

Networks Structure and Dynamics 6. Community detection (Part 2)

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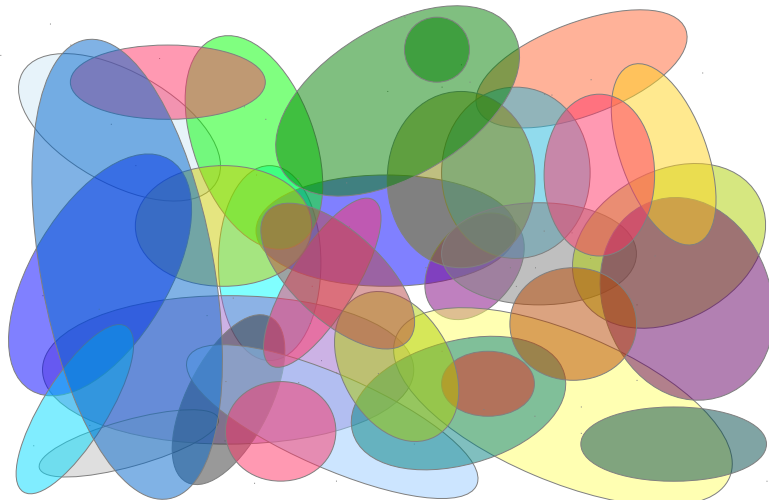
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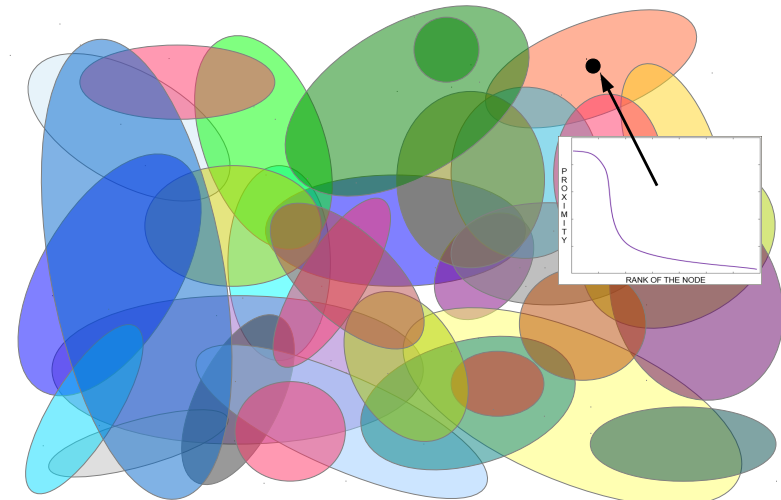
Outline

- 1 Communities and proximity metrics
- 2 Validation of a community detection algorithm
 - The case of a partition
 - The case of overlapping communities

