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Short Communication

Importance of Radar Application for Ship Detection in Oceans

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DESCRIPTION

The concept of Automatic Target Recognition (ATR). In this work target recognition based on Inverse Synthetic Aperture Radar (ISAR) images acquired through high resolution radar is presented. The methodology used to design the complete process from the acquisition step to the recognition (classification) step is based on the artificial intelligence approach and this method is known as Knowledge Discovery from Data (KDD). KDD process is used to develop ship detection system based on ISAR images. Radars are used to detect the targets at all weather conditions and without differentiation of day or night [1]. Radar is a very popular sensor to detect and classify targets at very large distances. Automatic Target Recognition (ATR) system is an important segment of modern military strategy. Correct recognition of military targets such as aircrafts, naval ships and missiles etc., is essential to attack the targets accurately. The target characteristics can be acquired from several kinds of radar signatures. Usually certain geometrical parameters or attributes are extracted from these radar signatures [2].

Automatic Target Recognition (ATR) system is an important segment of modern military strategy. The target characteristics can be acquired from several kinds of radar signatures. Usually certain geometrical parameters or attributes are extracted from these radar signatures. Data preparation mainly includes data pre-processing and data transformation [3]. In preprocessing, the unwanted noise in the raw data is removed. The data transformation decreases the high dimensionality of signal and increases the significant aspect of raw data visualization collected in step one. Hence, this step generally performs the reconstruction of ISAR images from raw signals collected, followed by extraction of attributes of ship targets from ISAR images [4].

Detection of targets in the presence of noise and sea clutter interference using radar ISAR images is not an easy task. The sea surveillance radar plays an important role in the ocean surveillance. It measures the range of targets and computes the position of targets and provides the metric information of target parameters such as range, speed and direction. Most of today's aircraft flying above a certain height or ships moving in sea are being equipped with an electronic transponder whose mission is to report altitude or range and other parameters like speed and direction of target to provide its identity [5]. Radar appears as a unique sensor that could provide useful target characteristic information for achieving Automatic Target Recognition in any conditions by using powerful processing tools for identifying aircraft or ship based on some kind of prior knowledge.

CONCLUSION

Radar measurements can provide an image of the distribution of reflectivity of a target. Because such radar images contain the target structure and shape information and an unknown target can be identified and stored in a database. ISAR images are captured using high resolution radar at sea. Inverse Synthetic Aperture Radar (ISAR) imaging of moving ships is complex and computationally intensive. Digital image processing techniques are used for feature extraction of ISAR images and obtained features are used for Automatic Target Recognition.

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