



# Graphs in Machine Learning

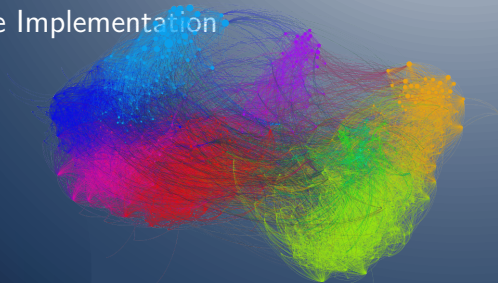
## Google PageRank: Computation

Power Method and Large-Scale Implementation

Michal Valko

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Partially based on material by: Andreas Krause,  
Branislav Kveton, Michael Kearns



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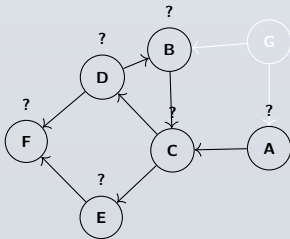
$\mathbf{G}$  is **stochastic** **why?** What is  $G_{aa}$  for any  $a$ ? We look for  $\mathbf{G}\mathbf{v} = 1 \times \mathbf{v}$ ,  
steady-state vector, a right eigenvector with eigenvalue 1. **why?**

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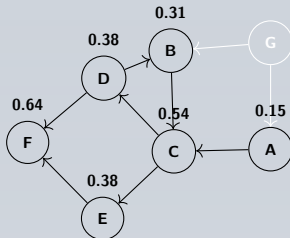


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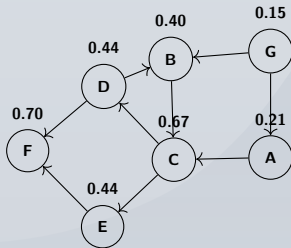


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we store only  $\mathbf{M}$  but do computations as with  $\mathbf{G}$





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`https://misovalko.github.io/mva-ml-graphs.html`