

Relevance Vector Machine Feature Selection and Classification for Underwater Targets

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Abstract: Feature selection is an important issue in detection and classification of underwater targets. Often feature selection is performed only indirectly linked to the ultimate objective: target classification. In this paper we consider several techniques for feature selection, applied to high-frequency side-looking sonar imagery of mine-like targets. An important tool in this context is the relevance vector machine (RVM), which adaptively determines which training examples are most important (or "relevant") for the ultimate classification task. In this paper we demonstrate how the RVM may also be employed for feature optimization, in which the RVM selects the optimal set of features for the ultimate detection and classification tasks. After presenting the basic formalism, we will present example results using data measured by the US Navy.