The Value of Innovation

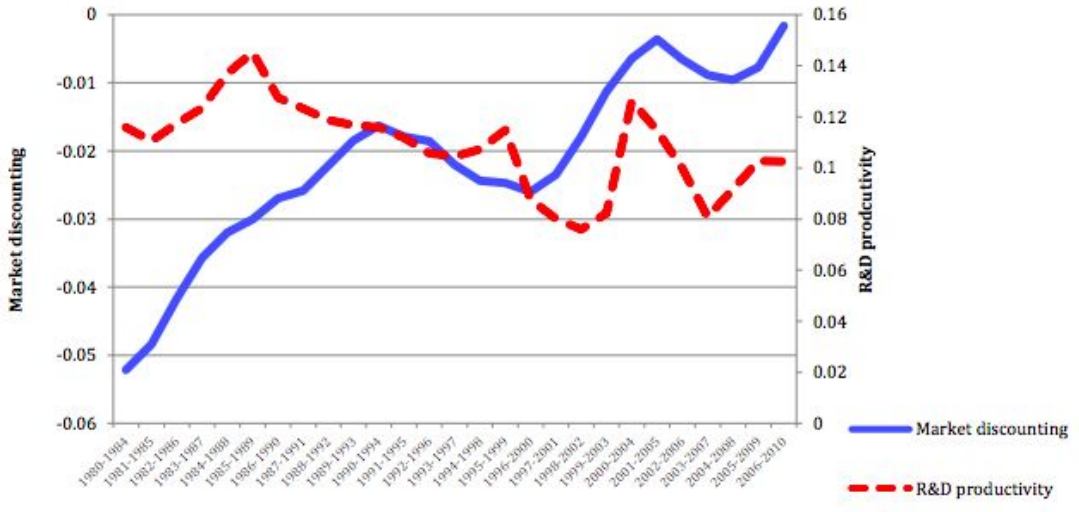
Using Patent Data to Make Intelligent Decisions

