

## Supplementary Material

### **PMINR: pointwise mutual information-based network regression – with application to studies of lung cancer and Alzheimer’s disease**

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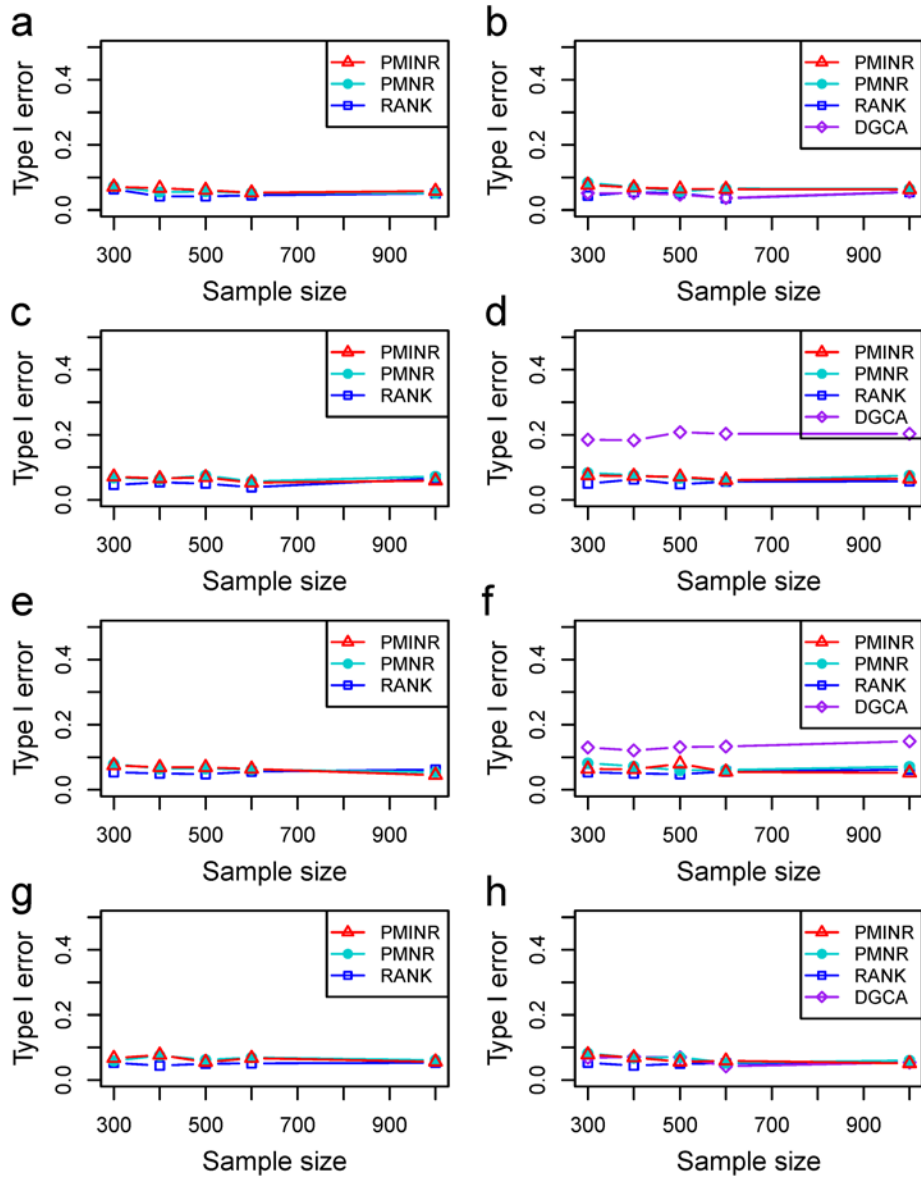
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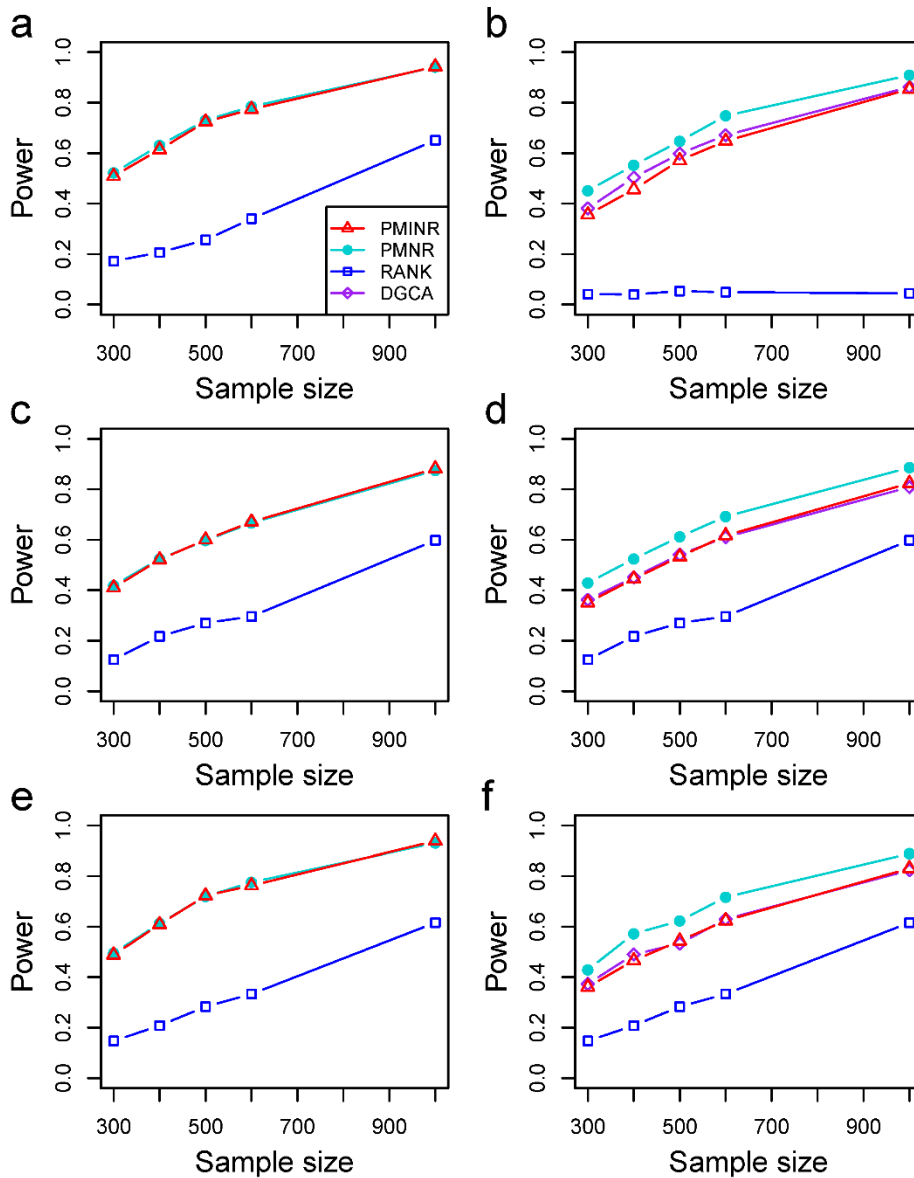
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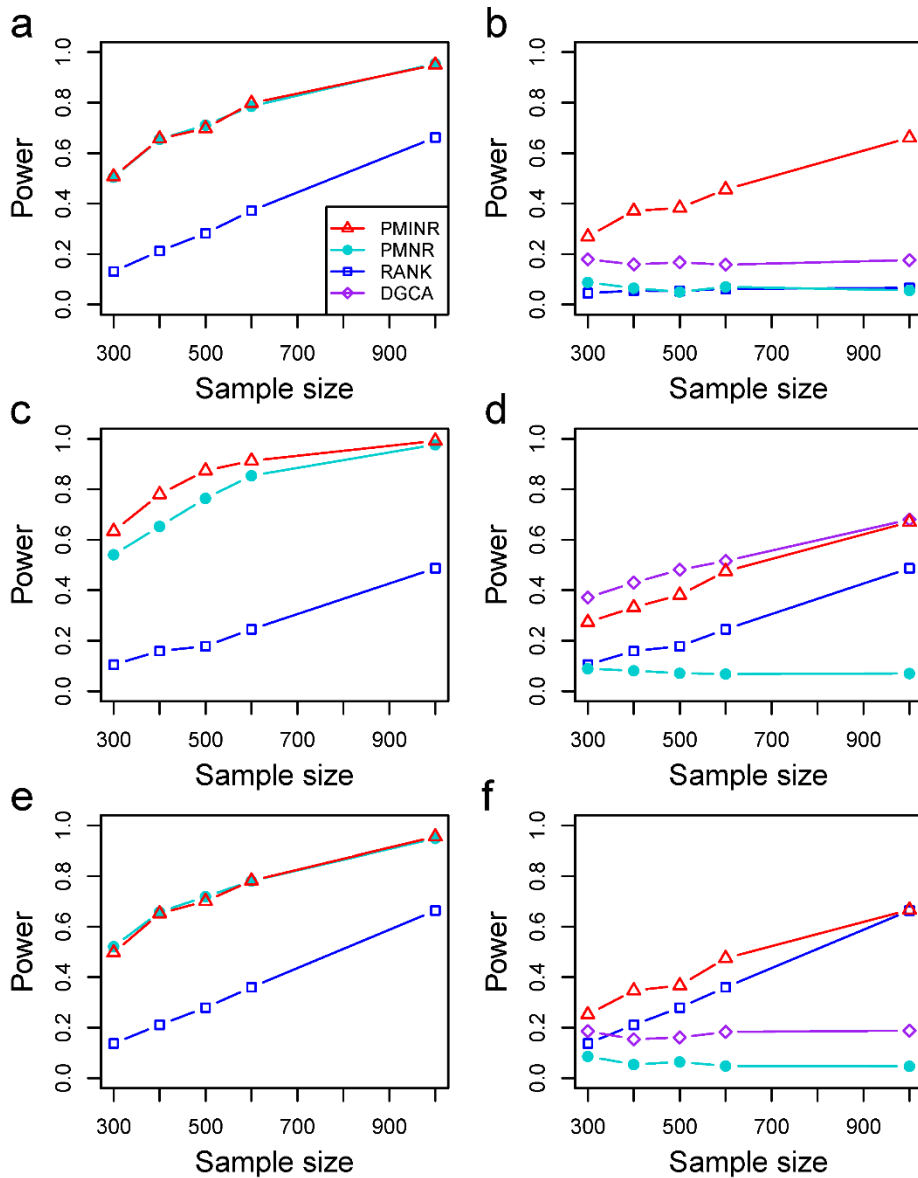
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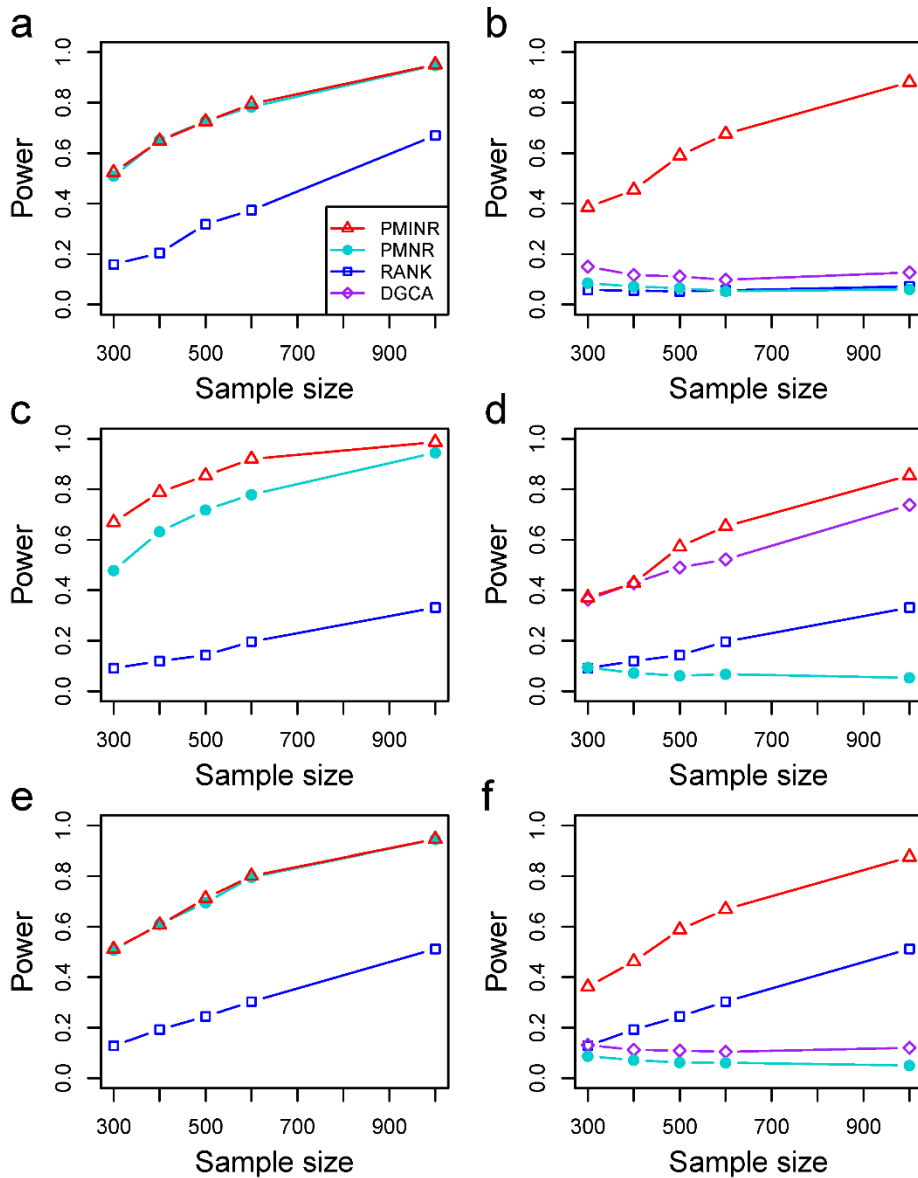
**Figure S1.** Type I error of PMINR, PMNR, RANK and DGCA when the changing node and edge are fixed. **(a)** the result for detecting node