July 20 - July 27 Seminar Review

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Title: Practical leverage-based sampling for low-rank tensor decomposition
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This talk introduces a sketching method to fasten the alternating algorithm of CP decomposition for large-scale sparse tensor. Given a large-scale response tensor, the least-squares problems in the alternating algorithm become extremely high-dimensional, which leads to ~~an~~ expensive computation in practice. To reduce the complexity, the presenter samples the rows of the predictor and response matrices. The optimal choice of sampling probabilities is based on leverage scores. However, calculating the leverage scores for the predictor matrix is also computationally expensive due to the high dimension. Therefore, the presenter assigns the probabilities using the leverage scores for individual factor matrices, which are computationally cheaper. Then, we reduce the dimension of the least-squares problems efficiently. After sketching, the presenter also combines the repeated rows and hybrids the deterministic and randomly-sample rows to strengthen the method. The numerical results imply that the sketching method is over ten times faster than the classical alternating method.

randomly-sampled

hybrids is noun

Comments: We also ~~meet~~ similar least-squares problems in the alternating algorithm for Tucker decomposition. We may adopt the above sketching method for Tucker decomposition when the response tensor is larger-scale and sparse. However, the sketching method may not output sparse outcomes. Because the sketching fastens the least-squares problems through reducing the dimension of the response and predictor, not the number of parameters.

have

this is not a sentence. “Because” is conj.