

Literature review of Quartet-based methods

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Motivation:

- › Naive Quartet method is statistically consistent, but it fails a lot. Are there some quartet-based methods with higher success rate and better strategy?



Methods I found so far:

- › Buneman Tree
- › Quartets MaxCut
- › Quartet FM



Buneman Tree:

- › $O(n^4)$ running time
- › Guaranteed to output a tree
 - 1: calculate set of estimated quartet tree Q by using four point methods.
 - 2: Find the maximum resolved tree T in Q set that are resolved

(resolved tree defined as having an edge separating two edges from the two others)

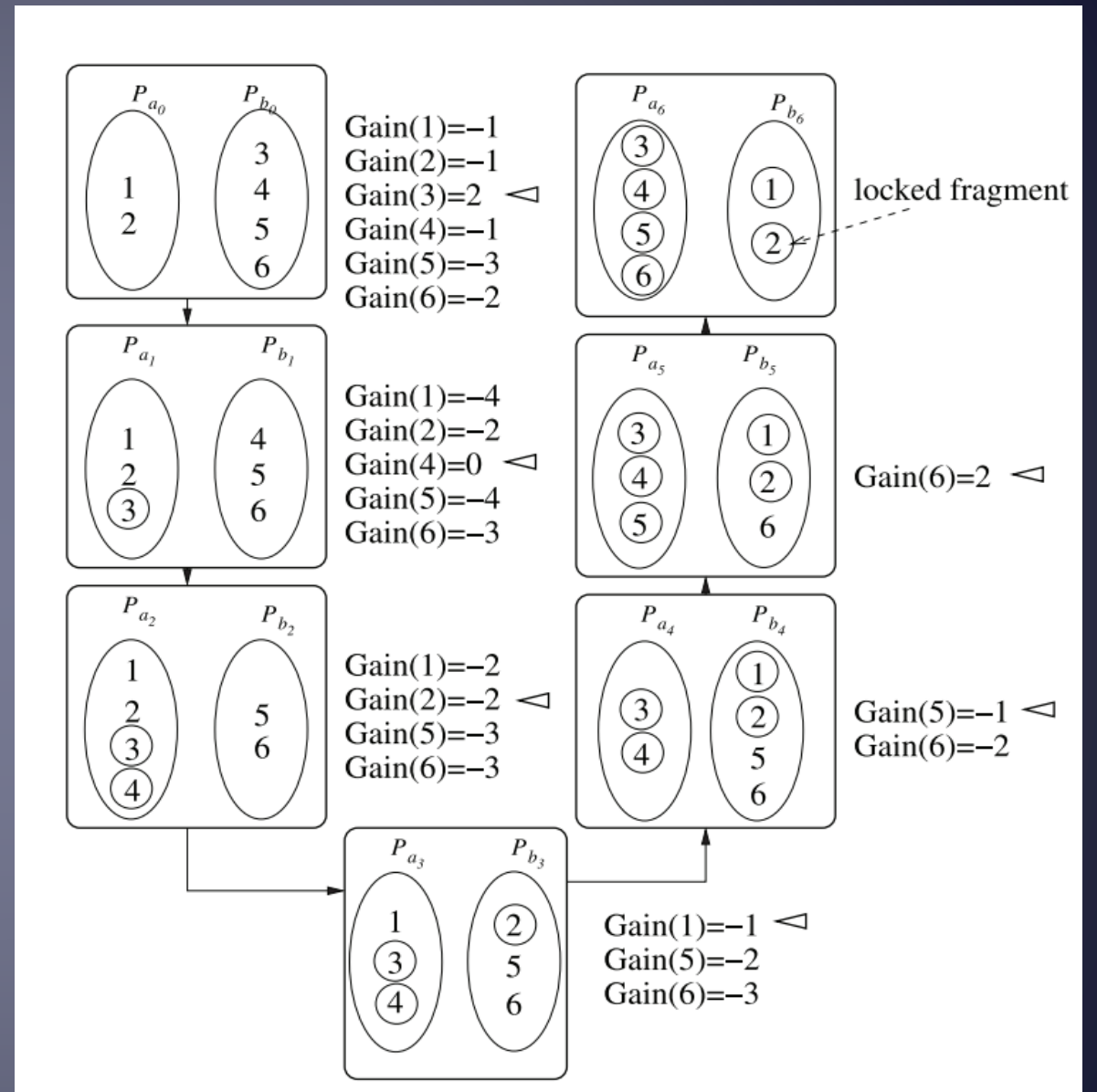


Quartets MaxCut:

- › “Divide and conquer” strategy
- › 1: Algorithm will first try to partition the set into two or more parts
- › 2: Recursively solves the sub-problems by maximize the ratio between satisfied and violated quartets at each step
- › 3: Merge sub-solution back to a single tree

Quartet FM:

- › Similar strategy as Maxcut
- › A bipartition technique
- › uses a gain measurement to determine partition





Biography

- › Berry, Vincent, and Olivier Gascuel. "Inferring Evolutionary Trees with Strong Combinatorial Evidence." *Lecture Notes in Computer Science Computing and Combinatorics* (1997): 111-23.
- › Reaz, Rezwana, Md. Shamsuzzoha Bayzid, and M. Sohel Rahman. "Accurate Phylogenetic Tree Reconstruction from Quartets: A Heuristic Approach." *PLOS ONE. Public Library of Science*
- › S. Snir and S. Rao, "Quartets MaxCut: A Divide and Conquer Quartets Algorithm," in *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, vol. 7, no. 4, pp. 704-718, October 2010. doi: 10.1109/TCBB.2008.133
- › Tandy, Warnow, "Computational Phylogenetics An introduction to designing methods for phylogeny estimation" Book