

An Efficient Memory Data Organization Strategy for Application-Characteristic Graph Processing

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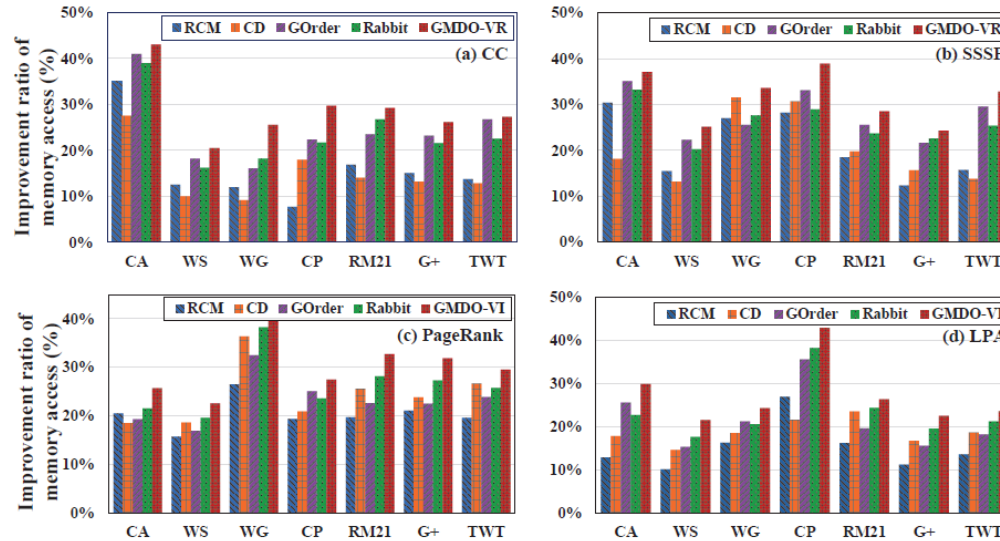
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Problems & Ideas

- Problems of memory data organization for graph processing
 - Inability to combine the memory access pattern with the structural information of a graph well
 - Limited efficiency and a lot of preprocessing overhead on the large-scale graphs
 - Only a single memory data organization to deal with all graph applications or design for some specific graph processing tasks
- Ideas: Organizing memory data based on the application operating characteristics (GMDO)
 - Dividing the graph applications into traversal and iterative applications based on the application operating characteristics
 - GMDO-VR adopts the relevance degree to organize data more granular to ensure the locality during traversal
 - GMDO-VI accelerates vertex convergence based on the vertex influence to deal with the long-tailed distribution in the iteration

Main Contributions

- Maximumly improve memory access efficiency by more than 40%



- GMDO provides prominent system acceleration and improves the cache hit ratio to over 90% for the state-of-the-art graph systems

Layout	CA	WS	WG	CP	RM21	C+	TWT
GMDO-VR	2.05X	1.53X	1.65X	1.75X	1.59X	1.81X	1.67X
GMDO-VI	2.27X	1.62X	2.08X	1.82X	1.74X	1.72X	1.63X