

H A R V A R D | B U S I N E S S | S C H O O L

Only Humans Need Apply: Winners and Losers in the Age of Smart Machines

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May 19, 2016

Many Roads Lead to Automation

Expensive labor

Too
much
data

Need for accurate decisions

Tedious work



Powerful technologies

A Smooth Transition from Analytics to Cognitive

Correlation/
Regression

Text
Analytics

Natural
Language
Processing

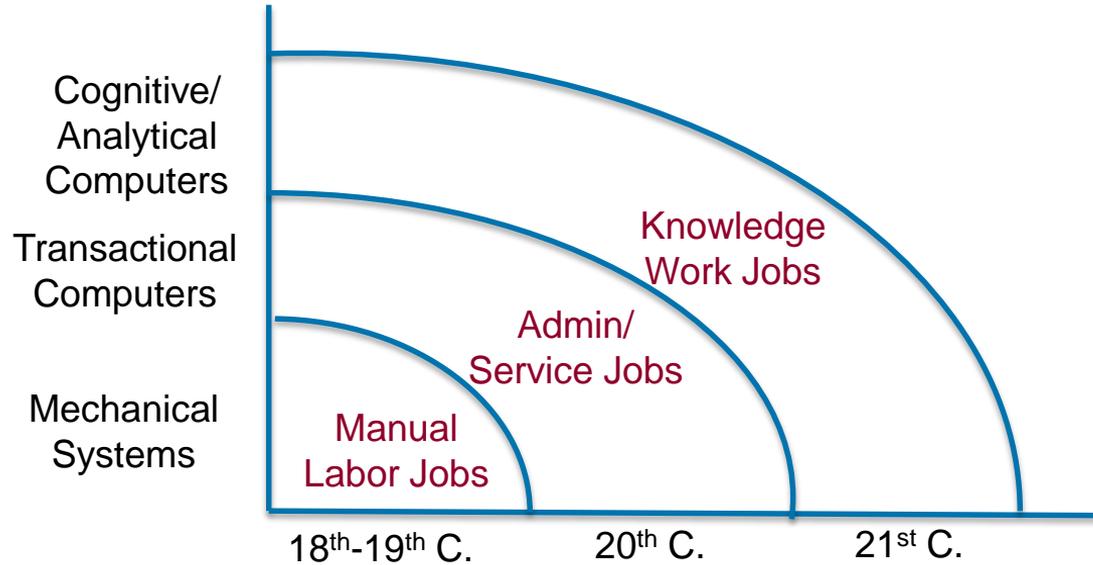
Logistic
Regression

Machine
Learning

Neural
Networks

Deep
Learning

Is Knowledge Work Next to Go?



My Answer Is...Yes...and No

- ▶ Many knowledge work job *tasks* are at risk of being automated
- ▶ Some knowledge workers will lose their jobs, but it will be on the margins
 - ▶ We'll need 8 lawyers instead of 10
- ▶ There are going to be a lot (no one knows how many) of jobs working alongside smart machines
- ▶ We'll have plenty of productivity gains, so we can afford to retrain and redeploy people if we want to
- ▶ But there is no room for complacency!



Ten Knowledge Work Jobs w/ Automatable Tasks

1. Teacher/Professor—online content, adaptive learning
2. Lawyer—e-discovery, predictive coding, etc.
3. Accountant—automated audits and tax
4. Radiologist—automated cancer detection
5. Reporter—automated story-writing
6. Marketer—programmatic buying, focus groups, personalized e-mails, etc.
7. Financial advisor—”robo-advisors”
8. Architect—automated drafting, design
9. Financial asset manager—index funds, trading
10. Pharmaceutical scientist—cognitive creation of new drugs



Automation or Augmentation?

- ▶ Augmentation—smart humans helping smart machines, and vice-versa
- ▶ People do this by aiding automated systems that are better than humans at their particular tasks, or by focusing those tasks at which humans are still better
- ▶ The classic example: freestyle chess
 - ▶ Better than humans or automated chess systems acting alone
 - ▶ Humans can choose among multiple computer-recommended moves
 - ▶ Humans know strengths and weaknesses of different programs
- ▶ We've seen this before: textile machinery, spreadsheets



Five Ways of Augmented Stepping

- ▶ *Step in*—humans master the details of the system, know its strengths and weaknesses, and when it needs to be modified
- ▶ *Step up*—humans take a big-picture view of computer-driven tasks and decide whether to automate new domains
- ▶ *Step aside*—humans focus on areas they do better than computers, at least for now
- ▶ *Step narrowly*—humans focus on knowledge domains that are too narrow to be worth automating
- ▶ *Step forward*—humans build the automated systems



The Five Augmentation Steps for Financial Advisors

- ▶ *Step in*—advisors become experts in online advice, and assist clients to use it to their best advantage
- ▶ *Step up*—advisors identify the domains most in need of automation, or those already automated needing improvement
- ▶ *Step aside*—advisors primarily communicate with clients, but don't make decisions for them—or work outside investments
- ▶ *Step narrowly*—advisors identify a narrow client segment or investment type
- ▶ *Step forward*—advisors use their expertise to build and support robo-advisor systems



Implications for Organizations

- ▶ Take an augmentation perspective from the beginning
- ▶ Pick the right cognitive technology for your problem
- ▶ Get good at work design for smart humans and smart machines
- ▶ Give your people the options and the time to transition to them
- ▶ Put someone in charge of thinking about this

