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Onboard intelligence system development for remote sensing application

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In remote sensing satellites, information is transmitted in store and forward mode, which acquired by sensors (camera) imagery stored on board till ground stations come not within view. Satellite imaging sensors generate mass volumes of data at very high speeds. On the other hand, storage capacity and communication bandwidth are crucial parameters for satellite resources and that decided cost and power requirements. By processing on the data in terms of compression and detection of objects which are required based on applications at onboard and only those data are transmitted at ground level is create an efficient utilization of resource. Here, we have proposed an algorithm based on ratio and threshold method which work on color images that work very efficiently for discriminating different objects of earth as well as clouds. Accuracy of algorithm is more than 97% and gives better PSNR (peak signal to noise ratio). Reconfigurable computing technology, which combines the flexibility of traditional microprocessors with the performance of ASIC devices, is very promising for space applications. FPGA is used for verification and testing of the proposed algorithm, the results are accurate and matched with the simulation results.

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Evidence of repeated swarm activity delaying impending earthquake in Indo-Nepal Himalaya which probably occurred on April 25, 2015

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E arthquakes are regarded as the most dangerous natural hazards because they strike all of a sudden without any warning with respect to space, time and magnitude. The prediction of earthquakes is one of the most important societal goals in the seismological research. Indo-Nepal Himalaya accommodated all major tectonic features of the Himalayan mobile belt and is seismically one of the active regions in the Himalayan arc. In the present work, anomalous seismicity and the delineation of preparation zones are carried out using the temporal and the spatial distribution of events considering the total events and the events with mb \geq 4.3 in four anomalous episodes, respectively. Observations indicate that there is a significant fluctuation in seismicity prior to large earthquakes. It have been observed that, three medium size earthquakes of 1980 (mb 6.1), 1984 (mb 5.6) and 1999 (mb 6.6) already occurred in the Western Nepal and its adjoining Indian region were preceded by well-defined patterns of precursory swarm. Other two cases for which gap period still continues but no earthquake occurred till date is inspected for future earthquake. Study indicates that an earthquake with M 6.5±0.5 should have occurred till December 2011 in delineated preparatory area (29.30-30.50 N and 81.20-81.90 E) having focal depth range 10-30 km. However, analyzing seismicity data from period 1963-2006 conclude that delay in impending earthquake is the case of a repeated swarm sequence and April 25, 2015 (M 7.9) Nepal earthquake was the consequence of this, which probably enhanced the preparatory area, magnitude and occurrence period.

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