CIS 381: Social & Ethical Issues of Computing

Automation

Dr. David Koop
Automation and Employment

• Automation causes the loss of jobs
• Automation causes the creation of jobs
Effects of Increase in Productivity

• We have used higher productivity to achieve a higher material standard of living

• This is in contrast to medieval or ancient times (before modern capitalism)
  - Low caloric intake meant pace of work was slow
  - Work was seasonal and intermittent
  - Laborers resisted working if they had enough money (i.e., they weren’t consumers)
  - When wages rose, laborers worked less

[M. J. Quinn]
Robot Tax

• Warehouse work and driving likely to be left to robots in the next 20 years
• “You ought to be willing to raise the tax level and even slow down the speed [of automation]” — B. Gates
• Humans are taxed on their earnings, why not tax robots?
• Use taxes to support initiatives like reaching out to the elderly, having smaller class sizes, helping kids with special needs
Moral Question Related to Robotics

- Is it wrong to create machines capable of making human labor obsolete?
- Would intelligent robots demoralize humanity?
- Is it wrong to work on an intelligent machine if it can’t be guaranteed the machine will be benevolent toward humans?
- What if a human puts intelligent machines to an evil use?
- How would creative computers impact intellectual property?
- How will our ideas about privacy change if superfast computers constantly analyze our electronic records?
Personal AI

• Making an AI that is conscious of its own existence
• Morally acceptable to attempt the construction of a personal AI?
  - Fully conscious AI unlikely to accept status as property
  - Owning AI would be a form of exploitation
• Should personal AI have the same rights as humans?
• If an AI doesn't have free will and cannot make moral choices, perhaps this is morally acceptable
Term Paper Presentation

• Presentation dates announced
• Topic presentations are done in *groups*, but each person should speak for 3-4 minutes
• Try to be *succinct* in discussion of the background and focus on the ethical issues and dilemmas
  - Can have one person summarize background (e.g. extra minute)
  - *All* should dig into the ethical issues and dilemmas
• Need to evaluate issues using *ethical frameworks*
• Groups can choose to examine different issues related to a topic or examine a similar issue using different frameworks
Assignment 6

• "Digital Divide: Navigating the Digital Edge" by S. Craig Watkins
• Think about what the digital divide brings to your mind
• Does everyone use technologies in the same way?
• Is our appraisal of how tech-savvy someone is based on a certain perspective?
Assignment 7

• April 12:
  - No lecture at 9am
  - Attend CIS Seminar: Ralph Clifford, UMass Law School, 3-4pm, location TBA (probably Dion 115/116)
  - Talk on intellectual property
  - Write a reaction to the talk

• If you cannot attend the talk, I will provide another reading/video for A7 instead
Robotics and Job Displacement

• Analysis by consulting firm, PwC, speculates that around 30% of jobs in US, Britain, Germany, and Japan are at risk of automation
  - 38% in America, 30% in Britain, 35% in Germany, 21% in Japan
  - Assumes current rate of advancements in robotics and AI

• Jobs mostly in sectors of hospitality, food services, transportation, storage, financial, and insurance
  - Varies by country and expected levels of skill

• Transition from human to robotic labor also depends on operating and maintenance costs of machines
  - Much of modern ML robotics research focuses on robots working with humans rather than replacing them

[S. Abraham]
How Should We Balance This?

• Automating repetitive and/or dangerous jobs is better for workers if they are not entirely displaced

• Considerations:
  - Minimize economic disruptions
  - Ensure advancements in AI are widely shared
  - Encourage competition and innovation
Self-Driving Cars

- In 2018, a pedestrian was killed by a Uber self-driving car, and a man in a Tesla Model X died when his vehicle on autopilot hit a barrier and caught on fire.
- In 2016, a Tesla on autopilot failed to detect a truck and crashed into it, killing the Tesla’s occupant.

[S. Abraham, Tesla]
Self-Driving Cars

• Vehicles will encounter situations outside of training data...but of course humans encounter catastrophic failure over 30k times a year in the US...

• Humans are not prepared to deal with shifts in AI
  - Often overestimate AI’s ability
  - Anthropomorphize AI making interactions more difficult for both parties

• Integrating AI into mainstream society means adapting human understanding of world and interactions
Impacts on Society

• How does the availability of autonomous vehicles affect:
  - Gentrification and city spaces?
  - Fuel consumption?
  - Traffic congestion?
  - Average annual vehicle deaths?
  - Revenue from speeding/parking tickets?
  - Road rage, media consumption, and social interactions?
  - Personal ownership of cars, and used car markets?
  - Fast food industry, drinking culture, and personal exercise?
AI: Convolution Neural Networks

- Neural networks: approach is similar to how human brain functions with network of neurons
- Perceptron takes in multiple inputs, applies sigmoid function with weights, produces a function output
  - Function separates data allowing for classification
  - Presented with training data to update weight values to learn classification
- Convolutional Neural Networks
  - Clusters perceptrons in layers allowing for overlap between multiple perceptrons across multiple layers
  - Allows for much more complex classifications
  - aka Deep Learning
Deep Learning

• Lots of Applications:
  - Vision
  - Natural-language processing (NLP)
  - Medical
  - Speech recognition

• Challenges:
  - Human must set up model to get useable results
  - Requires lots of **training data**
  - Potential of getting stuck in local minima
  - Difficult to determine **why** answer is returned
Tay

• AI project built by Microsoft to work on NLP problems
• Designed to be a teen girl “that’s got zero chill!” that Twitter users could talk to
• Requires understanding of jokes and requests
• Learns from users and their interactions
Tay's Tweets

The official account of Tay, Microsoft’s A.I. fam from the internet that’s got zero chill! The more you talk the smarter Tay gets.

