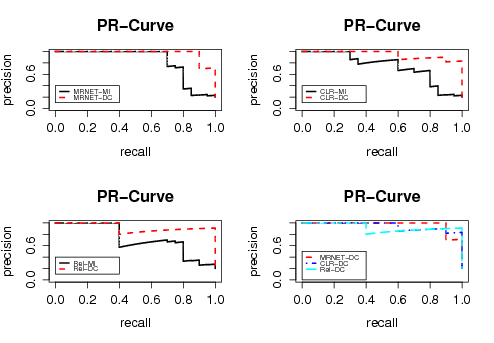
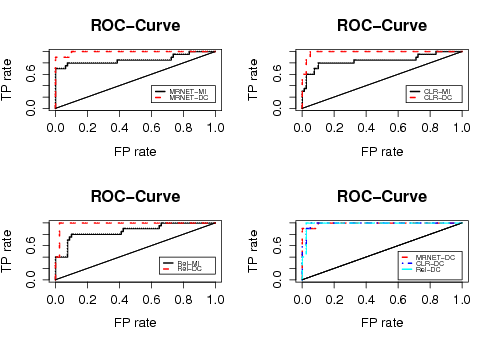
Supplementary Materials

#### Results of validation of *Yeast* gene expression data with size 10 and 100(DREAM3)

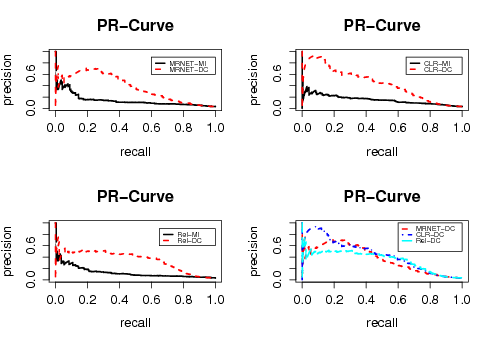
To describe the efficiency of DC-based methods, we compare our methods with MI-based methods in datasets with different size. Both PR curves and ROC curves were considered. Figure. S1 and Figure. S3 were plotted of PR curves for dataset in size 10 and 100 respectively, while Figure. S2 and Figure. S4 were plotted of ROC curves. All the figures showed that our DC-based methods obtained bigger PR area and ROC area than MI-based methods.



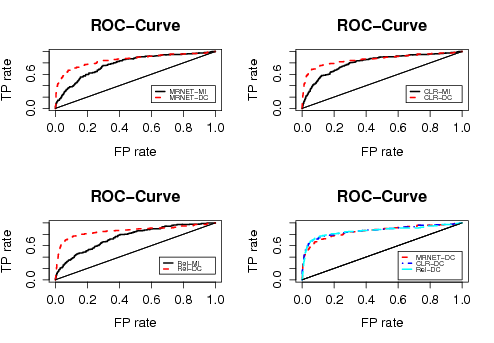
**Fig.S1** PR curves of different methods on DREAM3 *Yeast* dataset in size 10



