MIS 0855 Fall 2016 – Data Science

Week 13 – Data Science and Your Career

Min-Seok Pang

Management Information Systems
Fox School of Business, Temple University
minspang@temple.edu

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Women Mathematicians at World War II

who were called “Computers.”

Today’s Question

● How to *survive* in the job market and *thrive* in your career by *winning* the battle against the machine?

A Good but Not-So-Good News – Jobless Recovery

September 5, 2009

In Unemployment Report, Signs of a Jobless Recovery

Man vs. Machine, a Jobless Recovery

U.S. Companies Are Spending to Upgrade Factories but Hiring Lags; Robots Pump Out Sunny Delight

October Data Point the Way to a 'Jobless Recovery'

American unemployment

Forgotten men

The jobless recovery, long prophesied, is here
Spending Spree | Businesses splurge on machines, not muscle

Change since each recovery began in blue spending by business on equipment, software; adjusted for inflation* orange the number of private-industry jobs.

In the current recovery, business spending on equipment and software has rebounded faster than usual...

...while private-industry jobs have been relatively slow to return...

The difference between the speed of the rebound in business investment in equipment and software and that in private-industry hiring is the widest in decades, as a result.

http://online.wsj.com/article/SB10001424052970204468004577164710231081398.html
What does this mean and *Why*?

**More Bang for the Buck**

The value of goods and services produced for every hour worked has grown sharply in the nonfarm business sector during this recovery—while the total number of hours worked is up only a bit. The upshot: The ratio of compensation to productivity, or unit labor costs, has been falling.

*Change since the recovery’s start in:*

- **Output per hour**
- **Output**
- **Hours**
- **Unit labor costs**

Source: Labor Department

Pat Minczeski/The Wall Street Journal

[http://online.wsj.com/article/SB10001424052970204468004577164710231081398.html](http://online.wsj.com/article/SB10001424052970204468004577164710231081398.html)
Why Jobless Recovery?  
– Automation (1/2)

http://stormhighway.com/blog/july2109a.shtml
Why Jobless Recovery? – Automation (2/2)

What if every item in a grocery store has an EZPass (an RFID chip)?

http://www.flickr.com/photos/whole_foods/4495467654/
http://earthpulse.nationalgeographic.com/earthpulse/focus-us-text
Why Jobless Recovery? – Outsourcing

The Man Who Makes Your iPhone
Foxconn founder Terry Gou might be regarded as Henry Ford reincarnated if only a dozen of his workers hadn’t killed themselves this year. An exclusive look inside a postmodern industrial empire.

http://www.businessweek.com/magazine/content/10_38/b4195058423479.htm
http://images.businessweek.com/ss/10/09/0909_foxconn/2.htm
Why Jobless Recovery? – Skill Mismatch (1/3)

Chart 4. The Beveridge Curve (job openings rate vs. unemployment rate)
Seasonally adjusted

Before 2007-08 Recession

After Recession

Why Jobless Recovery? – Skill Mismatch (2/3)

JOB OPENINGS RATE AND UNEMPLOYMENT RATE, BY INDUSTRY
Percentage of the labor force, three-month-averages, Aug-Oct 2014

- Openings
- Unemployment

Construction
Manufacturing
Mining and logging
Transportation, warehousing, and utilities
Other services
Wholesale and retail trade
Leisure and hospitality
Total private
Information
Government
Professional and business services
Education and health services
Financial activities

https://tcfdotorg.atavist.com/where-are-the-jobsnbsjq
Why Jobless Recovery? – Skill Mismatch (3/3)

Most job growth in mature economies involves complex interactions, not routine production or transaction work.

New jobs created in the United States, 2001–09

<table>
<thead>
<tr>
<th>Category</th>
<th>Job Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactions</td>
<td>4.8</td>
</tr>
<tr>
<td>Transactions</td>
<td>-0.7</td>
</tr>
<tr>
<td>Production</td>
<td>-2.7</td>
</tr>
</tbody>
</table>

**SOURCE:** US Bureau of Labor Statistics; McKinsey Global Institute analysis

http://www.foreignpolicy.com/articles/2012/03/16/help_wanted?page=full
Race Against the Machine

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“You’re hired, but remember, you can be replaced by a machine...believe me.”

