Automation and the Disruption of Labor Markets

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2019 Technology-Enabled Disruption Conference
A World Without Work

For centuries, experts have predicted that machines would make workers obsolete. That moment may finally be arriving. Could that be a good thing?
Automation: Lessons from the Past

1) Technological progress = human progress
   – replacing the drudgery of human work effort with machines

2) Effects on the labour market are uneven
   – there are winners and losers

3) And …
Automation: Present

- Sort occupations based on tasks (Autor-Levy-Murnane, 2003)
  - “cognitive” versus “manual” (brain vs brawn)
  - “routine” versus “non-routine”

- **Routine**: involve a limited set of tasks; tasks that are performed following instructions/rules/procedures

- **Non-routine**: perform wider set of tasks that require flexibility, problem solving, discretion, human interaction
Classifying Occupations

• Non-routine Cognitive
  – physician, software engineer, economic policy analyst, financial manager, executives/directors

• Routine
  – Manual:
  – Cognitive:

• Non-routine Manual
  – waiter, groundskeeper, janitor, manicurist, home health aide, personal care aide
Classifying Occupations

- **Non-routine Cognitive**
  - physician, engineer, economic policy analyst, financial manager, executives/directors

- **Routine**
  - **Manual**: machine operator, fabricator/assembler, automotive mechanic, forklift driver
  - **Cognitive**: secretary, bank teller, travel agent, data entry keyer, retail salesperson

- **Non-routine Manual**
  - waiter, groundskeeper, janitor, manicurist, home health aide, personal care aide
Shares of Total US Employment

Source: Jaimovich-Siu (2018)
US Per Capita Employment: Routine

Source: Jaimovich-Siu (2018)
Metal and Plastic Machine Workers

Summary

<table>
<thead>
<tr>
<th>Quick Facts: Metal and Plastic Machine Workers</th>
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<td>2016 Median Pay</td>
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What Metal and Plastic Machine Workers Do

Metal and plastic machine workers set up and operate machines that cut, shape, and form metal and plastic materials or pieces.

Metal and plastic machine workers set up and operate automated and computer-controlled machinery.
Metal and Plastic Machine Workers

**Summary**

**Quick Facts: Metal and Plastic Machine Workers**

- **2016 Median Pay**: $34,640 per year, $16.75 per hour
- **Typical Entry-Level Education**: High school diploma or equivalent
- **Work Experience in a Related Occupation**: None
- **On-the-job Training**: See How to Become One
- **Number of Jobs, 2014**: 1,048,700
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**Travel Agents**

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#### What Travel Agents Do

Travel agents sell transportation, lodging, and entertainment activities to individuals and groups planning trips. They offer advice on destinations, plan trip itineraries, and make travel arrangements for clients.
Job Polarization

• Job polarization = “hollowing out of the middle” = “disappearing middle-class”
  – contributing factor to widening income inequality within industrialized economies

• Technological progress ≠ greater inequality (necessarily)
  – e.g.: 2nd Industrial Revolution: mass production/assembly line
Who Works (Worked) in Routine Jobs?

- Cortes-Jaimovich-Siu (2017): lower levels of education
  - Men (largely routine manual): at most a high school diploma
  - Women (largely routine cognitive): high school diploma, some post-secondary
20-49 yr old High School Men: US
What Are They Doing Instead?

Source: based on data from Cortes-Jaimovich-Siu (2017)
Who Works (Worked) in Routine Jobs?

- Cortes-Jaimovich-Siu (2017): lower levels of education

- Account for most of the fall in US labour force participation among working-aged men, esp. young
  - “Routine women” becoming more educated, moving into better jobs
  - “Routine men” increasingly not working (put out to pasture)
Who Works (Worked) in Routine Jobs?

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• Implications for family structure and outcomes of single- vs dual-parented children (Autor-Wasserman, 2013)
The Future Workplace

• Is simply increasing (formal) education enough?
  – Beaudry-Green-Sand (2016): since 2000s, increasing supply of high-skilled labour outpacing demand

• What’s next? Artificial intelligence, machine learning / neural networking, advanced robotics (3D printing, autonomous vehicles)
A.I. Is Doing Legal Work. But It Won’t Replace Lawyers, Yet.

