

Impact of AI, IT, and Automation on Employment and Politics October 10, 2020 (IEEE Student Chapter)

Hamid R. Arabnia

Professor Emeritus, Computer Science

Editor-in-Chief, The Journal of Supercomputing (Springer)

Editor, Transactions of Computational Science & Computational Intelligence (Springer)

Fellow & Adviser, Center of Excellence in Terrorism, Resilience, Intelligence & Organized Crime Research (CENTRIC)

Senior Adviser, Araware LLC (multi-national)

The University of Georgia

Department of Computer Science

Athens, Georgia 30602-7404, USA

Cell/Mobile: (706) 340-4707

URL: <http://cobweb.cs.uga.edu/~hra/> ; email: hra@uga.edu

Arabnia's PhD Students:

- Soheyla Amirian
- Farid Gharehmohammadi
- Farzan Shenavar Masouleh
- Mehdi Assefi
- Abolfazl Farahani
- Sahar Voghoei
- Mohammadreza Iman
- Saied Safaei

Arabnia's PhD Students (Continued ...)

- Zengyan Wang
- Rodrigo Louzada-Campos
- Fukun Liu

- Graduated PhD Students: **Dr. Alireza Khatamian** (St. Jude's Children's Research Hospital)+ **Dr. David Luper** (Senior Research Director at Apple) + **Dr. Karen Aguar** (Faculty at UGA) + **Prof. Gita Phelps** (GA College & State Univ) + **Prof. Junfeng Qu** (Clayton State Univ.) + Dr. Jiang Lu (FaceBook) + ...

Outline

- Impact of Automation and Technology on Employment
- Trust in AI
- Impact of Technology on Politics

Artificial Intelligence

Computer Science

Machine Learning

Statistics

Mathematics

Cognitive Science

Social Science

Psychology

Data Science

...

Positives:

Manufacturing

Precision Farming

Recommendation
Systems

Robots

Transportation

Medicine

IoT

+ many 1000's of
others

The Dark Side !

- GREAT: Productivity is at record levels !
- GREAT: Innovation has never been faster !
- However, we have a falling median income and we have fewer jobs !!
- Is automation taking our jobs? Or is it merely easing our workload?
- Generational Jobs are disappearing!
- People are falling behind because technology is advancing so fast and our skills and organizations aren't keeping up.

Examples:

- USA: 20% to 28% of Americans do not have any savings!
- Most have enough savings to last 6 weeks.

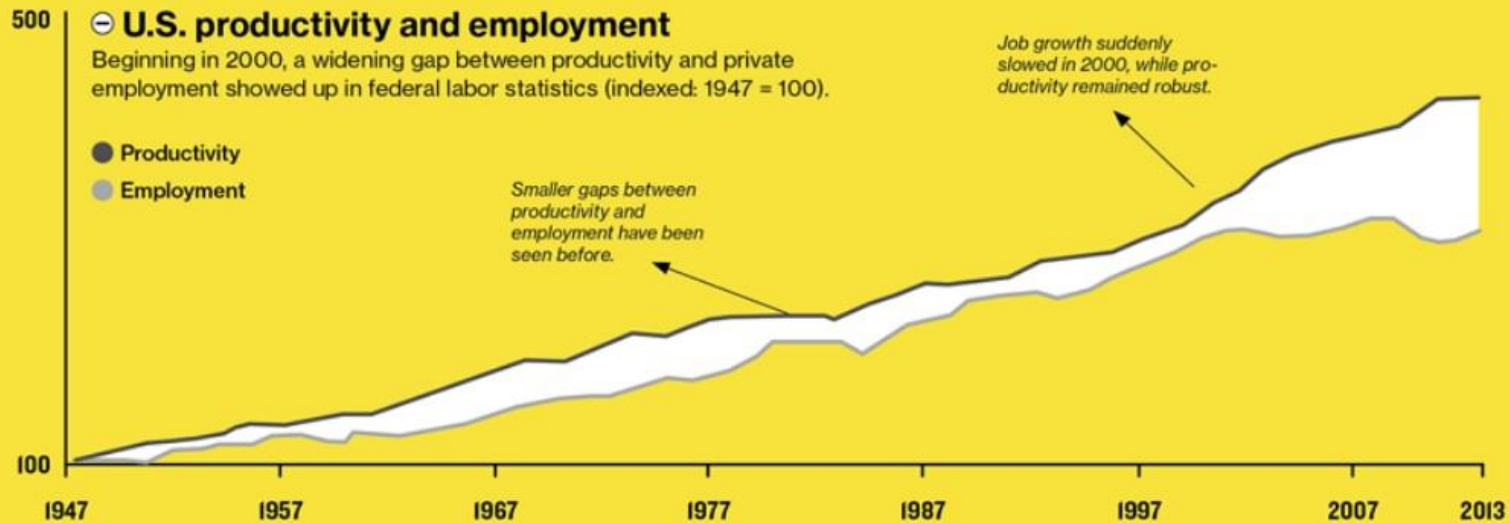
A piece of evidence ?

