VColor*: a practical approach for coloring large graphs

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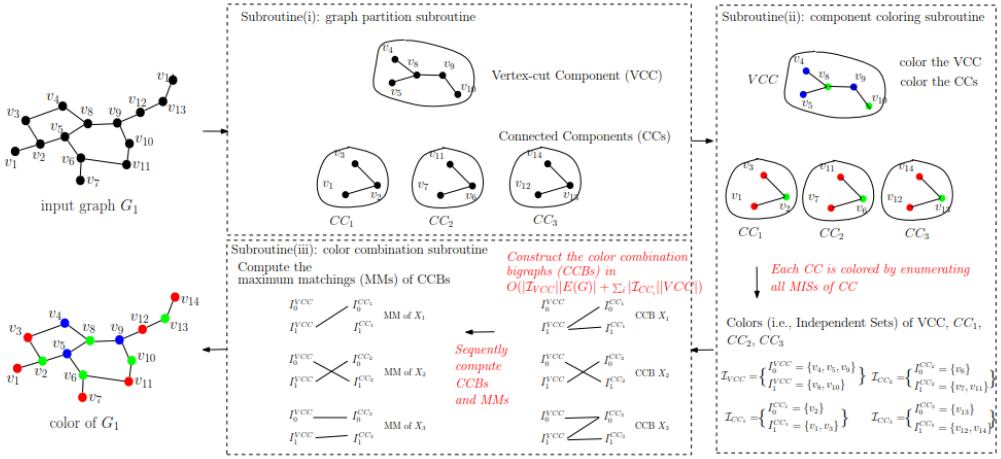
Frontiers of Computer Science, DOI: 10.1007/s11704-020-9205-y

Problems & Ideas

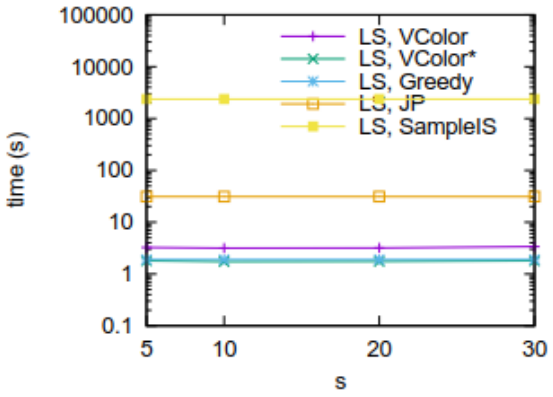
- Efficiency bottlenecks of the divide-and-conquer framework VColor
  - The construction of the Color Combination Bigraph (CCB) in VColor is inefficient as the edges crossing the VCC and the CCs are scanned redundantly for many times
  - VColor enumerates all Maximal ISs (MISs) of each CC to color the CC
  - VColor colors the CCs sequentially and computes the CCBs sequentially

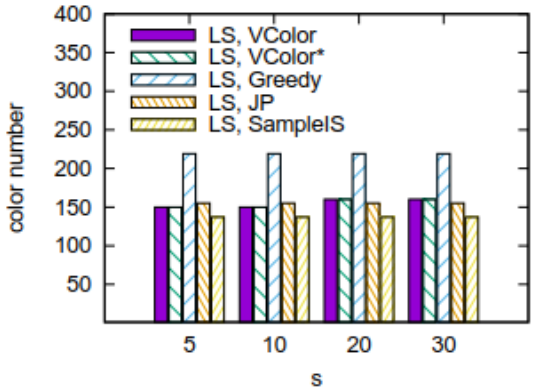


- Ideas of VColor*
  - VColor* indexes the edges crossing the VCC and the CCs, such that the crossing edges only need to be scanned for one time
  - VColor* uses a hybrid algorithm to optimize the coloring of the CCs. When a CC is sparse, a greedy algorithm is used; Otherwise, MIS enumeration based method is used
  - A distributed graph coloring algorithm is proposed to color the CCs and compute the CCBs

Main Contributions

- **Performance comparison on small graphs**





- **Performance comparison on large graphs**

	color number			coloring time (s)		
	Pokec	PA	NY	Pokec	PA	NY
VColor*	35	5	5	522	22	30
VColor	35	5	5	45300	4500	116
Greedy	48	6	6	39	3.7	1.4
JP	41	5	5	266.7	6.8	3.3

- **Performance of distributed algorithm**