An Introduction to Knowledge Discovery Applications and Challenges in Life Sciences

We focus on the role of knowledge discovery technologies in life sciences in this tutorial. We describe in detail a few example applications. We also discuss a few of the remaining challenges, and suggest promising future directions in these applications. We plan to cover the following example applications: (1) diagnosis and understanding of diseases, (2) inference of protein functions, (3) recognition of gene regulatory sites, (4) extraction of information from biomedical literature, (5) prediction of protein subcellular localization, and (6) detection of protein interaction binding motifs . At the end of this tutorial, we hope the student would have gained an appreciation of these problems, their current state-of-art solutions, and future directions of their development.

Short CV

Limsoon Wong is a Professor of Computer Science and a Professor of Pathology at the National University of Singapore. Before that, he was the Deputy Executive Director for Research at A*STAR's Institute for Infocomm Research. He is currently working mostly on knowledge discovery technologies and is especially interested in their application to biomedicine. Prior to that, he has done significant research in database query language theory and finite model theory, as well as significant development work in broad-scale data integration systems. Limsoon has written about 100 research papers, a few of which are among the best cited of their respective fields. In recognition for his contributions to these fields, he has received several awards, the most recent being the 2003 FEER Asian Innovation Gold Award for his work on treatment optimization of childhood leukemias. He serves on the editorial boards of *Journal of Bioinformatics and Computational Biology* (ICP), *Bioinformatics* (OUP), and *Drug Discovery Today* (Elsevier). He is a scientific advisor to GeneticXchange (USA), Molecular Connections (India), and KooPrime (Singapore).