

Online algorithms for packing and covering problems

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Packing and covering problems are among the classic problems in area of combinatorial optimization and the research is ongoing for many decades. High importance of these problems is the result of the fact that multitude of computational problems can be expressed as as packing or covering problems. If one notices that the problem at hand is an instance of packing or covering problem, it immediately gives the tools to solve the given computational problem, as well as it gives the insight into its combinatorial structure. Improvements of highly general packing or covering problem can improve a whole variety of different computational problems. Tackling the most general problem at hand is the quintessence of basic research.

Multitude of real-world situations is modeled as a packing or covering problem. Solutions for such real-world situations has enormous importance in logistics, production, supply-chain, transportation, inventory optimization, designing micro-circuits, as well as directly in computers systems in form of problems solved millions of times per second in computer networks and operating systems. Improvements over existing algorithms for packing and covering can bring significant improvements in all of those areas.

The main goal of the project is to develop an improvements for certain special cases of packing and covering in an online variant, which are modeling situations where the hardness lies in passage of the time and not knowing the future. The reasoning and decision-making in non-complete information is a challenging task with enormous practical implications. The reason for starting the research in this area is the fact that the knowledge about this discipline is incomplete.