under scenario 1, **(b)** detecting edge under scenario 1, **(c)** detecting node under scenario 2, **(d)** detecting edge under scenario 2, **(e)** detecting node under scenario 3, **(f)** detecting edge under scenario 3, **(g)** detecting node under scenario 4, **(h)** detecting edge under scenario 4.



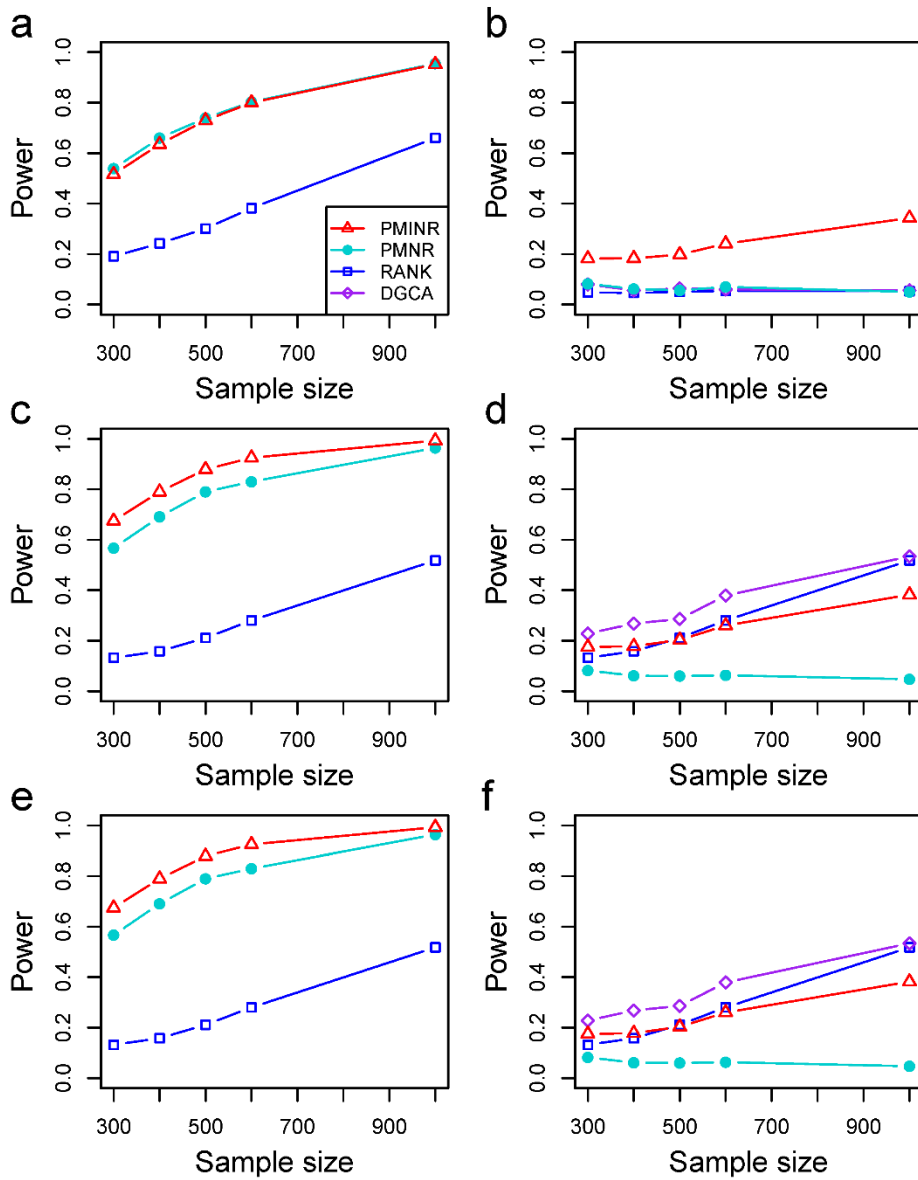
**Figure S2.** The statistical power of PMINR, PMNR, RANK and DGCA under scenario 1 when the changing node and edge are fixed. **(a)** only node changes, **(b)** only edge changes, both node and edge change, with effecting node hanging on the edge (**c**: the result for effecting node, **d**: the result for effecting edge), both