

MANUFACTURING MEANINGFUL REALITIES VIA ED-TECH + DATA SCIENCE



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Better Solutions, to
Harder Problems,
Faster.

<https://youtu.be/R87W5CyCLhs>

Manufacturing Reality: A 21st Century Worth Dreaming About
TEDxDayton, July 2019

THE SKILLS GAP OPPORTUNITY

Everything is interdisciplinary now

- Universities still teach one-dimensionally
- Massive Open Online Courses (MOOCs) and digital education options have great content that is hard to navigate
- **People know what jobs they want to aim at**, but **they don't know what they need to know or to do** to get them

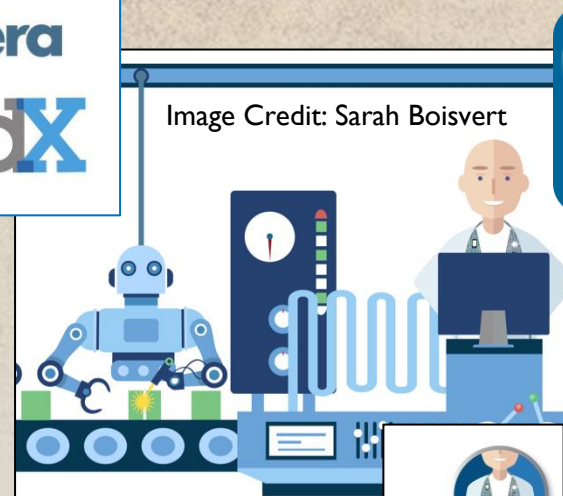


My project will offer a solution

- **Prototype a way to identify these Advanced Manufacturing jobs**



Image Credit: Sarah Boisvert



First FDA-
Approved
3D Printed
Facemask

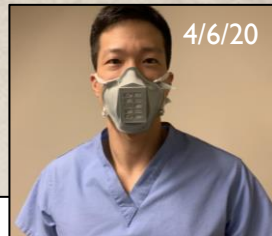
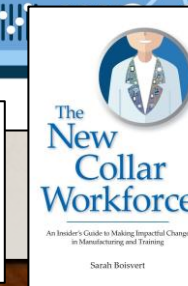


Image Credit:
governmentCIO
Media &
Research



EXAMPLE: MECHANICAL ENGINEER

Consider two positions that might be filled by someone interested in “Mechanical Engineering”

- Display Mechanical Engineer
 - Company/Locale
 - Apple, Cupertino, CA
 - Expected Salary: \$120 - \$156k
- Mechanical Designer/Draft Engineer
 - Company/Locale
 - Allied Motion Technologies, Dayton, OH
 - Expected Salary: Much, much less




Important Note

Apple is also a company on the “No Degree Required” list, along with Google (<https://www.glassdoor.com/blog/no-degree-required/>)



RESEARCH META-QUESTION

Can a path of least resistance to a *specific job title* in a *specific industry* **and** *locale* be charted based on current job postings and remote online learning opportunities?

