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STANISLAUS

December 20, 2017

Mr. Pedro Nava
Chairman
Little Hoover Commission
925 L Street, Suite 805
Sacramento, California 95814

Dear Mr. Nava:

Thank you for informing me and the California State University of the Little Hoover Commission's project on artificial intelligence. In turn, I have informed the 23 CSU campus presidents of your work.

In the New Year I will be in touch, as you invite, with ideas on recommendations, research and/or experts.

Sincerely,

Timothy P. White
Chancellor

401 GOLDEN SHORE • LONG BEACH, CALIFORNIA 90802-4210 • (562) 951-4700 • Fax (562) 951-4986

State of California

925 L Street, Suite 805
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December 13, 2017

The Honorable Timothy White
Chancellor, California State University Office of the Chancellor
401 Golden Shore,
Long Beach, CA 90802

Dear Chancellor White,

The Little Hoover Commission is an independent and bipartisan California state agency charged with making recommendations to the Governor and the Legislature on ways to improve the efficiency and effectiveness of state programs. For its next study, the Commission is investigating the impacts of artificial intelligence in California and the possible ways California state government can play a role in the development and deployment of artificial intelligence.

Created in 1962, the Little Hoover Commission convenes public hearings, empanels expert advisory committees, conducts research and makes site visits to understand public issues and potential solutions. It deliberates on alternatives, provides detailed evaluations and offers recommendations to policymakers through a bipartisan process. In addition, the Commission actively supports legislation that would implement a Commission recommendation.

The purpose of this informational letter is to provide notice of the Commission's upcoming project on artificial intelligence. While there is no singular definition, the Commission is planning to approach artificial intelligence as a broad set of technologies that can be used to approximate some aspect of human intelligence or behavior.

For this study, the Commission will consider the key challenges of artificial intelligence, its economic implications for the state and how it can be used to solve societal ills. Through its public process, the Commission will review issues such as justice, equity, safety and privacy. The project will consider recent studies on workforce impacts, which could include both job creation and job displacement. Possible mitigations and worker protections will be discussed as will examples of efforts to plan and prepare for innovations and labor transformations.

Throughout its study, the Commission will consider state government's potential policy or regulatory role.

The Commission has scheduled a public hearing on Thursday, January 25, 2018, at 9:30 a.m. in Room 437 of the State Capitol. The Commission likely will hold additional hearings on this topic and may also decide to hold advisory meetings or other opportunities for public input.

The Commission's goal is to deliver a high-quality report that will be of the greatest value to executive branch and legislative policymakers, as well as to the general public. Please feel free

to provide recommendations that you or your staff may have on this topic, as well as any pertinent research or experts.

Please note that this letter is not a request to testify at the Commission's hearing; Commission staff will contact potential witnesses directly. If you have any information you would like to share with the Commission or have any questions, please contact Terri Hardy, deputy executive director, or Imran Majid, research analyst. They can be reached by phone at (916) 445-2125 or by email at terri.hardy@lhc.ca.gov and imran.majid@lhc.ca.gov.

Sincerely,

Pedro Nava
Chairman

Cal State Fullerton
Follow-up Contact at Fullerton: Chief of Staff to the President, Danielle Garcia:
daniellegarcia@Fullerton.edu ; (657)278-4626

Cal State Fullerton's College of Engineering and Computer Science is home to four faculty members whose research interests include artificial intelligence, and who are available to confer with the commission. They include:

Dr. John Clymer
Professor of Electrical Engineering, Emeritus
657-278-3708 – office
657-278-3013 – department
jclymer@fullerton.edu

Dr. Paul Salvador B. Inventado
Assistant Professor of Computer Science
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657-278-3700 – department
pinventado@fullerton.edu

Dr. Anand V. Panangadan
Assistant Professor of Computer Science
657-278-3998 – office
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Dr. Deepak Sharma
Assistant Professor of Civil and Environmental Engineering
657-278-3450 – office
657-278-3012 – department
dsharma@fullerton.edu

Additional information on their areas of expertise can be found: http://experts.fullerton.edu/

In addition, Dr. Mikhail Gofman, associate professor of Computer Science and director of Cal State Fullerton's Center for Cybersecurity, provided the attached statement, which describes the economic, national security and social benefits of developing a strong education program in the emerging field of biometrics:

Statement on Artificial Intelligence
California State University, Fullerton
January 19, 2018

Submitted by:
Dr. Mikhail Goffman
Associate Professor of Computer Science and Director for the CSUF Center for Cybersecurity
mgofman@fullerton.edu
657-278-7304

Biometrics is the science of identifying people based on their physical and behavioral traits, such as face, voice, and fingerprints. It is among the most important applications of machine learning and artificial intelligence that plays critical roles in consumer electronics, IoT, enterprise, military and homeland security applications.

Education in this area is critical for both STEM professionals as well as the general citizenry, who must understand the advantages and consequences of deploying and using biometric technologies. Yet the topic of biometrics is under-covered in the curricula of most universities. College courses either skip over the topic completely or provide a very short high-level introduction. Thus, an opportunity is lost to develop talent in the area where it is needed, and students are less likely to be able to take advantage of the emerging biometrics job market. Therefore, we strongly urge lawmakers to introduce and sponsor legislation to support the development of biometric programs, ranging from undergraduate and graduate courses to certification programs for working professionals.