Nicolas Giraldo-Wingler

The problem

- Hard to Quantify Innovation
  - Companies
  - Inventors

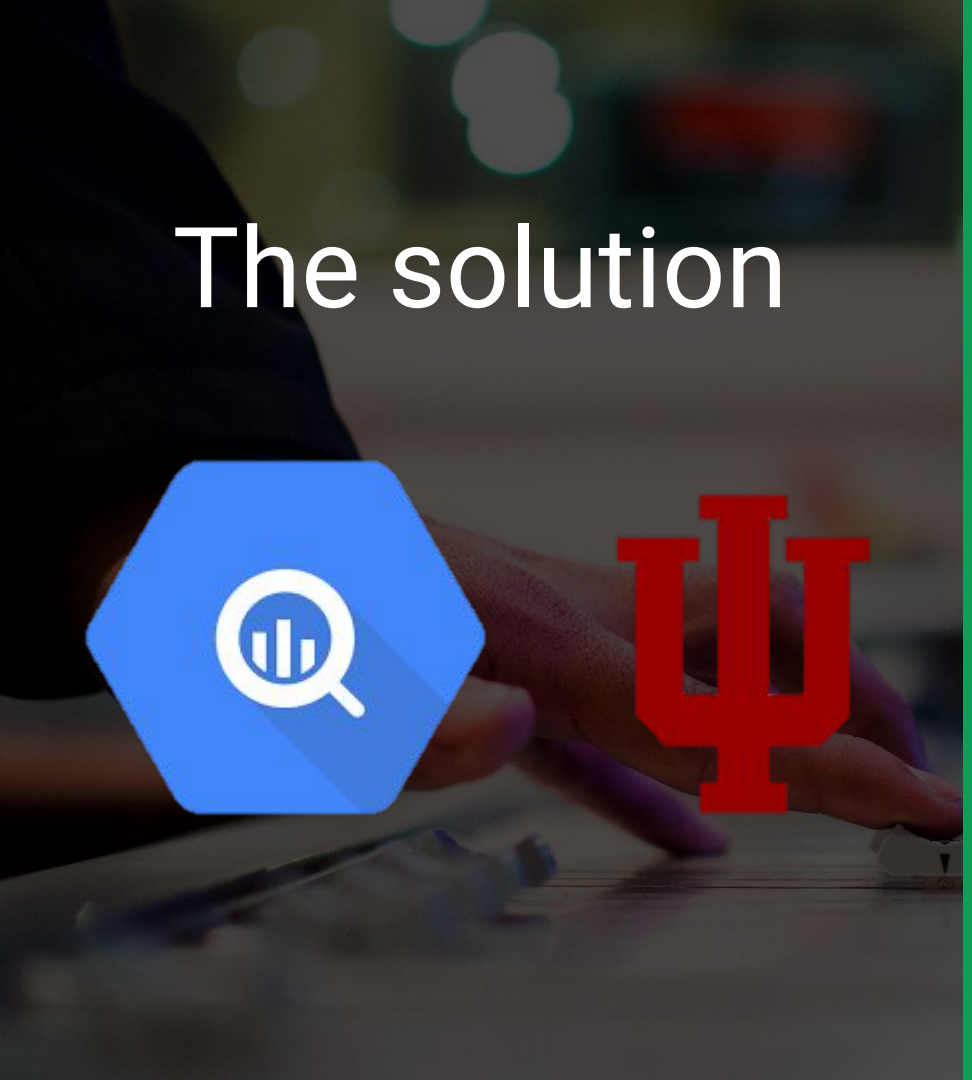
- Patent Valuation



Sampson, Rachelle C. and Shi, Yuan, Are US Firms and Markets Becoming More Short-Term Oriented? Evidence of shifting firm and investor time horizons, 1980-2013 (May 12, 2018). Available at SSRN: https://ssrn.com/abstract=2837524 or http://dx.doi.org/10.2139/ssrn.2837524


Question: Can we predict patent value based on public data?

