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Application of the Hit or Miss Transform to Detect Dams Monitored for Water Quality Using Remote Sensing in South Africa

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Abstract : The current remote sensing of water quality procedures does not provide a step representing physical visualisation of the monitored dam. The application of the remote sensing of water quality techniques may benefit from use of mathematical morphology operators for shape identification. Given an input of dam outline, morphological operators such as the hit or miss transform identifies if the water body is present on input remotely sensed images. This study seeks to determine the accuracy of the hit or miss transform to identify dams monitored by the water resources authorities in South Africa on satellite images. To achieve this objective the study download a Landsat image acquired in winter and tested the capability of the hit or miss transform using shapefile boundaries of dams in the crocodile marico catchment. The results of the experiment show that it is possible to detect most dams on the Landsat image after the adjusting the erosion operator to detect pixel matching a percentage similarity of 80% and above. Successfully implementation of the current study contributes towards optimisation of mathematical morphology image operators. Additionally, the effort helps develop remote sensing of water quality monitoring with improved simulation of the conventional procedures.

Keywords : hit or miss transform, mathematical morphology, remote sensing, water quality monitoring
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