

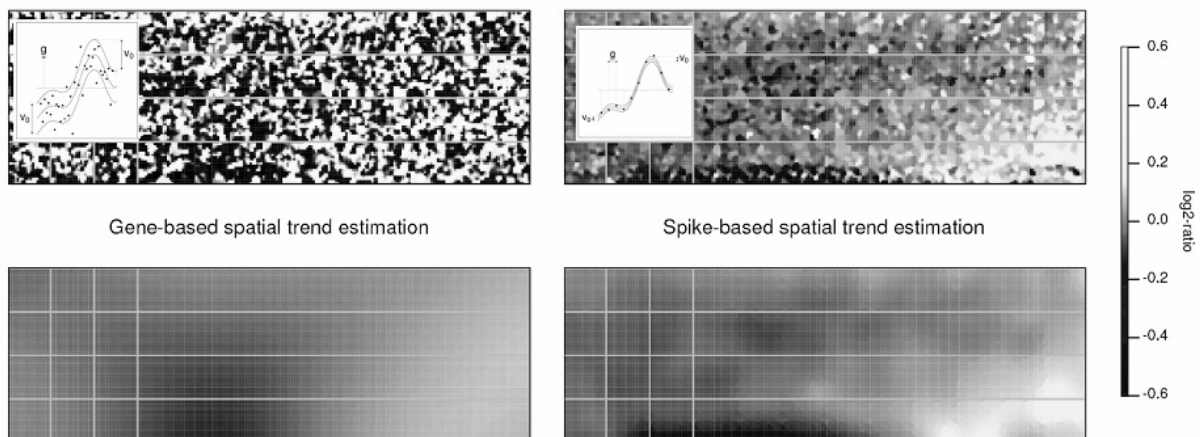
Tenfold improved performance of spatial normalization of microarrays

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Spatial variance is typically 2-3 times stronger than residual noise in microarray experiments. Improved microarray designs facilitate an efficient removal of these signal distortions. While the use of dedicated probes for exogenous spikes is becoming more widespread, their exploitation for the removal of spatial artifacts has received less attention. In particular, their potential to systematically quantify spatial effect characteristics, has so far not been considered. Since better knowledge of the underlying processes will afford enhanced experimental and analytical approaches, this is a gap to be filled. We present a Gaussian process framework to determine dimensionless quantitative characteristics of spatial effects in microarrays and we have evaluated the performance of spatial normalization procedures exploiting normalization probes. While microarray real estate is costly we can demonstrate that using just 10% of probes for spikes a tenfold improved spatial normalization can already be achieved. Such an approach will outperform traditional spatial normalization procedures relying on non-replicated gene probes.



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