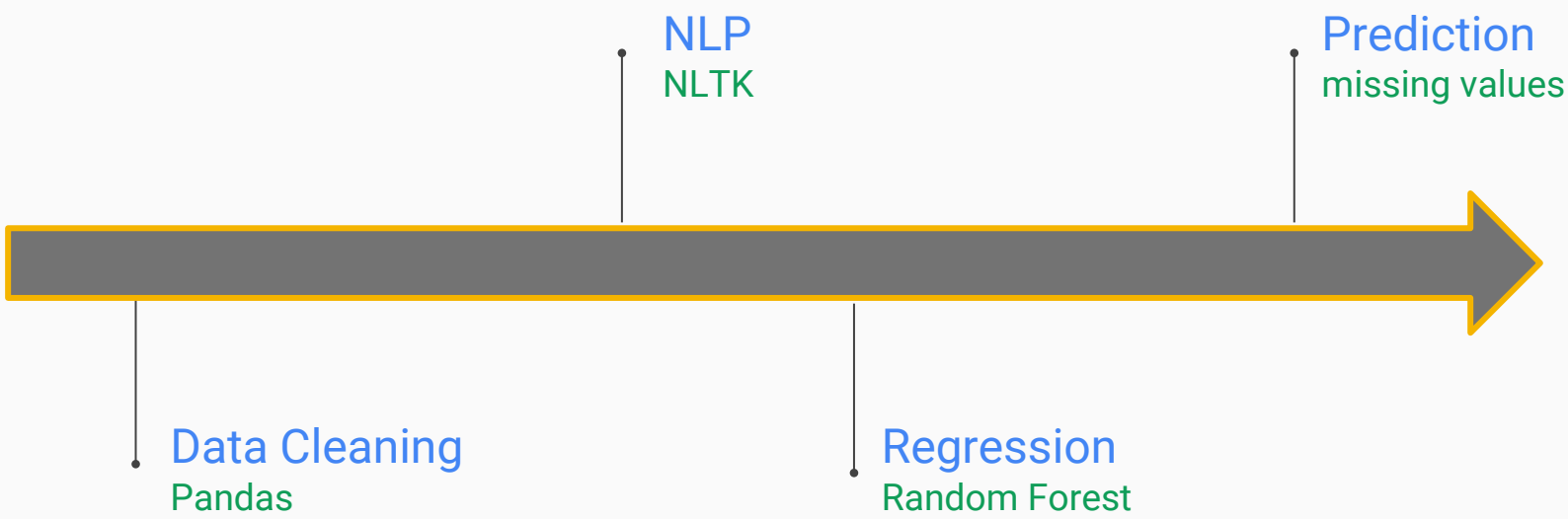
The solution



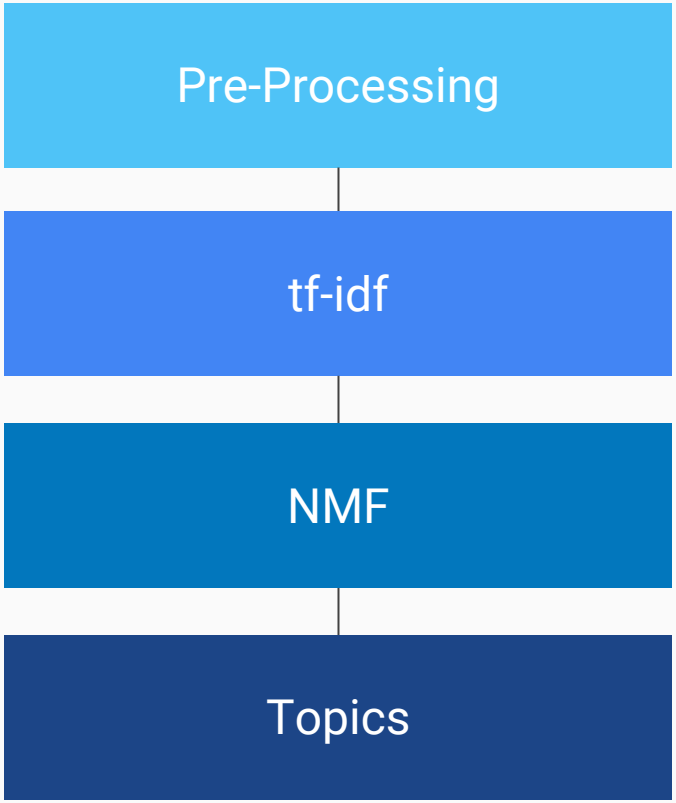
Topic-linear-regression model

- BigQuery Data
  - 6.5 Million Patents
    - Abstracts
  - Government Interest
  - Locations
- Patent Data from IU

Process


NLP
NLTK
Prediction
missing values
Data Cleaning
Pandas
Regression
Random Forest

Topic Modelling



100 Topics

Topic 0: Fittings
hous, wall, section, outer, inner, tube, connector,

Topic 1: Chips
semiconductor, conduct, metal, insul, chip, wire, pad,

Topic 2: Wireless Technology
network, user, comput, messag, request, servic, mobil,

Topic 3: New Compounds
group, acid, atom, alkyl, pa, carbon, hydrogen, polym,

Linear Regression

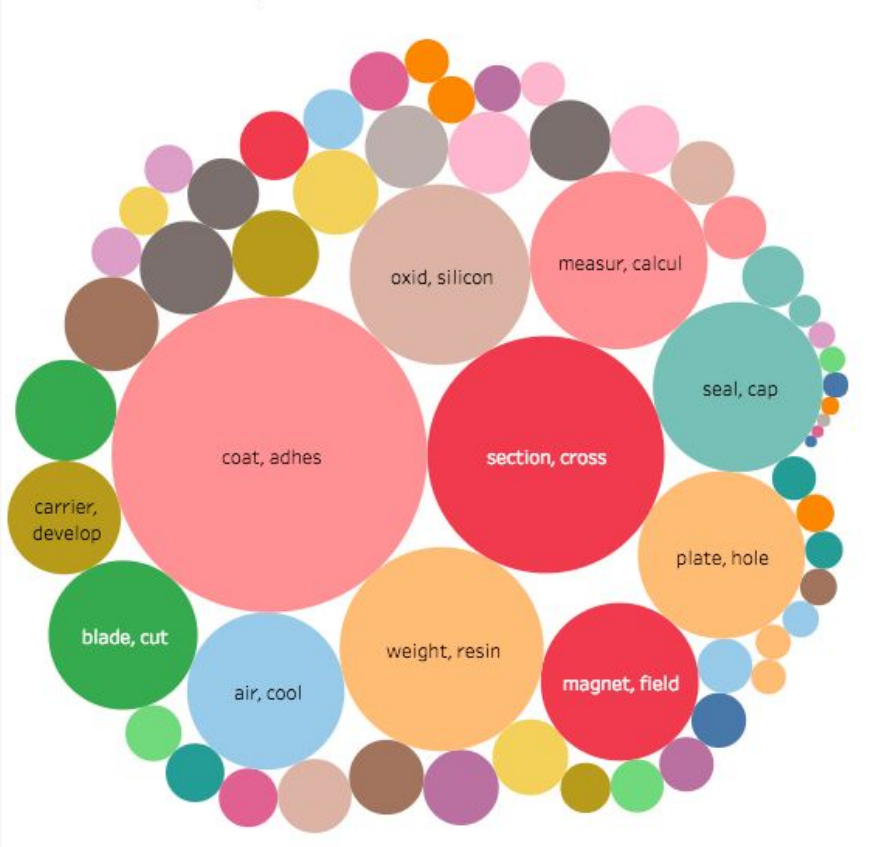
- Feature Engineering
  - Type of patent
  - Government Influence
  - Other Features...
- Final Choice
- Prediction

