**INTRODUCTION & MOTIVATION**

**Influence Maximization** studies the word-of-mouth effects in the viral marketing, politics, public health, bioinformatics and sensor networks.

It is an **NP-hard** optimization problem to activate the top-k vertices that can get maximal expected influence in graph G.

**HBMax** Parallel Influence Maximization algorithm using Huffman coding and Bitmap coding to address the memory inflation challenge.

**CONTRIBUTIONS**

- **Characterize** memory footprints
- **Identify** various shapes of intermediate RRs
- **Compress** with Huffman or Bitmap coding
- **Query** partially decoded or compressed data.
- **Reduces** memory usage up to 82.1%
- **Speedups** 6.3% (in average) than Ripples.

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**PROFILING**

- Skewness is from flat-headed (-1) to skewed(12).
- Density is from sparse (0.26%) to dense (53.3%)

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**IMPLEMENTATION**

- **Parallelize by OpenMP**
- **Parallel Merge**
- **Consider NUMA effects**
- **Leverage** bit operations

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**EVALUATION**

<table>
<thead>
<tr>
<th></th>
<th>DBLP</th>
<th>YouTube</th>
<th>Skitter</th>
<th>Orkut</th>
<th>Pokec</th>
<th>LiveJournal</th>
<th>Arabic</th>
<th>Twitter</th>
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<tbody>
<tr>
<td>Ripples</td>
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<td>9.8</td>
<td>46.5</td>
<td>55.7</td>
<td>163.7</td>
<td>248.6</td>
<td>1183.0</td>
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<td>1.7</td>
<td>5.3</td>
<td>30.1</td>
<td>10.7</td>
<td>29.3</td>
<td>81.5</td>
<td>200.3</td>
</tr>
</tbody>
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**SCALABILITY**

- HBMax, Ripples both have strong scalability
- HBMax scales better (high-skewed graphs)
- Overall speedup is 12.98x on 64 cores

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**WORKFLOW**

- **Warm-Up Phase**
- **Decision Making**
- **Blockwise Encoding**
- **Selection**

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https://github.com/hipdac-lab/hbmax-parallel