

Abstract ISSC presentation

Startracking for Small Satellites: Efficient Star Identification Using a Neural Network

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The required precision for attitude determination in spacecraft is increasing, providing a need for more accurate attitude determination sensors. The star sensor or star tracker provides unmatched arc-second precision and with the rise of micro satellites these sensors are becoming smaller, faster and more efficient. The most critical component in the star sensor system is the lost-in-space star identification algorithm which identifies stars in a scene without a priori attitude information. We present an efficient lost-in-space star identification algorithm using a neural network and a robust and novel feature extraction method. Since a neural network implicitly stores the patterns associated with a guide star, a database lookup is eliminated from the matching process. This makes the search time $O(1)$. This algorithm provides state-of-the-art performance in a simple and lightweight design, outperforming classical approaches. The efficiency of the algorithm enables small satellites to use high performance attitude determination sensors.