The bootstrap is a popular and powerful method for assessing precision of estimators and inferential methods. However, for massive datasets which are increasingly prevalent, the bootstrap becomes prohibitively costly in computation and its feasibility is questionable even with modern parallel computing platforms. Recently Kleiner, Talwalkar, Sarkar, and Jordan (2014) proposed a method called BLB (Bag of Little Bootstraps) for massive data which is more computationally scalable with little sacrifice of statistical accuracy. Building on BLB and the idea of fast double bootstrap, we propose a new resampling method, the subsampled double bootstrap, for both independent data and time series data. We establish consistency of the subsampled double bootstrap under mild conditions for both independent and dependent cases. Methodologically, the subsampled double bootstrap is superior to BLB in terms of running time, more sample coverage and automatic implementation with less tuning parameters for a given time budget. Its advantage relative to BLB and bootstrap is also demonstrated in numerical simulations and a data illustration.