Abstract:

Size of the smallest description of a given target data is called in general Minimal Description Size (MDS), and the problem of computing MDS is called Minimal Description Size Problem (in short, MDSP). MDS is a key concept in various fields of theory of computing, such as machine learning and computational cryptography, and MDSP itself is important in Computational Complexity Theory. Unfortunately, the hardness of MDSP has been left open from the early stage of discussing P≠NP conjecture. From 2018, we started a project supported by the government (i.e., Grant-in-Aid for Scientific Research (A), or JSPS KAKENHI A) for attacking this research topic and our team members have obtained several breakthrough results, some of which indeed had overcome the limit of conventional hardness analyses. I would like to survey some of these achievements made my young colleagues.