- Productivity—the amount of economic value created for a given unit of input
- A crucial indicator of growth and wealth creation
- It is a measure of progress

Technology is behind the great decoupling

Decoupling Productivity and Employment

Digital technologies have boosted productivity in the United States without also spurring the expected job growth, argue Erik Brynjolfsson and Andrew McAfee. A result of this decoupling is that while gross domestic product (GDP) has risen, median income has not, and inequality has grown.



Are we facing a future of stagnant income and worsening inequality?

- Automation is reducing the need for people in many jobs.
- Automation behind the sluggish employment growth of the last 10 to 15 years
- Rapid technological change has been destroying jobs faster than it is creating them
- contributing to the stagnation of median income and the growth of inequality in the United States

Examples (in the horizon)

- Generational Jobs (Truck Drivers)
- Printing Factories (more issues in the horizon)
- Small Factories
- Education – Universities (due to online classes)
- ...

Is this a new trend ?

- Since the Industrial Revolution began in the 1700s, improvements in technology have changed the nature of work.
- In 1900, 41 percent of Americans worked in agriculture; by 2000, it was only 2 percent.
- The proportion of Americans employed in manufacturing has dropped from 30 percent in the post–World War II years to around 10 percent today (due to automation)

Blue-collar jobs are Destroyed !

- Web, artificial intelligence, big data, and improved analytics—all made possible by the ever increasing availability of cheap computing power and storage capacity
- Automation is overtaking routine tasks
- Jobs, such as many in the post office and in customer service, have disappeared

Work Activity Categories

Work Activity Category	Time Spent Across All Occupations	Automation Potential
Managing and developing people	7%	9%
Applying expertise to decision making, planning, and creative tasks	14%	18%
Interfacing with stakeholders	16%	20%
Performing physical activities and operating machinery in unpredictable environments	12%	26%
Collecting data	17%	64%
Processing data	16%	69%
Performing physical activities and operating machinery in predictable environments	18%	81%

Source: McKinsey Global Institute

Where are the Jobs Going ?

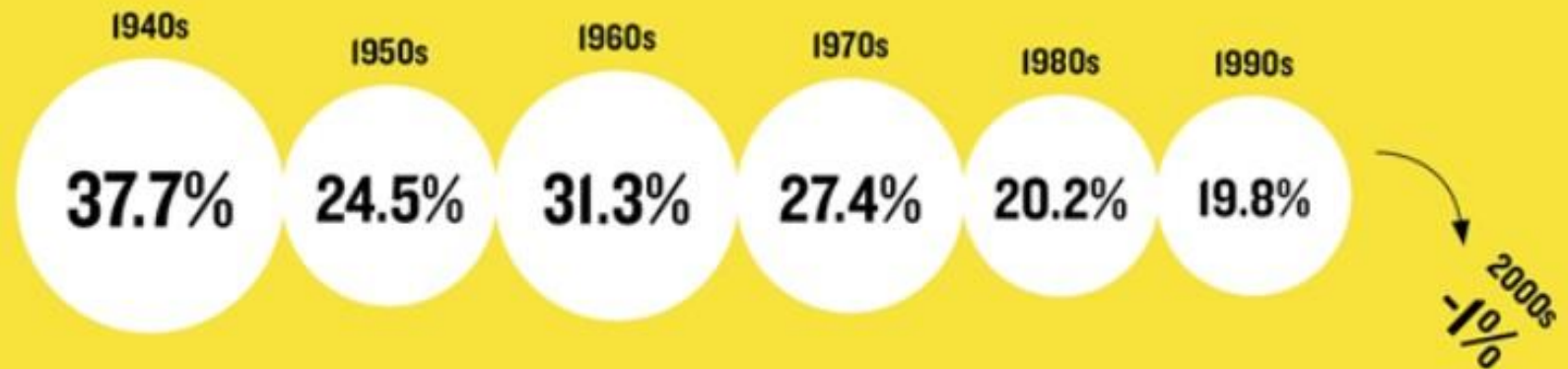
- Digital technologies are holding down job creation
- Jobs now requiring creativity and problem-solving skills, often aided by computers
- Such changes can be painful for workers whose skills no longer match the needs of employers
- People have always been able to create new jobs. People will come up with new things to do ?