$R^2 = 0.2$

Feature	Coefficient
Num_claims	0.364
Days_since	0.187
Sqrt_ncites	0.079
Year	0.075
compound, pharmaceut	**0.037**
record, medium	**0.031**
comput, applic	**0.029**
acid, nucleic	**0.021**
coat, polym	**0.018**
electrod, capacitor	**0.011**

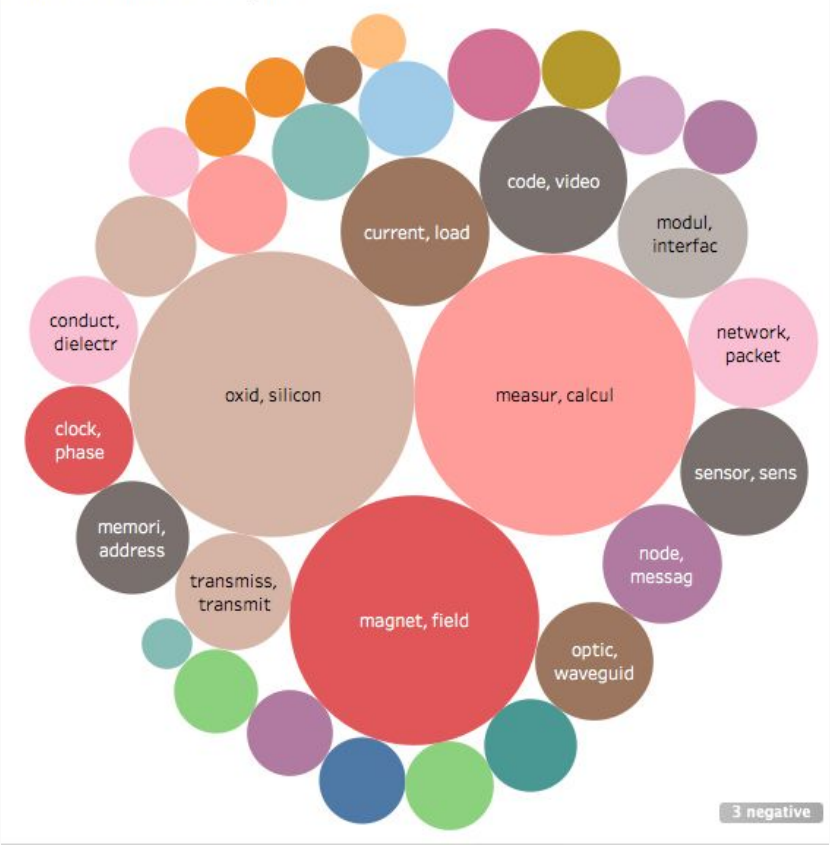
Topics

Most Valuable Topics by Patent Value



Topics
- coat, adhes
- section, cross
- weight, resin
- oxid, silicon
- measur, calcul
- seal, cap
- plate, hole
- magnet, field
- air, cool
- blade, cut
- carrier, develop
- gas, exhaust
- current, load
- code, video
- head, clamp
- ring, bear
- modul, interfac
- network, packet
- sensor, sens

