

YILDIZ TECHNICAL UNIVERSITY

ELECTRONICS AND COMMUNICATIONS ENGINEERING DEPARTMENT

IEEE CIS Turkey Chapter SEMINAR

Mixing Computational and Artificial Intelligence: Discovery of Prediction Rules in Protein Secondary Structures

Dr. Jacek M. Zurada

University Scholar and Professor

University of Louisville, Louisville, Kentucky, USA

SUMMARY: Prediction of protein secondary structures (PSS) has been known as one of the perennial problems of bioinformatics. Both difficult and important, the problem is known to elude efficient computational solutions. Although numerous computational techniques have been used to predict the PSS with increasing degree of accuracy, only limited studies have dealt with discovery of prediction rules underlying the prediction itself. Such rules offer interesting links between the prediction model and the underlying biology, and also enhance interpretability of PSS prediction by providing a degree of transparency to the predicting models - usually regarded (and also modelled) as a black-box. In this lecture, we explore the use of C4.5 decision trees to extract relevant rules from PSS predictions modeled with two-stage support vector machines (TS-SVM). The rules were derived on the RS126 dataset of globular proteins and on the PSIPRED dataset of 1923 protein sequences. Presented approach has produced sets of often comprehensible and interpretable rules underlying the PSS predictions. Moreover, many of the rules seem to be strongly supported by biological evidence.

SPEAKER: Dr. Jacek M. Zurada is a University Scholar and Professor of Electrical and Computer Engineering at the University of Louisville, Louisville, Kentucky, USA. He is also the author or co-author of more than 350 papers and several textbooks in neural networks, computational intelligence and their applications to bioinformatics clustering, image processing, learning theory, medical diagnostics and drug dosing. Dr. Zurada was the Editor-in-Chief of IEEE Transactions on Neural Networks (1998-2003) and was also the President of the IEEE Computational Intelligence Society (2004-05). He currently serves as Chair of IEEE TAB Periodicals Committee which sets policies and oversees all of the 145 IEEE periodicals. He is an IEEE Fellow and IEEE CIS Distinguished Speaker, he also holds three honorary professorships of foreign universities and an elected membership of the Polish Academy of Sciences.

Place : YTÜ Hünkar Salonu – Beşiktaş – İstanbul

Date : June 15, 2011, Wednesday

Time : 15:00-16:00