Where the Jobs Are Going

There is plenty of evidence that technological advances are affecting what jobs are in demand. High-skill positions that often take advantage of computers are growing, as are low-skill jobs doing work, such as home health care, that is difficult to automate. Many mid-skill jobs, however, are disappearing.

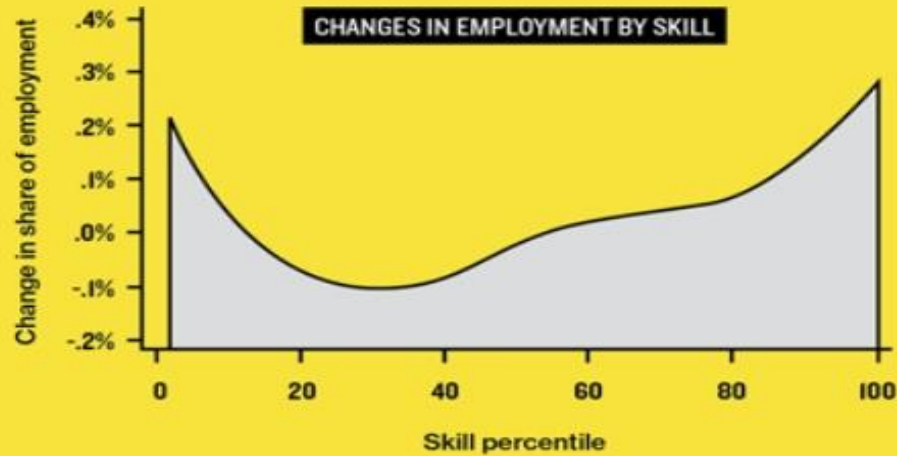
⊖ U.S. job growth by decade

The percentage change in nonfarm employment through the last seven decades illustrates just how dismal job prospects have been since 2000.



⊖ Following out the middle

Research by MIT economist David Autor shows that between 1980 and 2005, the middle class suffered both in share of jobs and in wage growth. The top chart shows share of employment held by workers of different skill levels; the bottom shows changes in wages.



⊖ The mix of jobs

The fastest-growing jobs in the U.S. from 2000 to 2010 reflect the demand for highly technical skills and those lower-skill jobs that are hard to automate. Highly routine jobs are especially vulnerable to automation.



