

SCMS Research Seminar:

r-SVMT: Discovering the Knowledge of Association Rule over SVM Classification Trees

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Abstract

This paper presents a novel method of rule extraction by encoding the knowledge of the data into an SVM classification tree (SVMT), and decoding the trained SVMT into a set of linguistic association rules. The method of rule extraction over the SVMT (r-SVMT), in the spirit of decision-tree rule extraction, achieves rule extraction not only from SVM, but also over the obtained decision-tree structure. The benefits of r-SVMT are that the decision-tree rule provides better comprehensibility, and the support-vector rule retains the good classification accuracy of SVM. Furthermore, the r-SVMT is capable of performing a very robust classification on such datasets that have seriously, even overwhelmingly, class-imbalanced data distribution, which profits from the super generalization ability of SVMT owing to the aggregation of a group of SVMs. Experiments with a Gaussian synthetic data, seven benchmark cancers diagnosis have highlighted the utility of SVMT and r-SVMT on encoding and decoding rule knowledge, as well as the superior properties of r-SVMT as compared to a completely support-vector based rule extraction.

Biography

Dr. Paul S. Pang is a Senior Research Fellow, director of centre for adaptive pattern recognition systems, Knowledge Engineering and Discovery Research Institute (KEDRI), AUT. He is principal investigator of RASP project (funded by HRC New Zealand), and Internet Security project (funded by NICT Japan), and KEDRI principal investigator of TELECOM project (funded by Telecom New Zealand, FRST, and LUCENT USA). His research fields include support vector machine (SVM), SVM aggregating intelligence, incremental and multi-task machine learning, and bioinformatics.

Dr. Pang is a Senior Member of IEEE, and a Member of the institute of Electronics, Information, and Communication Engineers (IEICE) and Association for Computing Machinery (ACM).