Erik Brynjolfsson
Andrew McAfee

Race Against The Machine

How the Digital Revolution is Accelerating Innovation,
Driving Productivity, and Irreversibly Transforming
Employment and the Economy

http://www.cartoonstock.com/directory/o/outsourcing.asp
Wall Street Bankers vs. the Machines

Wall Street banks are replacing people with computers to trade financial instruments that once generated some of their biggest profits. Late last month, UBS (UBS), Switzerland’s biggest bank, fired its head of credit-default swap index trading, David Gallers, and replaced him with computer algorithms that trade using mathematical models, according to two people familiar with the matter.

BloombergBusinessweek
Markets & Finance

Swaps

Computers Elbow Swaps Traders Aside

http://www.businessweek.com/articles/2012-11-15/computers-elbow-swaps-traders-aside
Accountants vs. the Machines

Let’s get your guaranteed biggest tax refund

- Get live, one-on-one advice from a tax professional, 7 days a week
- We find every tax deduction and credit you deserve so you get the biggest tax refund possible
- We guide you step by step and guarantee 100% accurate calculations

New to TurboTax?
Start for Free

We’ll guide you to the right TurboTax version for you

TurboTax Expert, Lisa Skelly

When It’s Not All About Wages
Pay of outsourced entry-level accountants in Argentina is higher than in India. But they still earn less than the $23 hourly wage in the U.S.

- India: $11.22
- U.S.: $23
- Philippines: $13.00
- Argentina: $19.90
- Costa Rica: $18.85
- China: $12.33
Journalists vs. the Machines

Lawyers vs. the Machines

http://www.nytimes.com/2010/08/05/business/global/05legal.html?_r=0
http://www.legallyindia.com/201111252419/Analysis/
Pilots vs. the Machines

Ryanair’s O’Leary Calls for Single-Pilot Commercial Flights

by CHARLES ALCOCK

Where did he go?

Ryanair chief executive Michael O’Leary is pushing for single-pilot commercial aircraft operations. In a September 8 interview with the Financial Times, O’Leary argued that copilots are essentially redundant in modern airliners because “the computer does most of the flying.” The Ireland-based low-cost carrier subsequently confirmed that it initiated a dialogue with aviation authorities regarding the possibility of legalizing single-pilot operations, but in a statement made clear that the proposal remains at an early stage. “No formal approach has been made, but we are starting the debate so that we can look to reduce costs without compromising safety,” Ryanair said in the statement. “Given the sophistication of our aircraft we believe that one pilot flying can operate safely on short routes and reduce fares for all passengers.”

Drivers vs. the Machines

http://bitsblogs.nytimes.com/2014/05/13/a-trip-in-a-self-driving-car-now-seems-routine/
http://wot.motortrend.com/1505_google_self_driving_cars_begin_tests_on_city_roads_this_summer.html
Subway Conductors vs. the Machines

- A new 10.7-mile subway line with no conductor

http://dragonphoto.tistory.com/535
http://m.blog.daum.net/el-tor/8446015
Restaurant Servers vs. the Machines

3D Printer vs. who?

Whose job is in danger if every household has one of these?

http://www.dezeen.com/2013/05/03/scientists-3d-print-bionic-ear-hears-beyond-human-range/
How long do you want to live?

- How long do you think you’ll live?
- Then, when do you have to retire if you want to live up to 100 years?
- What kind of technology breakthroughs will take place for the next 50 years?

http://physics.illinois.edu/history/timelines/1960s.asp
Let’s face it.

● Automation and outsourcing are irreversible trends.
● No occupation is immune to this trend.
● New technologies will continue to emerge for our lifetime and fundamentally transform the society and the job market (probably faster and faster).

http://www.bizbash.com/will_these_tech_advances_change_the_future_of_events/new-york/story/25226/
Let’s discuss.

● Which kind of occupation will be neither replaced by the machines nor outsourced for the next 30 years?

http://www.clotureclub.com/jobs/
In order not to be replaced, what kind of skills do we need that the machines don’t have?

- Creative, innovative, analytic thinking
- Problem-solving skills for complex, unstructured, open-ended, non-routine problems
- Face-to-face, human-touch, communication skills (e.g. negotiation, persuasion, writing)
- Entrepreneurship and leadership
- anything else?

Google DeepMind Beats Go Champion!

Google DeepDream Draws Arts!

https://news.artnet.com/market/google-inceptionism-art-sells-big-439352
We are NOT doomed.

- Advances in technologies are creating new opportunities and increasing demands for different skills.
  - Techs destroy some jobs but create new ones too, with the skills in the previous page.
- Tech developments have historically increased the size of the economies for the last several centuries.
- If you can survive in the waves of new technologies, you’ll be more thriving than ever before.