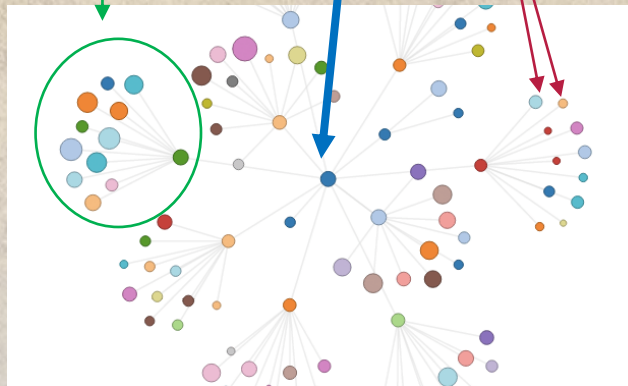


WHAT I ENVISION



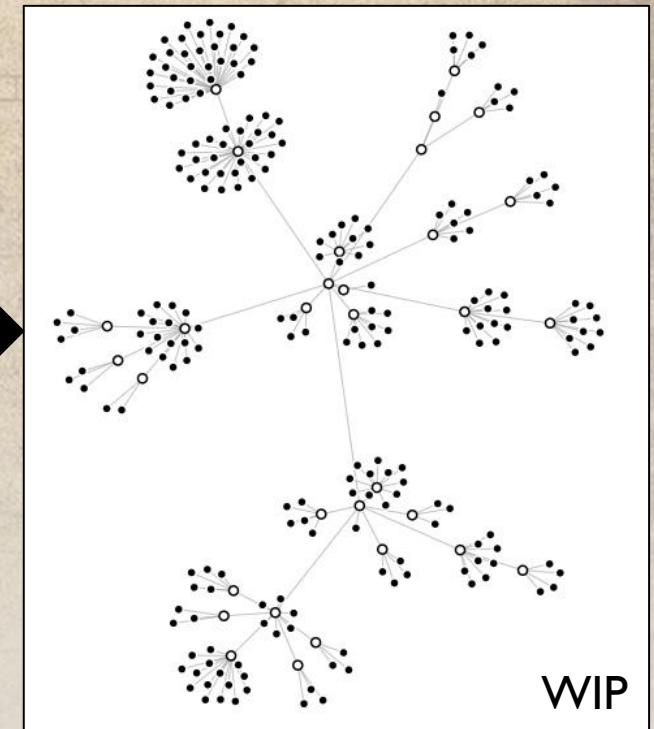
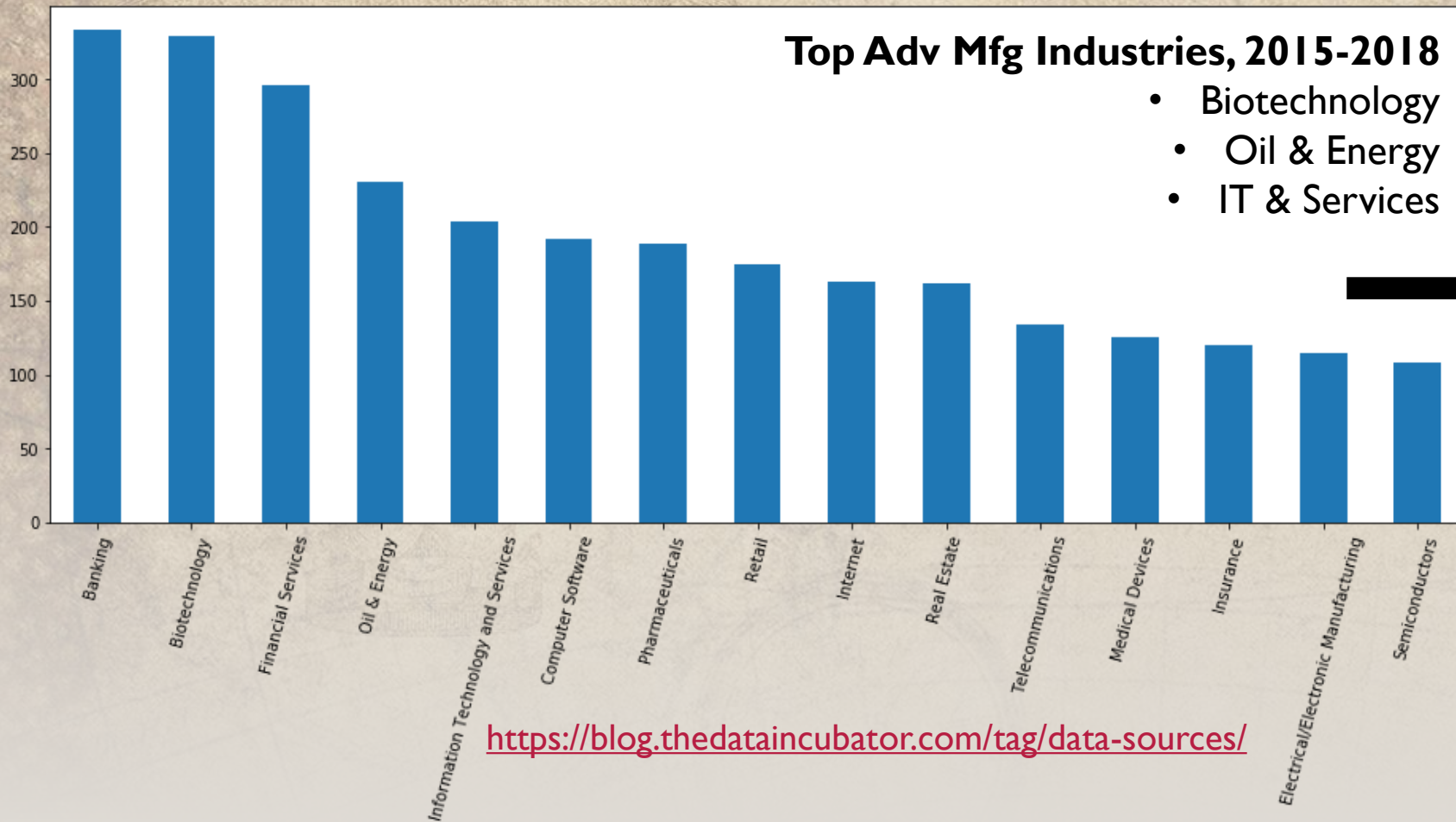
Students, parents, and employers could choose

