



Rensselaer

COMPOSITE MARGINAL LIKELIHOOD METHODS FOR RANDOM UTILITY MODELS

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RANK AGGREGATION



γ



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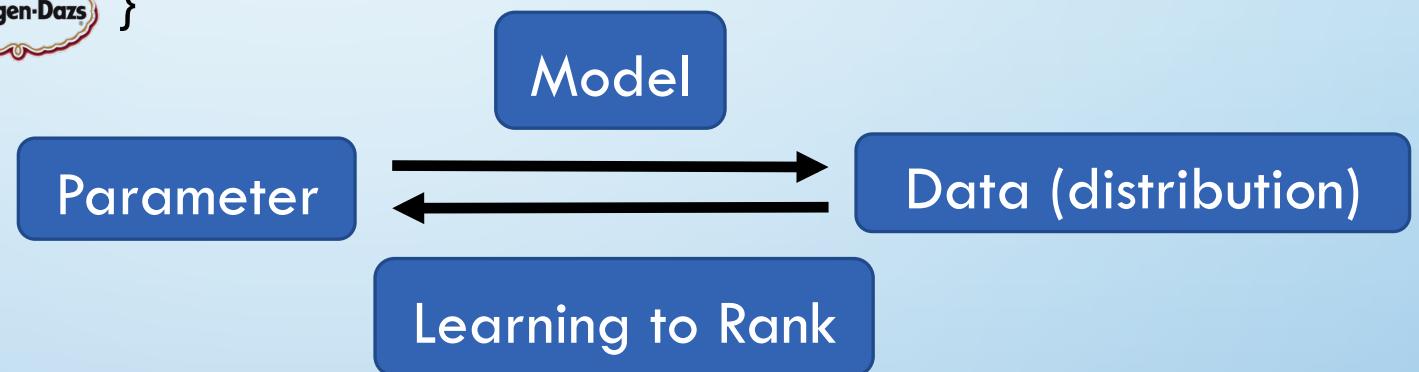


