Graphs in Machine Learning
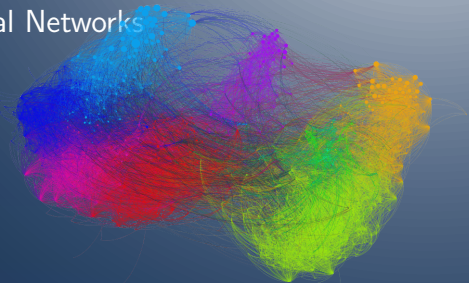
Natural Graphs

Social, Information, and Biological Networks

Michal Valko

Inria & ENS Paris-Saclay, MVA

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

Natural graphs from social networks

- people and their interactions

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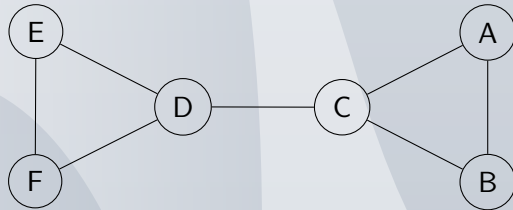- typical ML tasks
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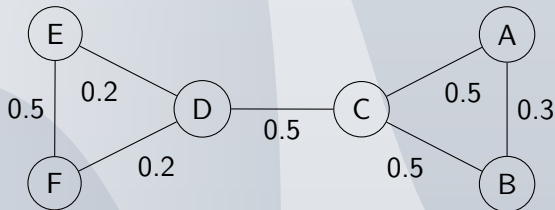 - link prediction (PYMK)
  - find influential sources

Social ME-dia

Success story #1 Product placement - problem
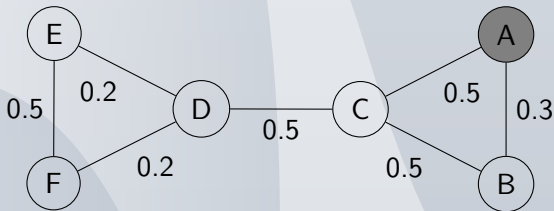
Success story #1 Product placement - problem

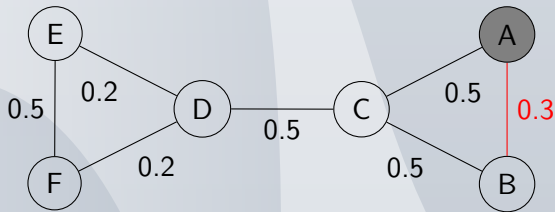**Who should get free cell phones?**

$V = \{\text{Alice}, \text{Bob}, \text{Charlie}, \text{Dorothy}, \text{Eric}, \text{Fiona}\}$

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Who should get free cell phones?

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Maximizing the Spread of Influence through a Social Network
http://www.cs.cornell.edu/home/kleinber/kdd03-inf.pdf
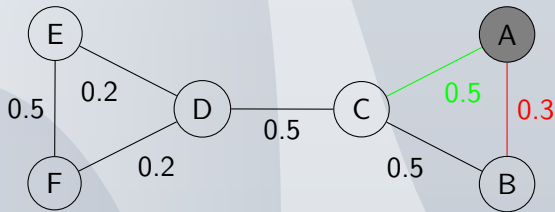
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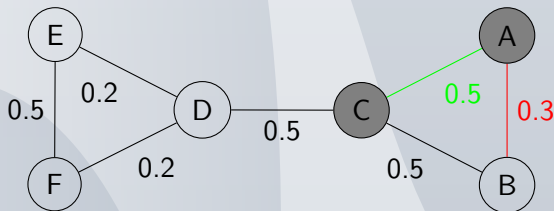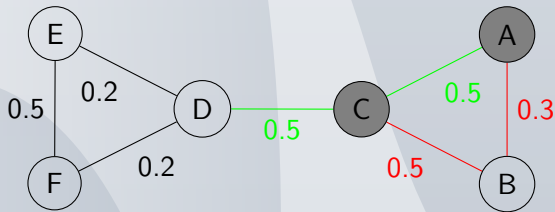**Who should get free cell phones?**

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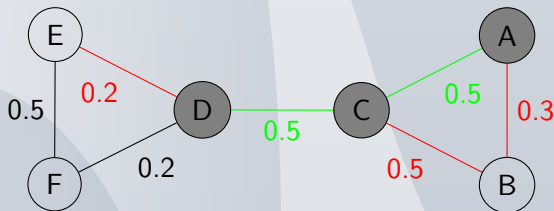**Who should get free cell phones?**

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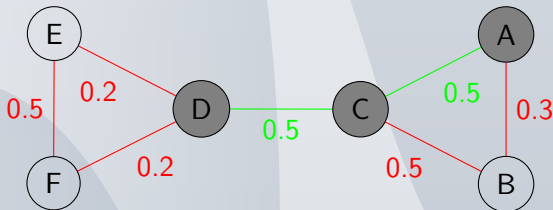
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How would you choose the target customers?

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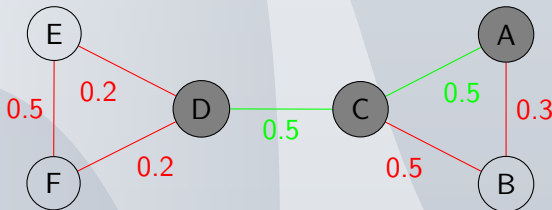
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highest degree, close to the center, . . .

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Inria & ENS Paris-Saclay, MVA

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