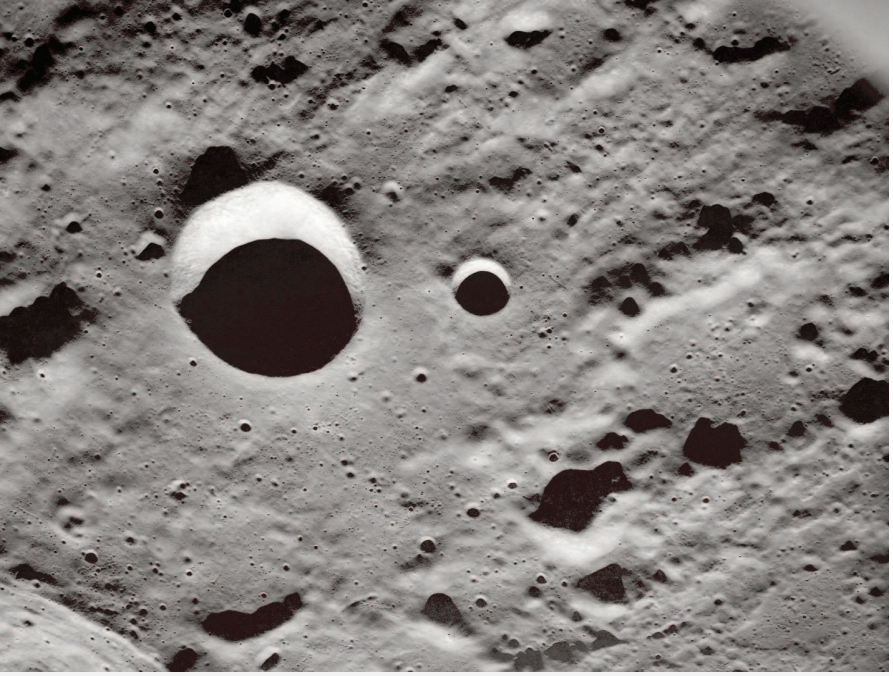


National Aeronautics and
Space Administration

Information Technology and Software

Automatic Extraction of Planetary Image Features and Multi-Sensor Image Registration

A method for the extraction of Lunar data and other planetary features

Many automatic feature extraction methods have been proposed and utilized for Earth remote sensing images, but these methods are not always applicable to Lunar data that often present low contrast and uneven illumination characteristics. The boundary of Lunar features is not always well defined, and it is therefore somewhat difficult to segment and characterize Lunar images. With the large quantity of new Lunar data that will be collected in the next few years, it is important to implement an automated method to extract these features, and to perform tasks such as image registration. This technology can be generalized for commercial applications with similar restraints such as medical imaging, where low contrast and uneven illumination image characteristics often pose issues.

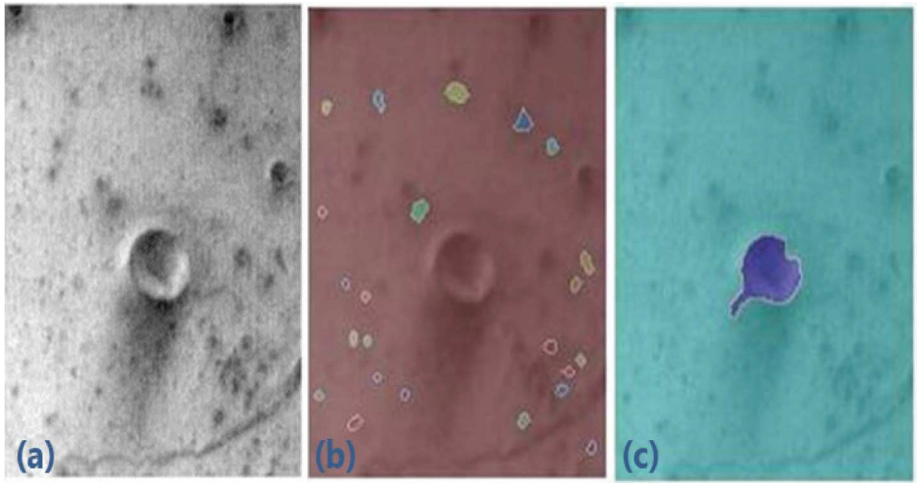
BENEFITS

- Can analyze images with low contrast and uneven illumination characteristics.
- Designed for extraction of Lunar features, but can be generalized for any imaging system
- Provides accurate registration of multi-temporal, multi-sensor, and multi-view images.

technology solution

THE TECHNOLOGY

NASAs Goddard Space Flight Centers method for the extraction of Lunar data and/or planetary features is a method developed to extract Lunar features based on the combination of several image processing techniques. The technology was developed to register images from multiple sensors and extract features from images in low-contrast and uneven illumination conditions. The image processing and registration techniques can include, but is not limited to, a watershed segmentation, marked point processes, graph cut algorithms, wavelet transforms, multiple birth and death algorithms and/or the generalized Hough Transform.



Feature extraction from data collected during the Mars Global Surveyor mission. The original image (a), the close contour features (b) and the elliptic shape features (c) are shown.

APPLICATIONS

The technology has several potential applications:

- Terrain mapping as a supplement to existing feature extraction methods.
- Military synthetic-aperture radar (SAR) images
- Medical imaging
- Autonomous vehicles

PUBLICATIONS

Patent No: 8355579

Patent Pending

More Information

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GSC-TOPS-7