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Classified Mixed Model Prediction

Mixed model prediction (MMP) has a fairly long history starting with Henderson's early work in animal breeding (Henderson 1948). Nowadays, new and challenging problems have emerged, to which methods of MMP are potentially applicable, but not without further methodological and computational developments. Often problems occur when interest is at subject level (e.g., personalized medicine), or (small) sub-population level (e.g., community, center). The challenges have to do with better prediction of a mixed effect, or a future observation, by identifying the class that a new subject belongs to. We propose a new method, called classified mixed model prediction (CMMP), to solve this problem. We develop a theory for CMMP and investigate its empirical performance through simulation studies and a real-data application.