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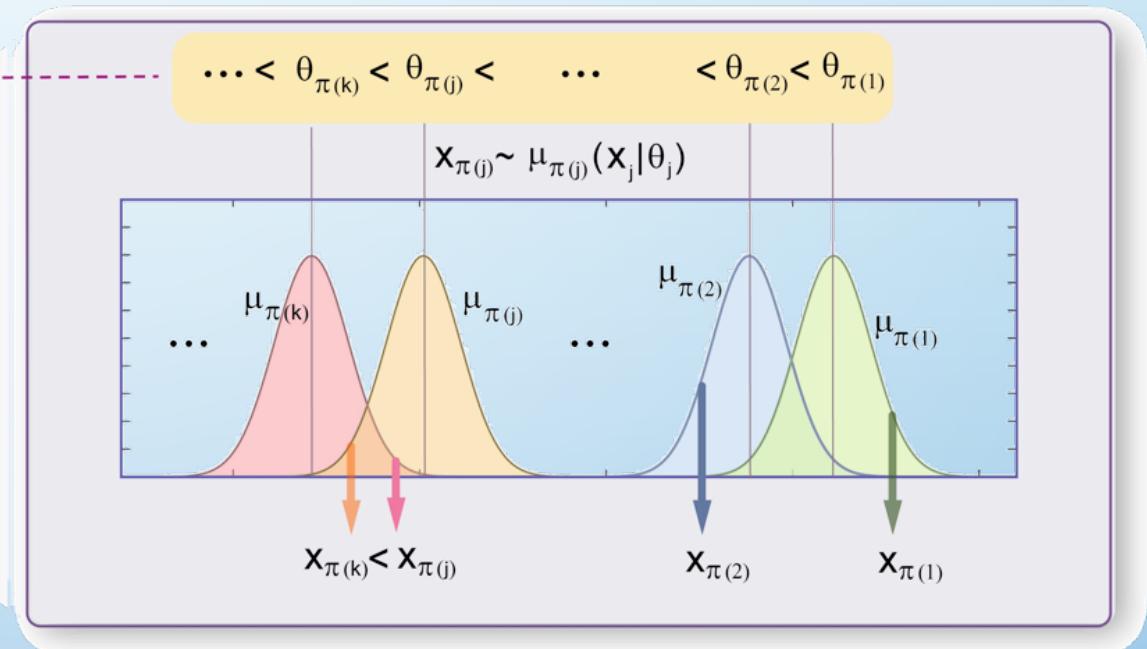
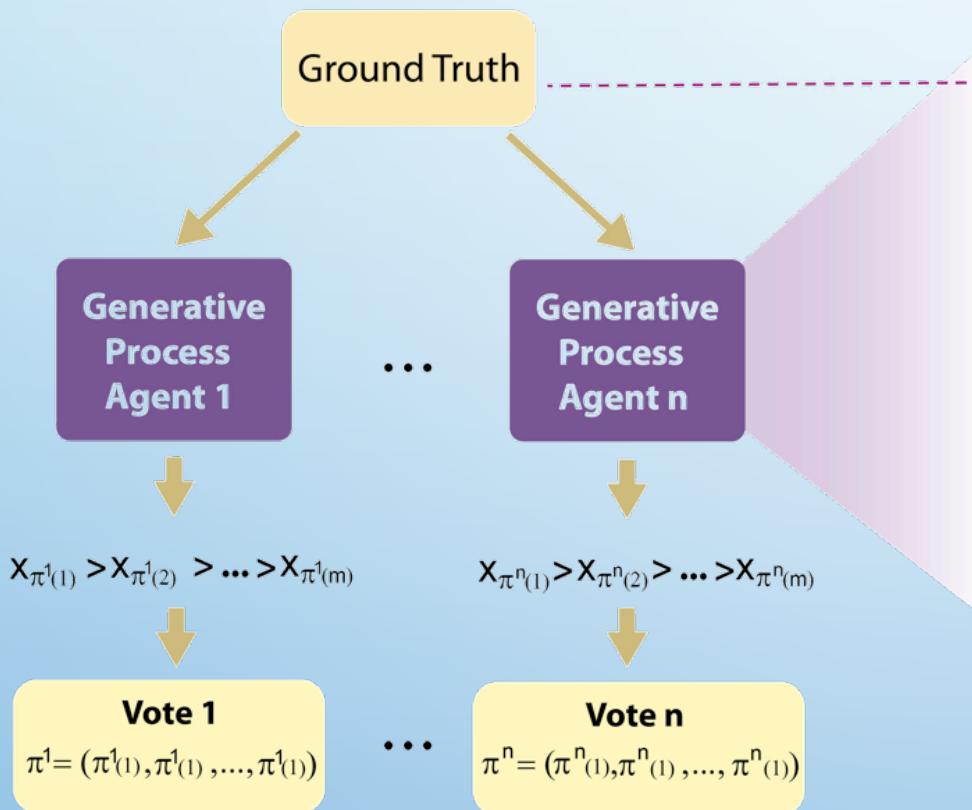


LEARNING TO RANK

- ALTERNATIVES: {    }
- AGENTS: {  }
- DATA:  >  > 
 >  > 
 >  > 
- MODEL(Θ)



RANDOM UTILITY MODELS



No closed-form likelihoods

RANK-BREAKING [AZARI SOUFANI ET AL 14]

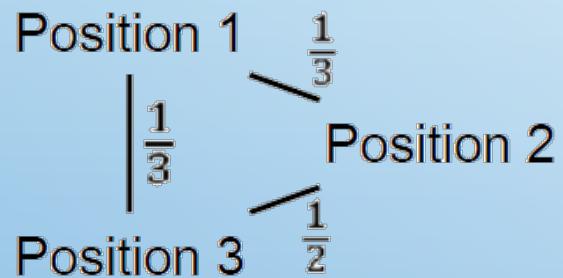
 κ_{ij}

	Dunkin' Donuts	Haagen- Dazs	Veggiegrill
Dunkin' Donuts		2	2
Haagen- Dazs	1		2
Veggiegrill	1	1	