FASTEST-GROWING JOBS

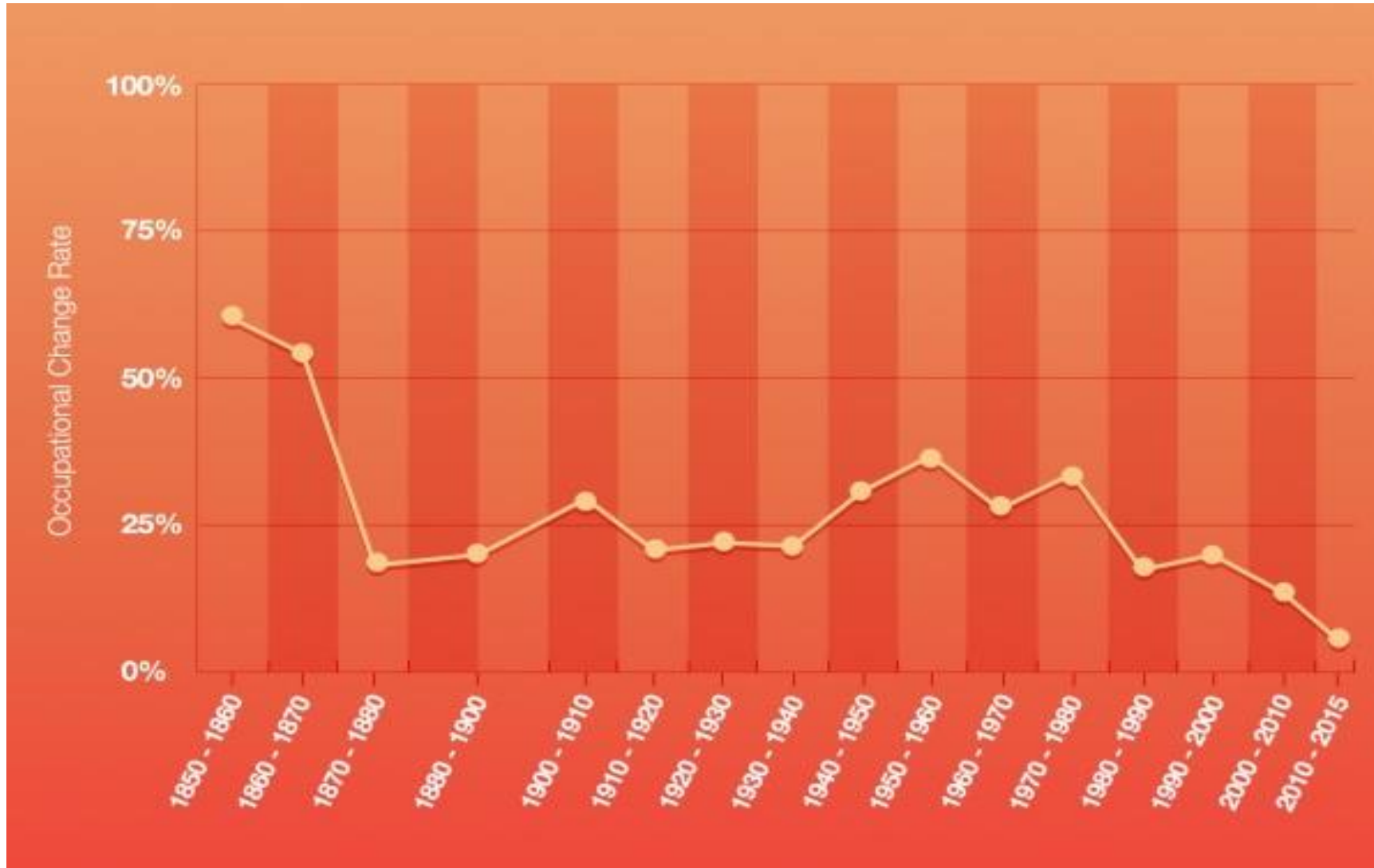
- 1 Software engineers-applications
- 2 Computer support workers
- 3 Software engineers-systems
- 4 Network administrators
- 5 Network systems analysts
- 6 Desktop publishers
- 7 Database administrators
- 8 Personal and home care aides
- 9 Computer systems analysts
- 10 Medical assistants



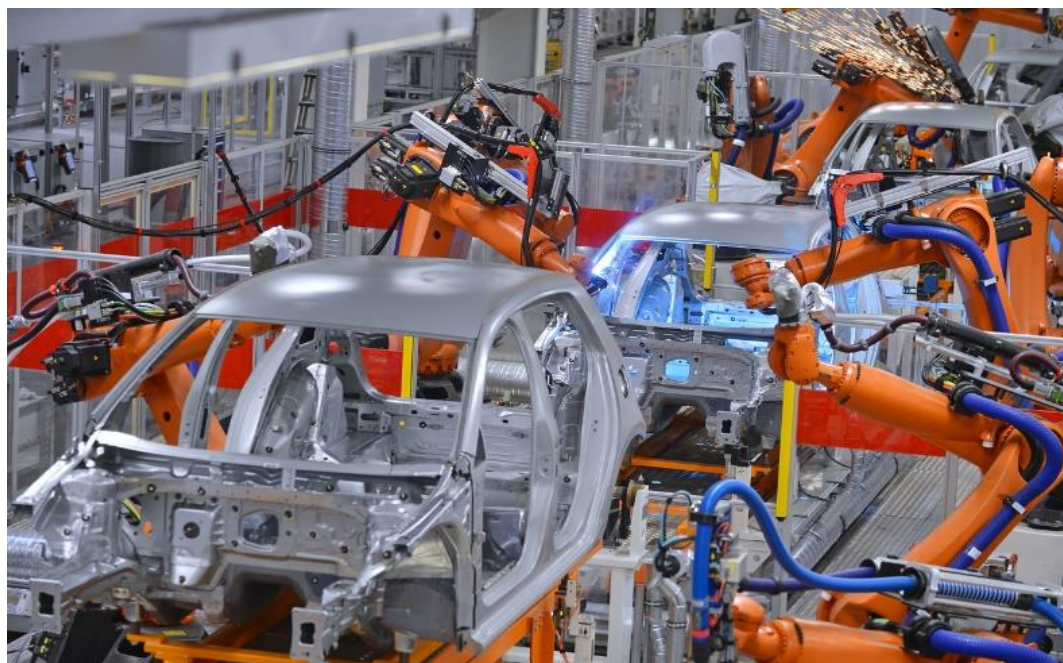
VULNERABLE JOBS?