node and edge change with node not hanging on the edge (**e**: the result of effecting node, **f**: the result of effecting edge). Note that the power of DGCA to test the effecting node is not presented due to DGCA conceptually only capture the effecting edge.



**Figure S3.** The statistical power of PMINR, PMNR, RANK and DGCA under scenario 2 when the changing node and edge are fixed. **(a)** only node changes, **(b)** only edge changes, both node and edge change, with effecting node hanging on the edge (**c**: the result for effecting node, **d**: the result for effecting edge), both node and edge change with node not hanging on the edge (**e**: the result of effecting node, **f**: the result of effecting edge). Note that the power of DGCA to test the effecting node is not presented due to DGCA conceptually only capture the effecting edge.



**Figure S4.** The statistical power of PMINR, PMNR, RANK and DGCA under scenario 3 when the changing node and edge are fixed. **(a)** only node changes, **(b)** only edge changes, both node and edge change, with effecting node hanging on the edge (**c**: the result for effecting node, **d**: the result for effecting edge), both node and edge change with node not hanging on the edge (**e**: the result of effecting node, **f**: the result of effecting edge). Note that the power of DGCA to test the effecting node is not presented due to DGCA conceptually only capture the effecting edge.



**Figure S5.** The statistical power of PMINR, PMNR, RANK and DGCA under scenario 4 when the changing node and edge are fixed. **(a)** only node changes, **(b)** only edge changes, both node and edge change, with effecting node hanging on the edge (**c**: the result for effecting node, **d**: the result for effecting edge), both node and edge change with node not hanging on the edge (**e**: the result of effecting node, **f**: the result of effecting edge). Note that the power of DGCA to test the effecting node is not presented due to DGCA conceptually only capture the effecting edge.