Locale | Industry | Job Title



Interactive graph network to allow
exploration of related possibilities

LINKEDIN INDUSTRY ANALYSIS, TOP 15 INDUSTRIES



Force Directed Tree

<https://observablehq.com/@observablehq/visualize-a-data-frame-with-observable-in-jupyter>

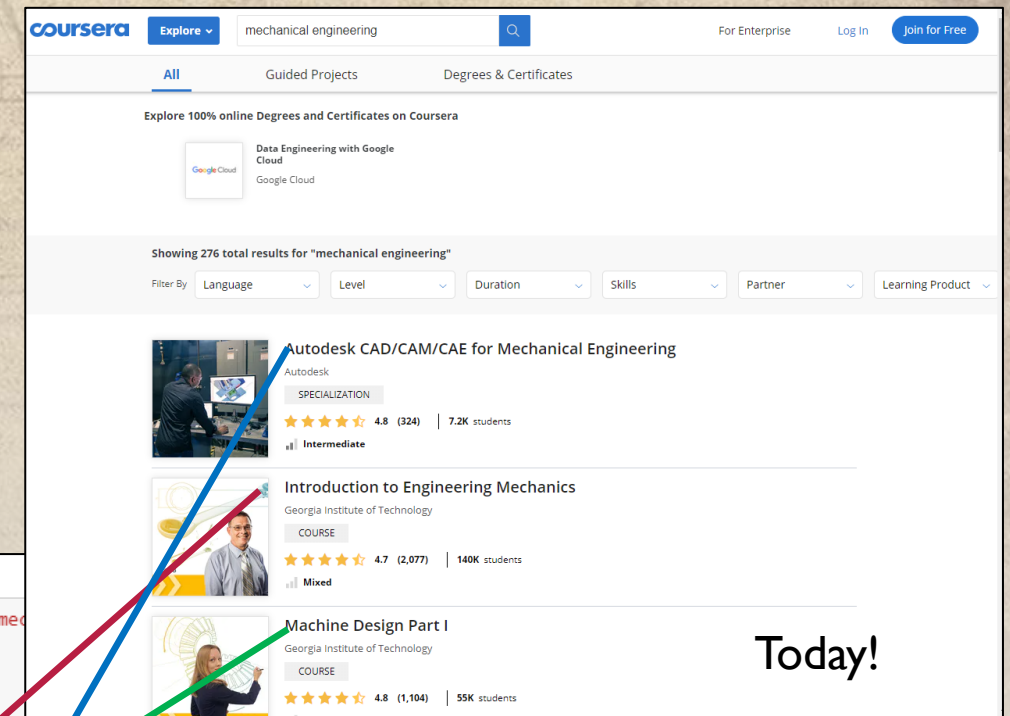
COURSERA WEB SCRAPING

- Searched for courses related to:
 - Mechanical Engineering
 - 3D Printing
 - Additive Manufacturing
 - Data Science
 - Machine Learning
- Note the order change

```
Mechanical Engineering
In [4]: url = "https://www.coursera.org/search?query=mech"
        driver.get(url)
        driver.implicitly_wait(80)

        for i in range(page_count):
            element = driver.find_element_by_id('pagination_right_arrow_button')
            ActionChains(driver).move_to_element(element).perform()
            find_courses(driver.page_source)
            ActionChains(driver).click().perform()
            driver.implicitly_wait(80)

Course Title: Introduction to Engineering Mechanics
Course Rating: 4.7
Course Title: Machine Design Part I
Course Rating: 4.8
Course Title: Autodesk CAD/CAM/CAE for Mechanical Engineering
Course Rating: 4.8
Course Title: CAD and Digital Manufacturing
Course Rating: 4.7
```



Today!

9 Days Ago

PROJECT OUTLINE

PROJECT PLAN

- **Phase I: R&D**
 - ~Weeks 1-4
- **Phase II: Product Demo Interactive Tool Dev**
 - ~Weeks 2-6
- **Phase III: Engineering and ML Ops**
 - ~Weeks 5-8
- **Phase IV: Refinement and Production Investigations**

PRELIM RESULTS/INFO

- Size of datasets looked at so far
 - Coursera (scraped): not much, just titles so far
 - LinkedIn (via Thinkum for now): ~ 1 TB
- Tools and techniques presented
 - Python + Jupyter
 - D3/Javascript + Observable
- See GitHub page for more info + code + results

<https://github.com/gregloughnane/DataIncubatorFellowship>

THANK YOU!

“The real University, he said, has no specific location. It owns no property, pays no salaries and receives no material dues. The real University is a state of mind. It is that great heritage of rational thought that has been brought down to us through the centuries and which does not exist at any specific location. It's a state of mind which is regenerated throughout the centuries by a body of people who traditionally carry the title of professor, but even that title is not part of the real University. The real University is nothing less than the continuing body of reason itself.”

— Robert Pirsig, Zen and the Art of Motorcycle Maintenance