- 1 Butchers
- 2 Secretaries and stenographers
- 3 Payroll clerks
- 4 Bank tellers
- 5 File clerks
- 6 Cashiers
- 7 Typists
- 8 Pharmacists
- 9 Bookkeepers
- 10 Postal clerks

Occupation Change Rate (ITIF Study)



Automotive Industry



KIVA Robots (Amazon)

- Fetching racks of ordered goods and delivering the products to humans who package the orders with endless energy
- A warehouse equipped with Kiva robots can handle up to four times as many orders as a similar un-automated warehouse
- Before KIVA, Workers might spend as much as 70 percent of their time walking about to retrieve goods

KIVA Robots



Waymo , Amazon Drone



Dr. Watson

- A computer system best known for beating human champions on the game show *Jeopardy!* in 2011.
- testing new generations of Watson to help physicians **diagnose diseases, evaluate patients, and prescribe treatments.**
- Offering Patients specific advice on even **technical and complex questions.**





Government Tax Revenues Shortfalls

Bill Gates and Elon Musk Opinion

- Gates believes the government should tax robots as they tax human workers, and “even slow down the speed” of incorporating robots into the workforce
- Musk predicts automation will lead to mass unemployment. The government would need to establish a universal income to maintain social and economic stability.

Trust in AI

Amazon recruiting tool Doesn't like women !!

- Amazon tried to build a tool that used artificial intelligence to rate the best job candidates
- System trained on the previous 10 years of resumes sent to Amazon, which were mostly men
- The algorithmic system went so far as to penalize the word “women” on a resume, as in a women’s club or sport, and downgraded all-women’s colleges as less preferable