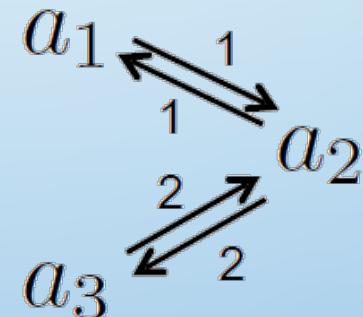
COMPOSITE MARGINAL LIKELIHOOD

- EVENTS: ALL PAIRWISE COMPARISONS

$$\cdot \vec{\theta}^* = \arg \max \sum_{i \neq j} w_{ij} \kappa_{ij} \log \Pr(a_i \succ a_j | \vec{\theta})$$



Breaking:
For Plackett-Luce:
weighted union of position
k breakings (Theorem 6)
For symmetric RUM:
uniform (Theorem 7)

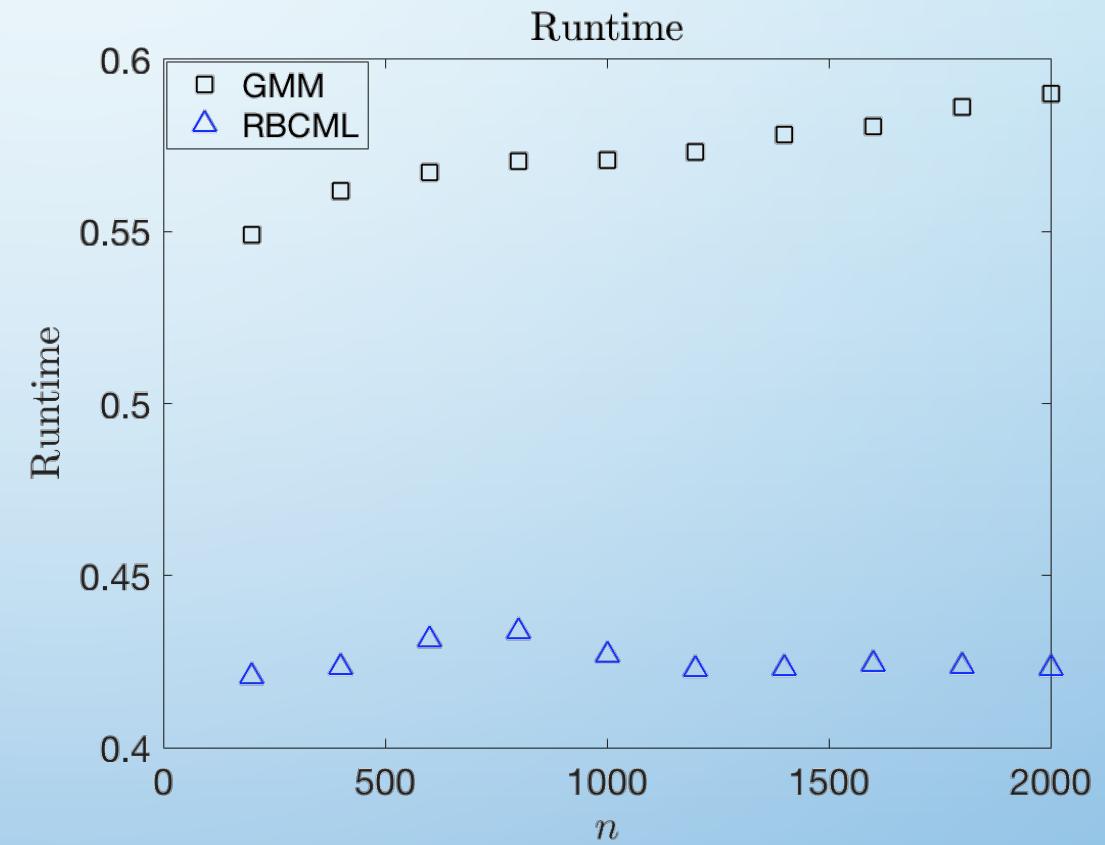