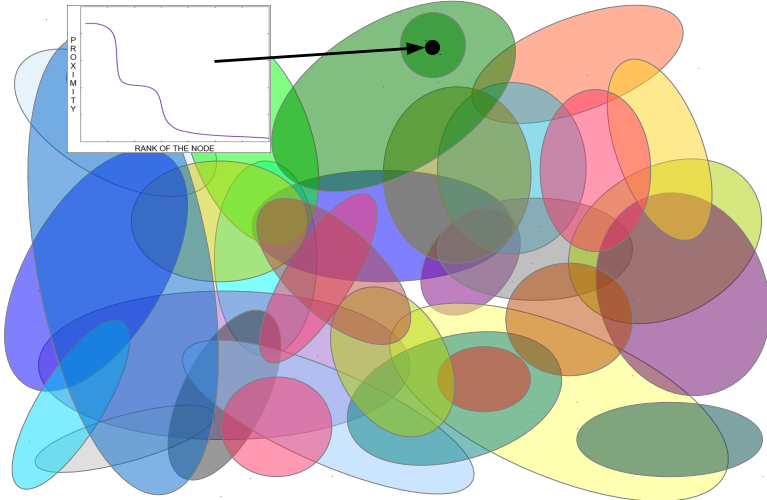
Communities and proximity metrics



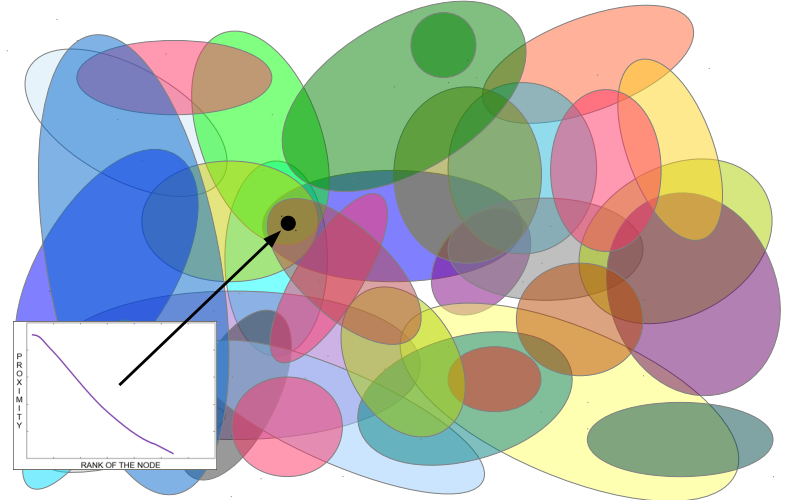
Communities and proximity metrics



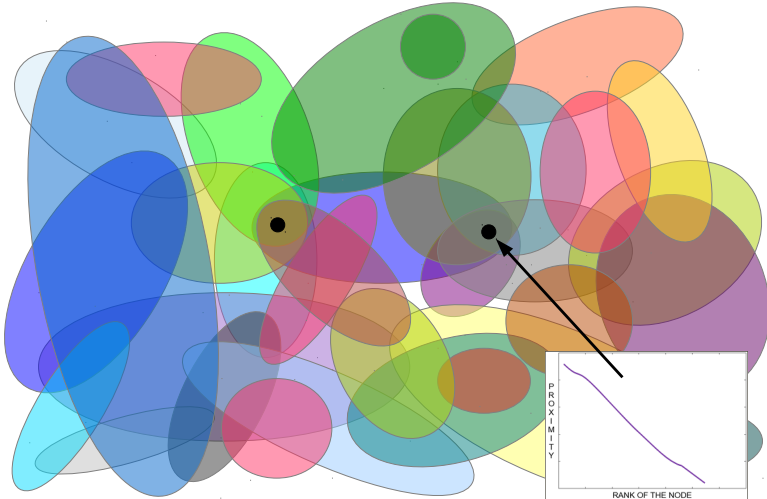
Communities and proximity metrics



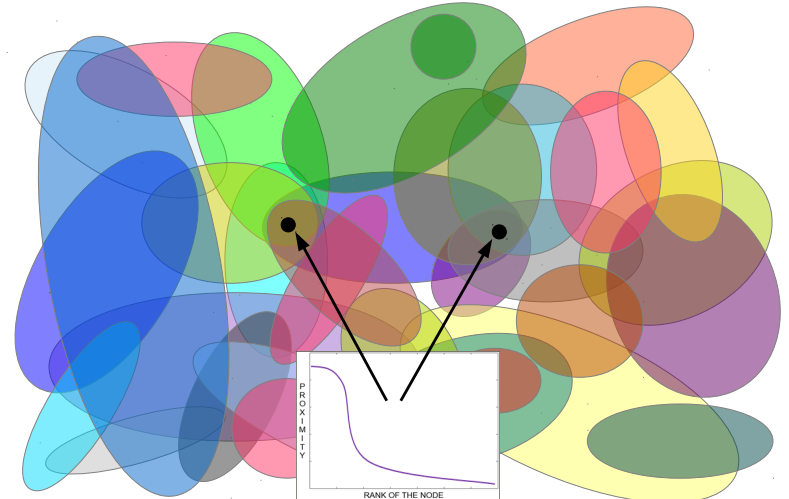
Communities and proximity metrics



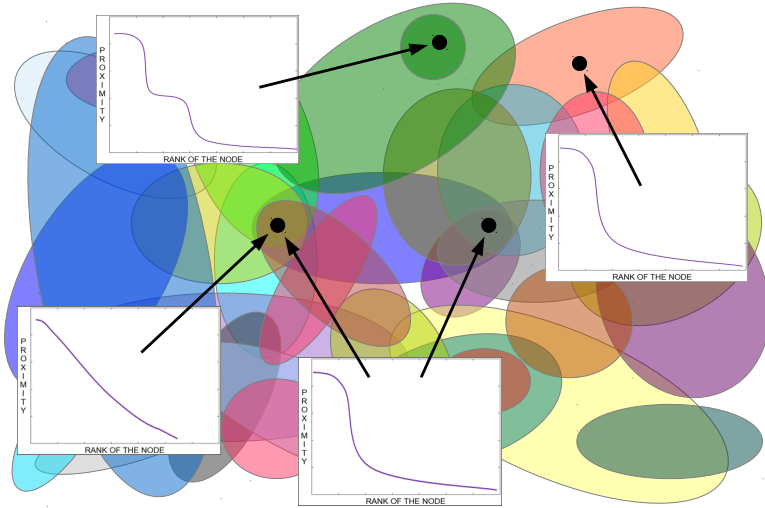
Communities and proximity metrics



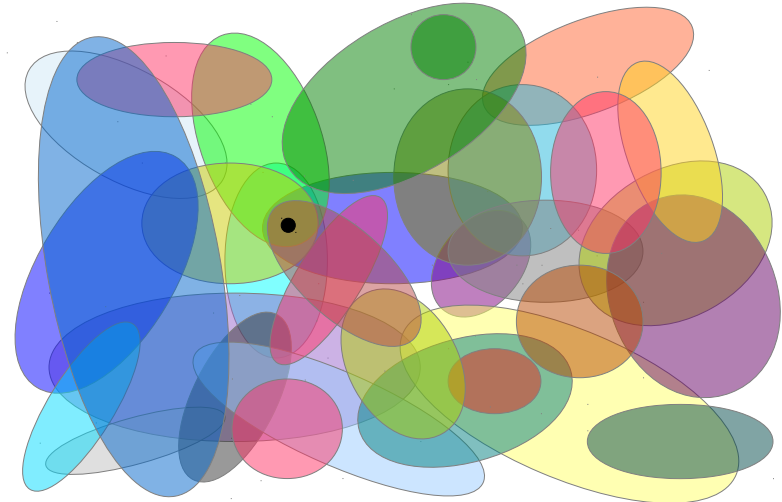
Communities and proximity metrics



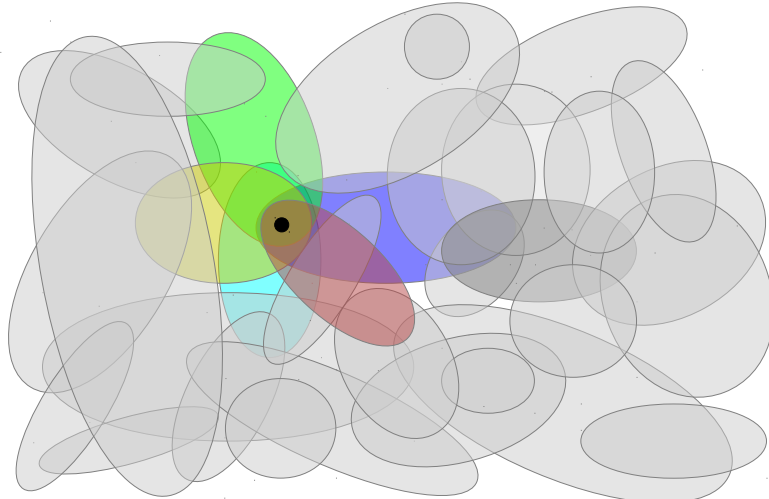
Communities and proximity metrics



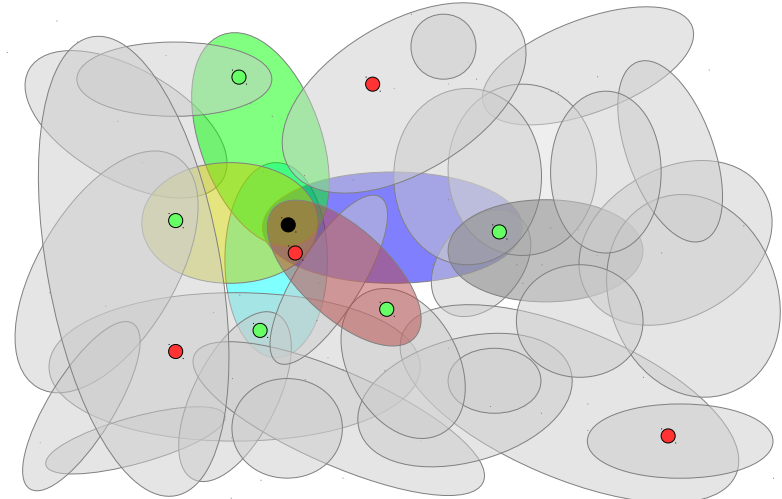
Communities and proximity metrics