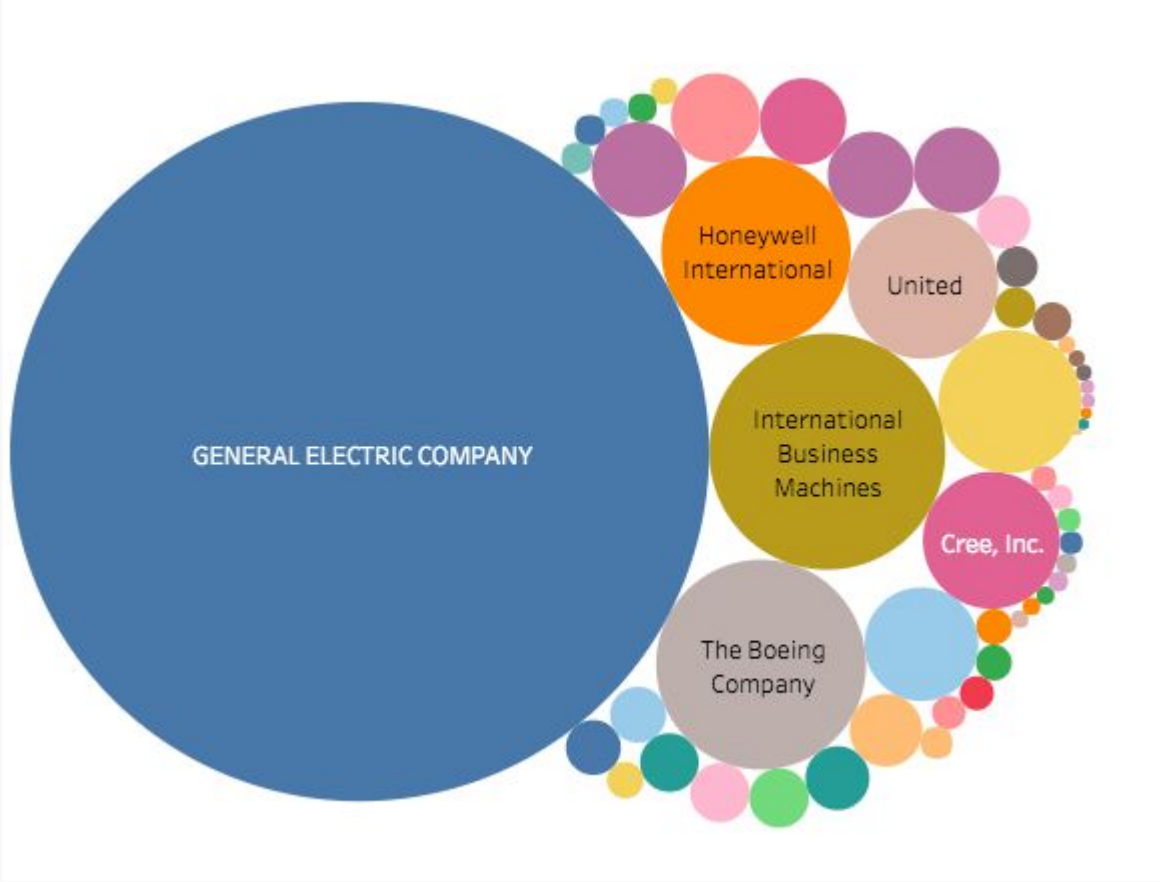
Tech Fragmentation



Topics

- oxid, silicon
- measur, calcul
- magnet, field
- current, load
- code, video
- modul, interfac
- network, packet
- sensor, sens
- node, messag
- optic, waveguid
- transmiss, transm..
- memori, address
- clock, phase
- conduct, dielectr
- display, screen
- semiconductor, w..

Company Values by Patent Sum



Organization
- GENERAL ELECTRI...
- International Busi...
- The Boeing Compa...
- Honeywell Interna...
- United Technologi...
- Lockheed Martin C...
- Cree, Inc.
- Raytheon Company
- Northrop Grumma...
- Caterpillar Inc.
- Motorola, Inc.
- Eaton Corporation
- The Regents of the...
- Xerox Corporation
- Cabot Corporation
- Sarnoff Corporation
- Nortel Networks L...
- Lucent Technologi...
- Harris Corporation
- 3M Innovative Pro...

Summary

- Patent Values Cannot be predicted accurately based on metadata
- Still valuable for macro trends
  - Technology
  - Years
- Can be used for public transparency on Inventor and Company level

Thank You!

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