Improved matrix pooling

Qizhai Li

Academy of Mathematics and Systems Science, CAS
E-mail: liqz@amss.ac.cn

Abstract: Pooled testing is useful to identify positive specimens for large-scale screening. Matrix pooling is one of the commonly used algorithms. In this work, we investigate the properties of matrix pooling and reveal that the efficiency of matrix pooling is related with the magnitude of overlapping among groups. Based on this property, we develop a new design to further improve the efficiency while taking into account of testing error. The efficiency, pooling sensitivity and specificity of this algorithm are explicitly derived and verified through plasmode simulation of detecting acute human immunodeficiency virus among patients who were suspected to have malaria in rural Ugandan. We show that the new design outperforms matrix pooling in efficiency while retain the pooling sensitivity and specificity