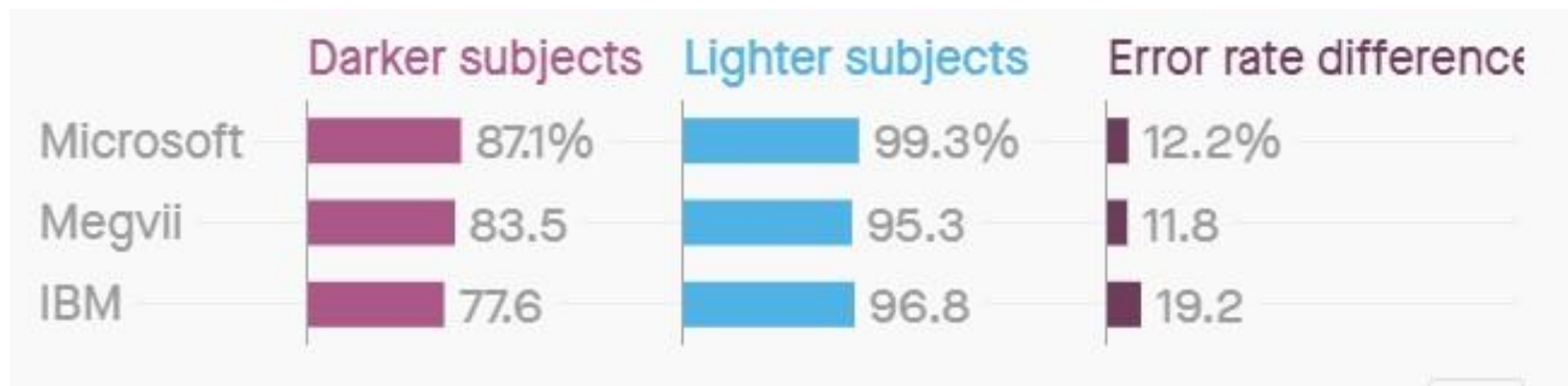
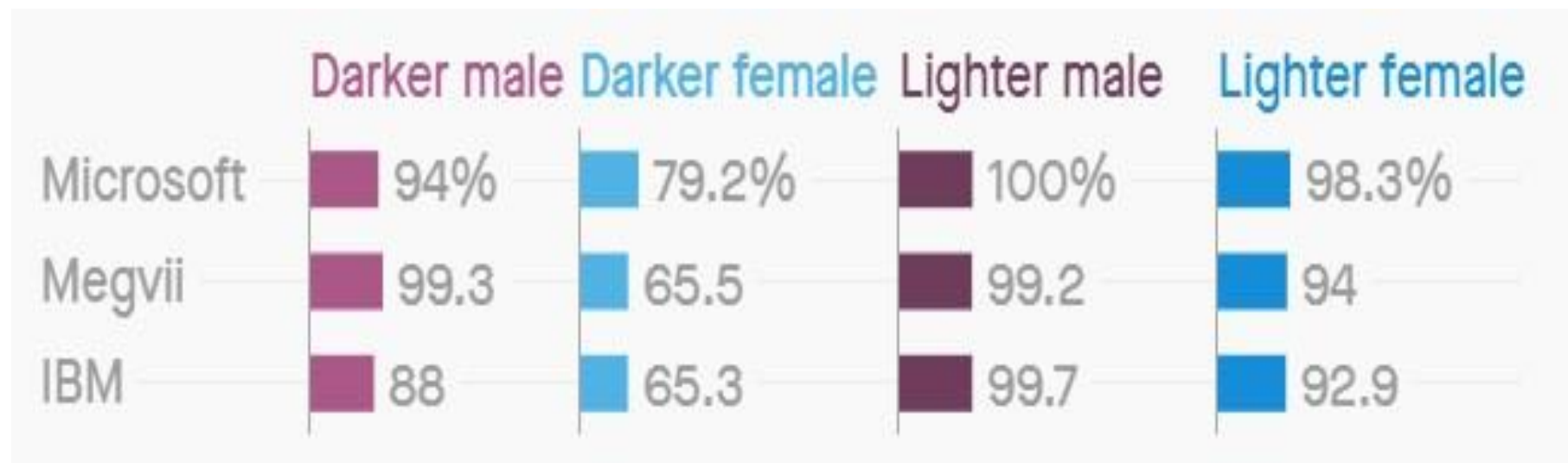
Digital eyes in L.A are racist !

- In 16 “undisclosed locations” across northern Los Angeles, digital eyes watch the public
- These aren’t ordinary police-surveillance cameras; these cameras are looking at your *face* using facial-recognition software
- Facial-recognition systems are more likely either to misidentify or fail to identify African Americans than other races , errors that could result in innocent citizens being marked as suspects in crimes

