

Statistics and Data Science Seminar

Some Recent Developments on the Applications of Evolutionary Algorithm in the Statistical Optimization

Frederick Phoa (Academia Sinica, Taiwan R.O.C.)

Abstract: Nature-inspired metaheuristic methods, like the particle swarm optimization and many others, enjoys fast convergence towards optimal solution via a series of inter- particle communication. Such methods are common for the optimization problem in engineering, but few in statistics problem. It is especially difficult to implement in some fields of statistics as the search spaces are mostly discrete, while most natural heuristic methods require continuous search domains. This talk introduces a new method called the Swarm Intelligence Based (SIB) method for optimization in statistics problems, featuring the searches within discrete space. Such fields include experimental designs, community detection, change-point analysis, variable selection, etc. The SIB method is a nature-inspired metaheuristic method that includes several operations. This method is advantageous over the traditional particle swarm optimization and many other heuristic approaches in the sense that it is ready for the search of both continuous and discrete domains, and its global best particle is guaranteed to monotonically move towards the optimum. The SIB method is demonstrated in several examples. Several extensions from the standard framework are also discussed at the end of this talk.

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