PARALLEL CALCULATIONS IN MAXIMUM LIKELIHOOD ESTIMATION

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Maximum likelihood estimation is a very popular approach to get estimates of unknown variables. Indeed, under certain conditions estimates are consistent and asymptotically normal. Moreover, if we correctly specified the underlying probability distribution, we would get efficient estimates [1]. However, in practice obtaining estimates is a very hard task: we need to find an optimum value of the function, which form depends on distribution we have chosen and the data. Thus, it might be concluded that the aim function in the maximization task is neither concave nor differentiable. So it often happens that the maximum is hard to obtain.

For aforementioned reasons in order to solve the maximization task we apply a method which does not use gradient in its work. The method is simulated annealing [2]. In our work we present a way how increase the speed of the algorithm and enhance its accuracy. To be more precise we propose to use the parallel scheme in calculations.

We apply proposed method of calculation to certain number of test functions and also apply the scheme to real world task of obtaining AIM [3] features.

[1] Andersen, Erling B. (1970); "Asymptotic Properties of Conditional Maximum Likelihood Estimators", Journal of the Royal Statistical Society B 32, 283–301.

[2] Kirkpatrick, S., Gelatt, C. D., Jr., and Vecchi, M. P. (1983). Optimization by simulated annealing. Science, 220:671–680.

[3] Jessica J. M. Monaghan, Christian Feldbauer, Thomas C. Walters and Roy D. Patterson (2008). “Low-Dimensional, Auditory Feature Vectors that Improve VTL Normalization in Automatic Speech Recognition”. Journal of the Acoustical Society of America 123.