Predicting Patent Evolution: Data MASTER 2018-19

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Motivation

- How does technology evolve?
- How does IP law affect the rate and character of tech evolution?
- Ex. America Invents Act - first-to-invent, not first-to-file.

Methods

1. Identify property of knowledge evolution in the patent citation network.
2. Predict the contribution of any given patent.
3. Employ a time series model to forecast network evolution for several specific patent classes.
4. Compare the rate of evolution before and after the implementation of the AIA.

Example

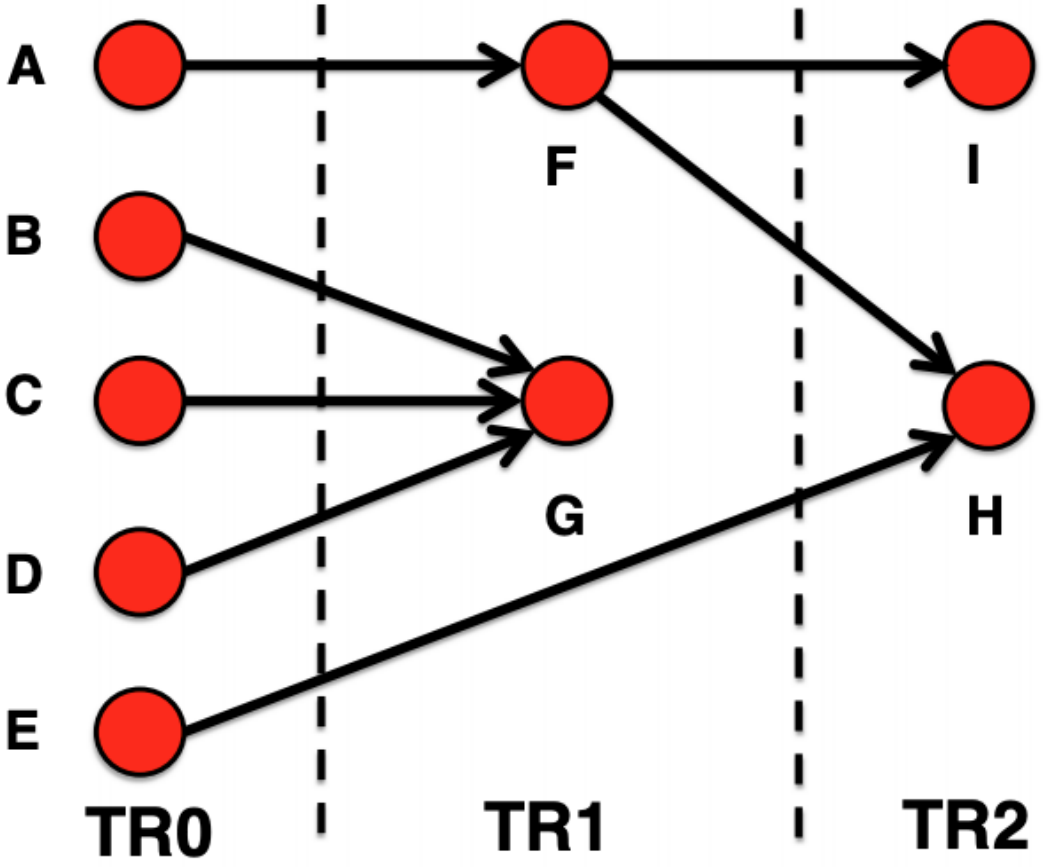

Figure 1: Sample network (Matinelli et al.)

Patent Importance

- H-index
- Centrality
- Quality
  - Forward cites
  - Backward cites
  - Claims
  - Family size

Genetic Knowledge Transfer

Where B is a measure of patent importance:

$$K_i(root) = B_i p(i, root) + \sum_{j=1}^{nciting} k_{i+1,j}$$

Note that the function $p(i, root)$ is the persistence index with respect to the root node being evaluated. $p(root, root) = 1$, but in all other cases $p(i, root) = ncited_i$.

Next Steps

- Genetic knowledge transfer over time - how rapid?
- Prediction - how will a patent contribute?
- Topological aggregation - how do sectors evolve?
- Large-scale experiment w/ HPC