How to survive? – Be Ambidextrous

● You’ll need to develop multiple skills and abilities to survive.
● Having one major may not be enough.
● Double major or graduate degree in a distant field
● so that, when you lose a job, you can jump into another occupation right away.
To make money, go to a graduate school!

Changes in Wages for Full-Time Male U.S. Workers

http://opportunityproject.ets.org/choosing-our-future
Today, the world's largest bookseller, Amazon, is a software company—its core capability is its amazing software engine for selling virtually everything online, no retail stores necessary. On top of that, while Borders was thrashing in the throes of impending bankruptcy, Amazon rearranged its website to promote its Kindle digital books over physical books for the first time. Now even the books themselves are software.

Today's largest video service by number of subscribers is a software company: Netflix. How Netflix eviscerated Blockbuster is an old story, but now other traditional entertainment providers are facing the same threat. Comcast, Time Warner and others are responding by transforming themselves into software companies with efforts such as TV Everywhere, which liberates content from the physical cable and connects it to smartphones and tablets.

Today's dominant music companies are software companies, too: Apple's iTunes, Spotify and Pandora. Traditional record labels increasingly exist only to provide those software companies with content. Industry revenue from digital channels totaled $4.6 billion in 2010, growing to 29% of total revenue from 2% in 2004.

Today's fastest growing entertainment companies are videogame makers—again, software—with the industry growing to $60 billion from $30 billion five years ago. And the fastest growing major videogame company is Zynga (maker of games including FarmVille), which delivers its games entirely online. Zynga's first-quarter revenues grew to $235 million this year, more than double revenues from a year earlier. Rovio, maker of Angry Birds, is expected to clear $100 million in revenue this year (the company was nearly bankrupt when it debuted the popular game on the iPhone in late 2009). Meanwhile, traditional videogame powerhouses like Electronic Arts and Nintendo have seen revenues stagnate and fall.
That 'Useless' Liberal Arts Degree Has Become Tech's Hottest Ticket

Such creativity can’t be programmed. Instead, much of it is minted by one of Slack’s 180 employees, Anna Pickard, the 38-year-old editorial director. She earned a theater degree from Britain’s Manchester Metropolitan University before discovering that she hated the constant snubs of auditions that didn’t work out. After winning acclaim for her blogging, videogame writing and cat impersonations, she found her way into tech, where she cooks up zany replies to users who type in “I love you, Slackbot.” It’s her mission, Pickard explains, “to provide users with extra bits of surprise and delight.” The pay is good; the stock options, even better.

What kind of boss hires a thwarted actress for a business-to-business software startup? Stewart Butterfield, Slack’s 42-year-old cofounder and CEO, whose estimated double-digit stake in the company could be worth $300 million or more. He’s the proud holder of an undergraduate degree in philosophy from Canada’s University of Victoria and a master’s degree from Cambridge in philosophy and the history of science.

How to survive? – Continue to Learn

● Some of the things you are learning here will probably be **obsolete** in the next couple of decades.

● New knowledge keeps produced in an increasingly faster rate.

● Will need to know not only how to use certain software tools (Excel, Tableau), but also how to learn new technology that is not invented yet.

● Will need to be flexible and to transform yourself anytime with new knowledge and skills

● Always be vigilant over and aware of technology trends and take advantage of them
Data Scientist: The Sexiest Job of the 21st Century

by Thomas H. Davenport and D.J. Patil

FROM THE OCTOBER 2012 ISSUE

Big Data, Big Paycheck
Median salary for analytics professionals and those specifically within data science, by level of experience.

- **Up to 3 years**
  - Analytics professionals: $65,000
  - Data scientists: $80,000

- **4 to 8 years**
  - Analytics professionals: $85,000
  - Data scientists: $120,000

- **9+ years**
  - Analytics professionals: $115,000
  - Data scientists: $150,000

Note: Data do not include managers. Source: Burtch Works. The Wall Street Journal.

http://www.wsj.com/articles/SB10001424052702304819004579489541746990638
How to survive? – Be data-smart!

● Whatever occupation you’ll have, you’ll need a skill
  ▪ to find right data sources
  ▪ to analyze a large amount of data, and
  ▪ to get valuable insights and knowledge from data

● for critical-thinking, creative abilities, analytic skills

● for an ability to solve open-ended, unstructured, non-routine problems.

The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn and relearn.

- Alvin Toffler

http://horageek.blogspot.com/2012/11/alvin-toffler-habla-sobre-el-prosumo.html#UL_ViYOzKSo
Connect with me at LinkedIn!
http://www.linkedin.com/in/minspang