On the performances of GCRF model based on digraph networks

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In many real world applications, results obtained using (unstructured) regression can achieve higher regression accuracy if correlation between the outputs of unstructured predictors is incorporated, provided they have some internal structure. Structured regression model such as Gaussian conditional random fields (GCRF) allows the utilization of unstructured predictors as feature functions, modeling of non-linear relationships between inputs and outputs, and symmetric correlation of outputs among themselves. We examine learning task problem defined by GCRF model allowing asymmetric relationships between output variables. In this setting, we show that the constrained optimization problem of the model based on the class of digraph networks with the given sums on arc weights between any two outputs is feasible only in the case when the arcs have the same weights, that is, when the underlying network is undirected. The effectiveness of DirGCRF is shown by reporting the improvement in accuracy with respect to unstructured models in the experiments conducted on different types of synthetic random networks.

References

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