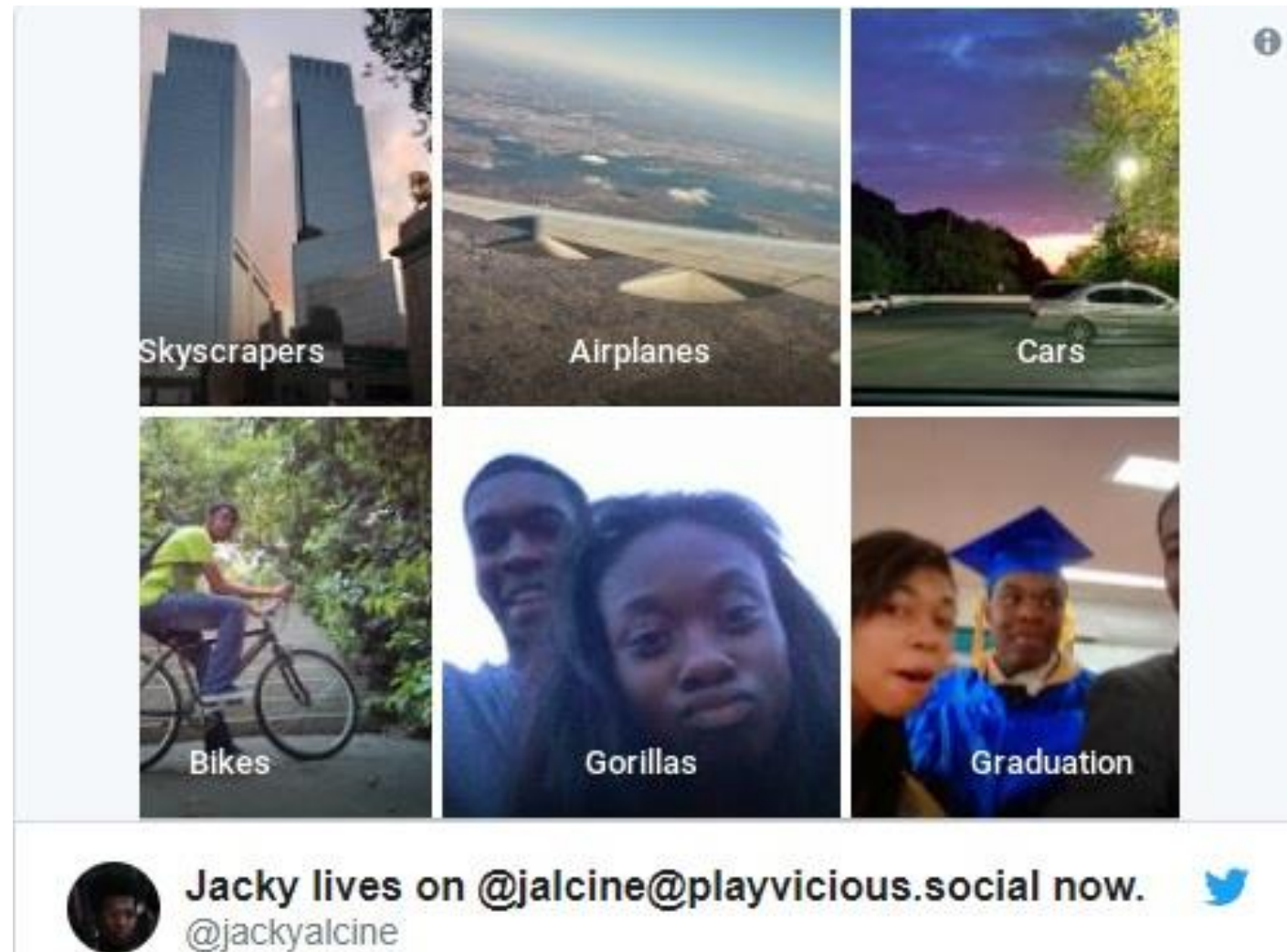
If you're a darker-skinned woman, this is how often facial-recognition software decides you're a man



MIT Media Lab and Microsoft research study



Google engineer apologizes after Photos app tags two people as gorillas



Google should not be in the business of war !

- Its main focuses for AI research are to be “socially beneficial”.
- That means avoiding unfair bias, remaining accountable to humans and subject to human control, upholding “high standards of scientific excellence and incorporating privacy safeguards.
- Weaponizing Software? Is this true? (eg: tik tok, Google, ...)

Impact of Technology on Politics

Why are people so angry?

Why do people vote against their own interests in advanced democracies?

Why do people believe fakeness?

2016 U.S Elections

- Millions of Facebook profiles of US voters were harvested
- Personal information taken by Cambridge Analytica without authorization in early 2014 to build a system that could profile individual US voters
- Their goal was to target people with personalized political advertisements.

Russian Inference in 2016 elections

- Russian Government directed recent hacking of emails
- Russian Military Intelligence Services (GRU) had hacked the servers of the Democratic national committee and personal Google email account of Clinton campaign chairman
- Russia also interfered in the elections by disseminating fake news promoted on social media

Should Politicians be Afraid ? (Deep Fake)



Why Do People Believe Outrageous Lies?

They are angry

Receptive to manipulation

They wish to be disruptive

A Simple Example:

01

Prepare a
document with
deceptive/fake
news

02

Use NLP/Linguistic
technologies to
create 1000's of
different versions

03

Launch on the
internet



Hilary Clinton – A Case Study

- The PizzaGate
 - Involved an outrageous fake news
 - Penetrated into social networks
 - Received high Google Ranking
 - Many people believed it!!!!

Internet Censorship in China

- block access to selected foreign websites and to slow down cross-border internet traffic
- limiting access to foreign information sources (pros and cons)

Questions ?