Using Cooccurrance Networks

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Coincidence Network

Constructing a coincidence network. I map the abundances according to

$$a(r_{ji}) = \begin{cases} \lfloor \left(\frac{r_{ji}}{\max_{s_k}(r_{jk})} \right) n \rfloor + 1 & \frac{r_{ji}}{\max_{s_k}(r_{jk})} \geq m \\ 0 & \frac{r_{ji}}{\max_{s_k}(r_{jk})} < m \end{cases}$$

into "bins" relative to the maximum that taxa appears. Then count

$$w_{jk}^1 = \frac{\|\{i : a(r_{ji}) = a(r_{ki}) \neq 0\}\|}{S}$$

how often two organisms appear in the same bin.

Cooccurrance Network

Same idea but now edges weights are compared to a random graph (null model).

$$w_{jk}^2 = \begin{cases} 1 & P(w_{jk}^N \geq w_{jk}^1) \leq t \\ 0 & P(w_{jk}^N < w_{jk}^1) > t \end{cases}$$

So we only keep edges that have a higher than "random" weight.

Using a Network

- Filter GOTTCHA results - try to determine probability of seeing groups of organisms - Random Markov Field
- Compare networks in different situations (clustering, connectivity, etc)