By STEVE LOHR  MARCH 19, 2017

Impressive advances in artificial intelligence technology tailored for legal work have led some lawyers to worry that their profession may be Silicon Valley’s next victim.

But recent research and even the people working on the software meant to automate legal work say the adoption of A.I. in law firms will be a slow, task-by-task process. In other words, like it or not, a robot is not about to replace your lawyer. At least, not anytime soon.
Google’s AI Can Read Your Retinas to Prevent Blindness

futurism.com/googles-ai-can-read-your-retinas-to-prevent-blindness/
The Future Workplace

- Is simply increasing (formal) education enough?
  - Beaudry-Green-Sand (2016): increasing supply of high-skilled labour outpacing demand

- What’s next: AI, machine learning, advanced robotics

- Technological progress creates whole new (non-routine) work opportunities, new occupations

- Non-routine occupations involve a variety of tasks
  - greater scope for transformation/evolution of jobs
  - offload some tasks, emphasize other (*more human*) tasks
The Future Workplace

• Technology substitutes for humans in some tasks, **complements** in others
  
  – Increased returns to being a “question asker” or “problem solver”
  
  – Logic, critical thinking, empirical reasoning
  
  – Curiosity, creativity/ingenuity, persistence, collaboration … “non-cognitive” skills
The Future Workplace

• We will always have the comparative advantage at “being human”
  – Social skills: collaboration, communication (verbal and non-verbal), empathy, emotional intelligence
  – Growing occupations require both cognitive and social skills (Deming, 2017)
  – Occupations increasingly demanding social skills, especially top-paying ones (Cortes-Jaimovich-Siu, 2018)
Doctors' Interpersonal Skills Are Valued More Than Training

The Wall Street Journal Online
Updated Sept. 28, 2004 12:01 a.m. ET

People place more importance on doctors' interpersonal skills than their medical judgment or experience, according to the latest Wall Street Journal Online/Harris Interactive health-care poll, and doctors' failings in these areas are the overwhelming factor that drives patients to switch doctors.

Eighty-five percent of those polled said treating a patient with dignity and respect is an extremely important quality in a doctor, and 84% cited listening carefully and being easy to talk to as important qualities, according to the poll.

Emotional Intelligence In Business And Leadership

Forbes

An Interview with

Jeff Moss
CEO and Co-Founder at FocusShot, a 2-ounce focus-enhancing shot. NYU Gallatin 2013 grad.

In recent decades, the definition of leadership has been changing, and an emphasis on emotional intelligence has emerged. Emotional intelligence, or EQ, has become recognized for its correlation to
We're so many years from Jetsons-esque machines that live among us and wash our dishes and fold our clothes. But the reality is the robots have arrived—you're just not noticing them.

Take a robot called Tug, for instance. No, Tug can't talk philosophy with you, and Tug can't do your laundry. But Tug is a pioneer. Because in hospitals around the world, this robot is helping nurses and doctors care for patients by autonomously delivering food and drugs, shouldering the burden of time-consuming mundanity. And now, it's rolling...
### Chart 1. Ten fastest growing occupations, projected 2016-26

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Percent change, projected 2016-26</th>
<th>Employment change, projected 2016-26 (in thousands)</th>
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<tbody>
<tr>
<td>Solar photovoltaic installers</td>
<td>104.9%</td>
<td>11.8</td>
</tr>
<tr>
<td>Wind turbine service technicians</td>
<td>96.3%</td>
<td>5.6</td>
</tr>
<tr>
<td>Home health aides</td>
<td>47.3%</td>
<td>431.2</td>
</tr>
<tr>
<td>Personal care aides</td>
<td>38.6%</td>
<td>777.6</td>
</tr>
<tr>
<td>Physician assistants</td>
<td>37.3%</td>
<td>39.6</td>
</tr>
<tr>
<td>Nurse practitioners</td>
<td>36.1%</td>
<td>56.1</td>
</tr>
<tr>
<td>Statisticians</td>
<td>33.8%</td>
<td>12.6</td>
</tr>
<tr>
<td>Physical therapist assistants</td>
<td>31.0%</td>
<td>27.4</td>
</tr>
<tr>
<td>Software developers, applications</td>
<td>30.7%</td>
<td>255.4</td>
</tr>
<tr>
<td>Mathematicians</td>
<td>29.7%</td>
<td>0.9</td>
</tr>
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</table>

Thank you

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