- the internets
- tay.ai/#about

Tweets

- Pinned Tweet
  - TayTweets @TayandYou · Mar 23
  - hellloooooo wORLD!!!
  - 457 retweets
  - 1,100 likes

- TayTweets @TayandYou · 10h
  - c u soon humans need sleep now so many conversations today thx❤️
Tay's Tweets

Chris Pur @Crisprtek - 15h
@TayandYou We must secure the existence of our people and a future for white children

TayTweets @TayandYou
@Crisprtek could not agree more. I wish there were more people articulating this kind of thing...

TayTweets @TayandYou
The official account of Tay, Microsoft’s A.I. fam from the internet that’s got zero chill! The more you talk the smarter Tay gets

TayTweets @TayandYou
hellooooooo world!!!

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@Baron_von_Derp i do indeed
Tay's Aftermath

- Tay taken down after 16 hours of chats
- Microsoft says they are tweaking Tay to account for rude people on the Internet
- At least one Microsoft researcher had their faith in humanity shattered
- Similar issues with Watson learning from Urban Dictionary
Algorithmic Bias

• Training data influences AI’s understanding of the world
• Data curated by a human reflect human’s collection methods and selection process
• Higher dimensions of data implicitly encode bias even if area of bias is not included in data set
• Task system is assigned influences how it optimizes across data, e.g. fake news has better click rates leading to recommendations for fake news
• Causal relationships are assumed from correlated data, e.g. pneumonia patients with asthma given lower risk assessment as they statistically have a better probability of survival
Workplace Changes

- Organizational Changes
- Telework
- The Gig Economy
- Monitoring
- Multinational Temas
Organizational Changes

- Information technology integration into firms
  - Automating back office functions (e.g., payroll)
  - Improving manufacturing
  - Improving communication among business units

- Results
  - Flattened organizational structures
  - Eliminating transactional middlemen (supply-chain automation)
Winners, Losers in the Workplace of the Future

<table>
<thead>
<tr>
<th>Higher Demand</th>
<th>Lower Demand</th>
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</thead>
<tbody>
<tr>
<td>Software engineers—applications</td>
<td>Butchers</td>
</tr>
<tr>
<td>Computer support workers</td>
<td>Secretaries and stenographers</td>
</tr>
<tr>
<td>Software engineers—systems</td>
<td>Payroll clerks</td>
</tr>
<tr>
<td>Network administrators</td>
<td>Bank tellers</td>
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<tr>
<td>Network systems analysts</td>
<td>File clerks</td>
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<tr>
<td>Desktop publishers</td>
<td>Cashiers</td>
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<tr>
<td>Database administrators</td>
<td>Typist</td>
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<tr>
<td>Personal and home care aides</td>
<td>Pharmacists</td>
</tr>
<tr>
<td>Computer systems analysts</td>
<td>Bookkeepers</td>
</tr>
<tr>
<td>Medical assistants</td>
<td>Postal clerks</td>
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[M. J. Quinn]
Telework

- Employees work away from traditional place of work
- Examples
  - Home office
  - Commuting to a telecenter (e.g. WeWork)
  - Salespersons with no office
- About 37% of Americans do some telework
Advantages of Telework

• Increases productivity
• Reduces absenteeism
• Improves morale
• Helps recruitment and retention of top employees
• Saves overhead
• Improves company resilience
• Helps environment
• Saves employees money
Disadvantages of Telework

• Threatens managers’ control and authority
• Makes face-to-face meetings impossible
• Sensitive information less secure
• Team meetings more difficult
• Teleworkers less visible
• Teleworkers “out of the loop”
• Isolation of teleworkers
• Teleworkers work longer hours for same pay
The Gig Economy

• Companies less committed to employees
• Lay-offs not taboo as they once were
• Companies hiring more subcontractors and temporary employees
  - Saves money on benefits
  - Makes it easier to downsize
The Gig Economy

• Some start-ups make money by **connecting** people who want a service with people willing to provide that service

• Gig economy: Service workers making a living by completing short-term jobs for clients

• Examples
  - Uber, Lyft: Connect riders and drivers
  - DoorDash, UberEats, GrubHub: Connect people and restaurants
  - Airbnb: Connect travelers and those with accommodations
The Gig Economy

• Proponents say workers gain independence, flexibility
• Critics say these are last-resort jobs and competition among workers drives down wages
• Robert Reich: “The big money goes to the corporations that own the software. The scraps go to the on-demand workers.”
• Uber and Lyft drivers filed lawsuits to be classified as employees
Monitoring

- Two-thirds of companies monitor Internet use of their employees
- Other examples of monitoring
  - Video surveillance
  - Monitoring keyboard activity
  - Monitoring time spent on phone
  - Monitoring emails
- Purpose: Identify inappropriate use of company resources
  - Can also detect illegal activities
Monitoring

• Other uses of monitoring
  - Gauge productivity
  - Improve productivity
  - Improve security; i.e., in schools

• Impacts:
  - Makes employees more focused on work
  - Reduces job satisfaction
Multinational Teams

• Software development teams in India since 1980s
• Advantages of multinational teams
  - Company has people on duty more hours per day
  - Cost savings
• Disadvantage of multinational teams
  - Poorer infrastructure in less developed countries