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We study the problem of simultaneous variable selection and parameter estimation in Gaussian process models. Conventional penalized likelihood approaches are attractive but the computational cost of the penalized likelihood estimation (PMLE) or the corresponding one-step sparse estimation (OSE) can be prohibitively high as the sample size becomes large. This is because the likelihood function heavily involves operations of a covariance matrix of the same size as the number of observations. To address this issue, this article proposes an efficient subsample aggregating (subagging) approach with an experimental design-based subsampling scheme. The proposed method is computationally cheaper, yet it can be shown that the resulting subagging estimators achieve the same efficiency as the original PMLE and OSE asymptotically. The finite-sample performance is examined through simulation studies. Application of the proposed methodology to a data center thermal study reveals some interesting information, including identifying an efficient cooling mechanism.