**Fig.S2** ROC curves of different methods on DREAM3 *Yeast* dataset in size 10



**Fig.S3** PR curves of different methods on DREAM3 *Yeast* dataset in size 100



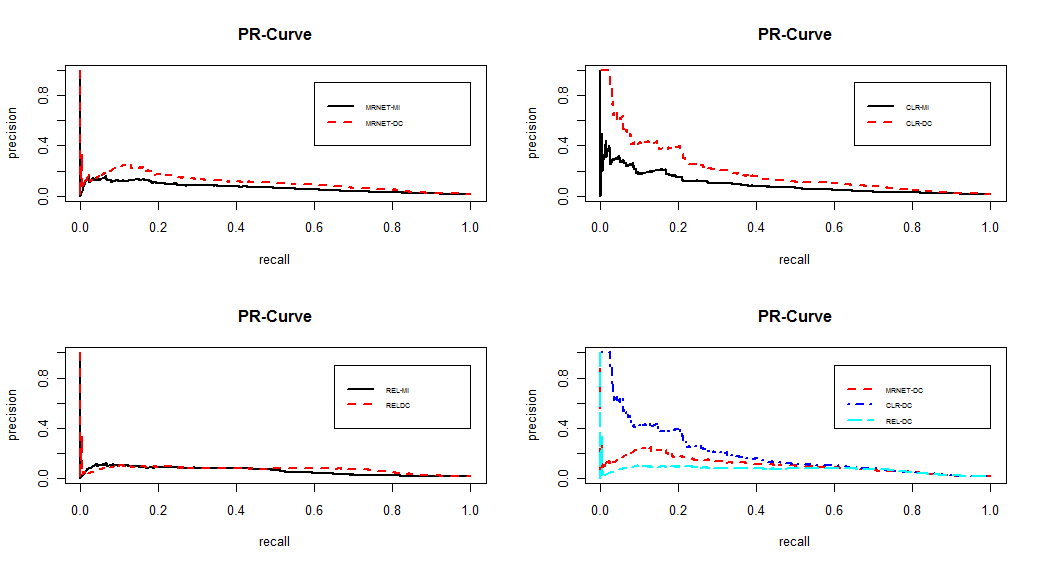
**Fig.S4** ROC curves of different methods on DREAM3 *Yeast* dataset in size 100

#### Performance comparison of different methods in noisy data

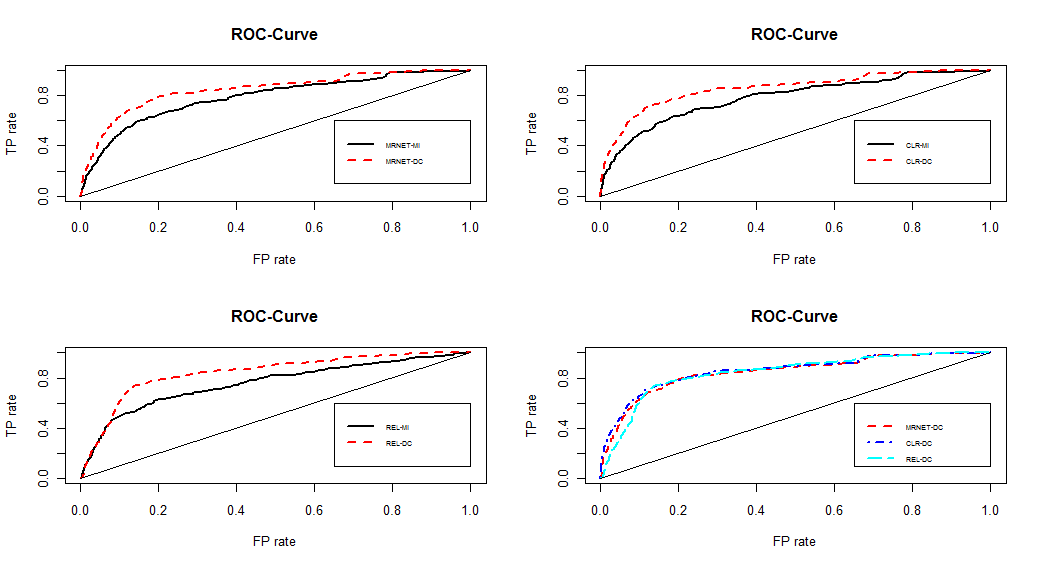
To access the performance of DC-based methods in noisy data, we compare REL-DC with REL-MI, DC-MRNET with MI-MRNET and DC-CLR with MI-CLR in datasets with different levels of noise. Those networks which contained 200 nodes and corresponding datasets were generated by SynTReN []. Moreover we compare the performance of different DC-based methods.

From these figures, we got that DC-based methods performed similarly to MI-based methods, however, they obtained better results which is more obvious in datasets with higher noise.

