Measures of Information in/for Systems Biology

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At (and above) certain level of abstraction all (bio-)physical and (bio-) chemical processes comprising the existence of a biosystem can be considered as information processing or storage. This is true not only about its genetic and signaling subsystems. Revealing the informational nature of a biological phenomenon can help understand it and predict its unknown properties. The ability to measure quantities of information is a crucial necessity in understanding information processing in complex biosystems.

This paper presents a thorough survey on the measures of information content that either are already adopted in systems biology or their appropriateness is still being considered. All scales from molecular to multi-cellular are investigated.

Some developments towards novel measures based on massive computer simulations are proposed. Analytical discussion and experimental results are presented.