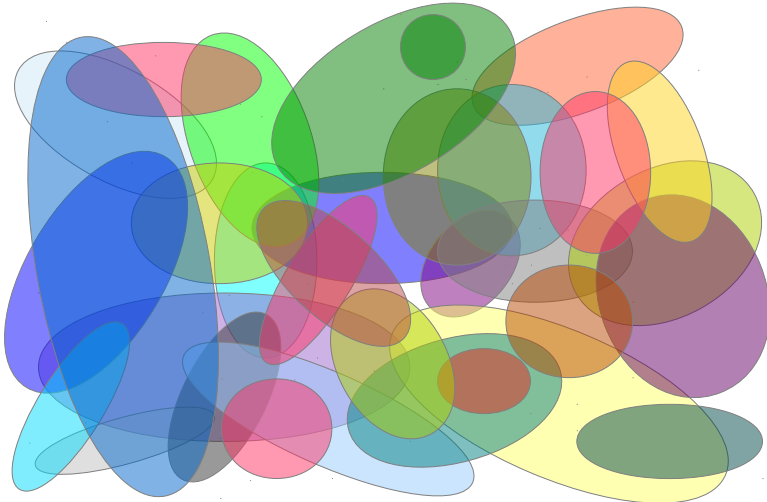
Communities and proximity metrics



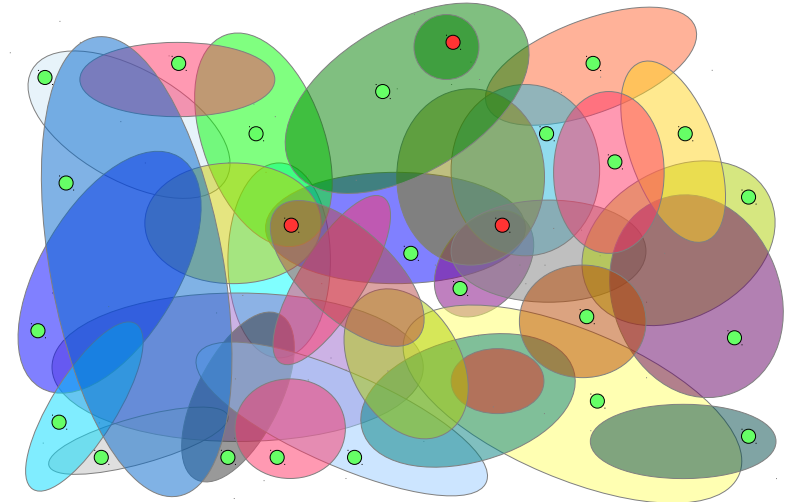
Communities and proximity metrics



Communities and proximity metrics



Communities and proximity metrics



For more on communities and proximity metrics

- <https://tel.archives-ouvertes.fr/tel-01207046>
- slides.pdf

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Validation: the case of a partition

Comparing the performance of several algorithms:

- Using synthetic graphs with a known community structure
 - **Exercise:** suggest such a graph
 - LFR benchmark: link
- Using a metric evaluating how similar the found community structure is to the ground-truth one
 - **Exercise:** Suggest such a metric
 - Adjusted Rand Index (ARI): Wikipedia paper
 - Normalized Mutual Information (NMI)
 - ...

Validation: the case of overlapping communities

Comparing the performance of several algorithms:

- Using a graph with a known community structure
 - **Exercise:** Suggest such a synthetic graph
 - Overlapping-LFR benchmark: link
 - Real-world graphs SNAP: link
- Using a metric evaluating how similar the found community structure is to the ground-truth one
 - **Exercise:** Suggest such a metric
 - Omega index (generalization of ARI)
 - Overlapping NMI: link
 - ...