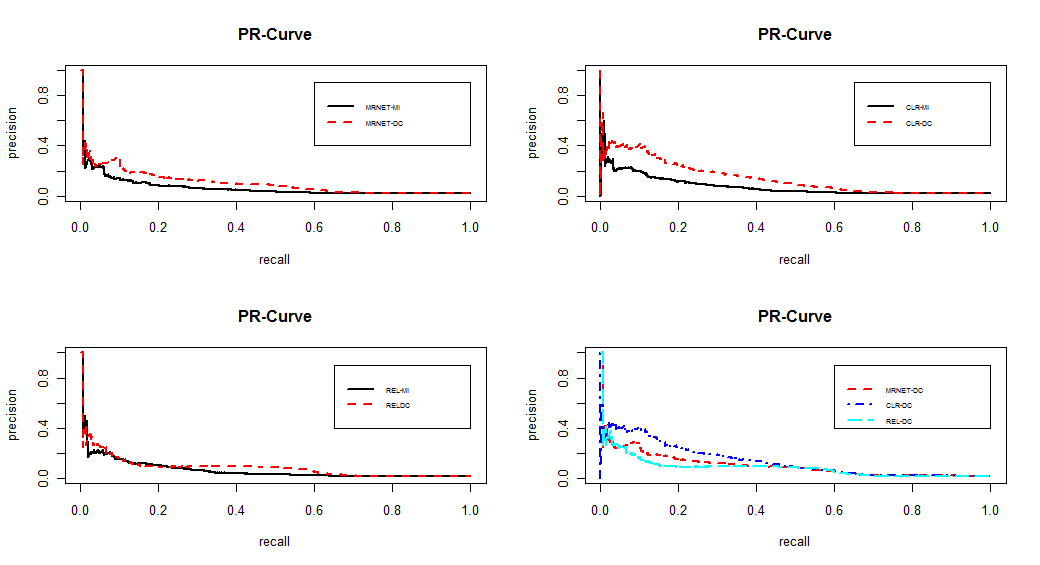
Yet, the performance of both DC-based methods and MI-based methods got worse significantly. However, as we can draw from Table 3, the difference between the performance of DC-based methods and MI-based methods remained nearly constant, which indicate that DC-based methods is robust in a sense.



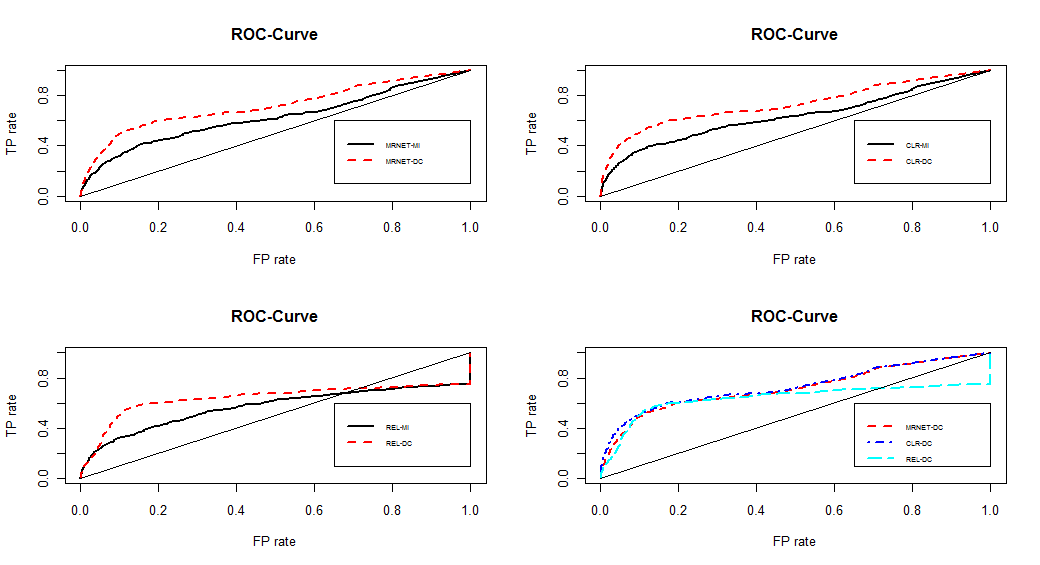
**Fig.S5** PR curves of different methods in data with 0.1 noise



**Fig.S6** ROC curves of different methods in data with 0.1 noise



**Fig.S7** PR curves of different methods in data with 0.3 noise



**Fig.S8** ROC curves of different methods in data with 0.3 noise