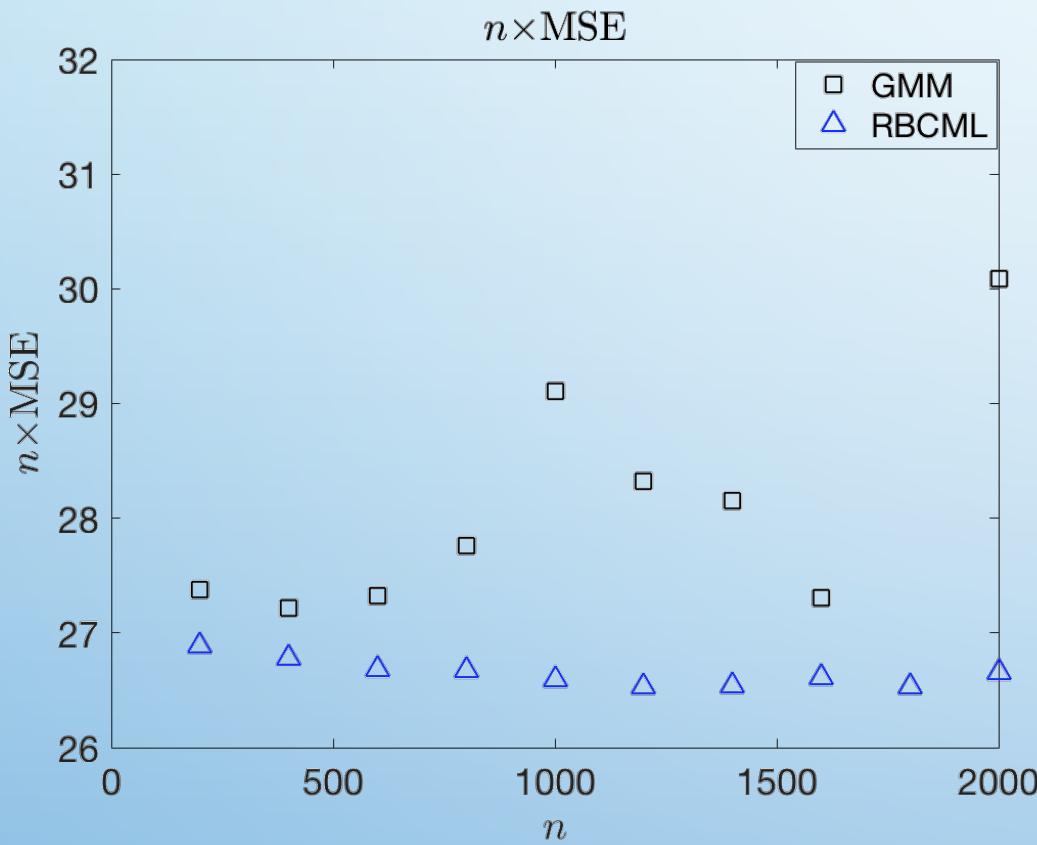


CML weights: symmetric
(Theorems 8 & 9)

PROS AND CONS

- PROS:
 - STRICT LOG-CONCAVITY ([THEOREMS 3 & 4](#))
 - ASYMPTOTIC NORMALITY ([THEOREM 5](#))
- CONS
 - CURRENTLY RESTRICTED TO FULL RANKINGS (FUTURE EXTENSIONS)

EXPERIMENTS (GAUSSIAN RUM)



Thank you!

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Poster #31

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