At Cal State Fullerton, we are currently laying the foundation for addressing this gap by developing a biometrics certification program for working STEM professionals and recent college graduates. This is the first step in creating a program that we hope can be deployed statewide. In the Orange County region of Southern California, nationally recognized companies Raytheon, Boeing and NextGate are actively involved in the development of biometric technologies. These companies would benefit from a certificate program that would empower their employees with hands-on expertise in biometrics. Further, this program will complement the degrees of recent college graduates and make them stronger candidates for the workforce, providing advanced training in cybersecurity with a focus in biometrics.

Our program will actively recruit individuals from historically underrepresented populations, including African-American and Hispanic students. Cal State Fullerton is well positioned to carry this out, as the only four-year public university in Orange County designated as a Hispanic-Serving Institution.

Ultimately, this certification program will facilitate targeted biometric training and education for the adoption of advanced technologies in the workforce. Further, it will facilitate the narrowing of the STEM employment disparity gap; although data show that schools are graduating more and more STEM majors, the workplace diversity gap has not seen significant improvement during the last decade. Providing underrepresented students with an in-demand skill in the key field of artificial intelligence will help them enter the workplace and help narrow the gap.

California State Polytechnic University, Pomona

Follow-up Contact at Pomona: Chief of Staff to the President, Anita Jessup: arjessup@cpp.edu; (909)869-3214

THE IMPACT OF AI IN CALIFORNIA

Comments from Cal Poly Pomona to the request of the Little Hoover Commission

Date*:* January 15, 2018

    Erik Rolland, Ph.D.

    Dean and Professor

    College of Business Administration

    California State Polytechnic University, Pomona

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    Pomona, CA 91768

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1. Introduction and Scope

The Most Impactful Change in Human Industrial History

There is no doubt that we currently find ourselves in a transformative state where technological innovations will fundamentally alter the way we live, work, and interact. One can also argue that the scope and scale of our current transformation will be very different from prior human experiences. And while we do not have clarity on exactly how this transformation will impact us, we are aware that a broad response in terms of planning for the future of California is needed now. While the current transformation is not the first in modern, industrial, human history, it is bound to be the most impactful to date.

The Four Industrial Revolutions

From a historical perspective, the first industrial revolution (1760-1840) introduced and specialized mechanized production. The second (1870-1914) created infrastructure (electric, rail, water, telegraph, sewage, etc.) to enable mass production through electrification. The third industrial revolution is more recent (1950s until early 2000s) and was spurred by a digitization of manufacturing, using information technology and robotics to automate production. Currently we find ourselves at the beginning of the fourth industrial revolution, where technologies are blurring the lines between the physical, digital, and biological systems, and where human and machine intelligence are independently contributing to both unskilled and skilled labor tasks, threatening to replace the human in many cases.

Scope

The fourth industrial revolution is bringing with it both deep and broad impact on society and work, and it is delivering change at a much faster pace than what we previously could imagine. In this report, we highlight some of the areas of impact, and summarize recommended actions that will help the State of California remain a global societal and economic leader through this next cycle of change.

2. Labor Transformation, Economic Impact, and Key Challenges

Labor Transformation

Since the 1940s, the US has seen an increase in requirements for the "entry level" job, where first a high-school diploma was needed, and where currently a bachelor's degree is becoming the low-end requirement. This has caused a shift in educational systems, but one for which the State of California was well-prepared due to the Master Plan for Higher Education (1960). This labor shift resulted in higher wages, and a better prepared/educated workforce. The next shift in educational requirements for the California labor force should build on our existing systems infrastructure, but will need considerable upgrades in ways that may be antithetical to common educational practices.

We will continue to experience increased automation where it makes economic sense, in parallel to what we have seen with robotization of production factories. That is, areas where autonomous machinery are as good as (or better than) the humans, and operate at a lower cost, autonomous machinery will eventually dominate. This holds not only in areas like autonomous cars, but also across unskilled and highly skilled professions (for example, in many areas of accounting, law, and even medicine).

Economic Implications

The economic impact from artificial intelligence (AI) will be derived from two major sources: labor force productivity improvements, and new value creation activities. In a recent report by [Accenture and Frontier Economics](#) (Mark Purdy, 2017), national economic growth rates doubles (on average) by changing the nature of work and creating new relationships between people and machines by the year 2035 (from 2.6% to 4.6% for the US, Figure 1). This growth is due primarily to labor force productivity improvements. Along with pure productivity and quality increases, the social impact will be uneven, in the sense that higher-income consumers are more likely to deploy AI-based technologies (Advertising Week, 2018)

With the popularity of mobile devices of all kinds, and the increased use of Internet of Things (devices that collect, process, communicate data, and when appropriate perform an autonomous task), *the data itself becomes the key source of value creation and economic growth* (The Economist, 2017). In turn, that means that resources will be controlled by those who understand the data that they hold. This results in an increasing economic importance of data and knowledge (as opposed to natural or physical resources). This will reshape economies, and continue the shift further away from tangible resource values (such as production facilities) towards intangible resources (derived from data and information-related products and services).
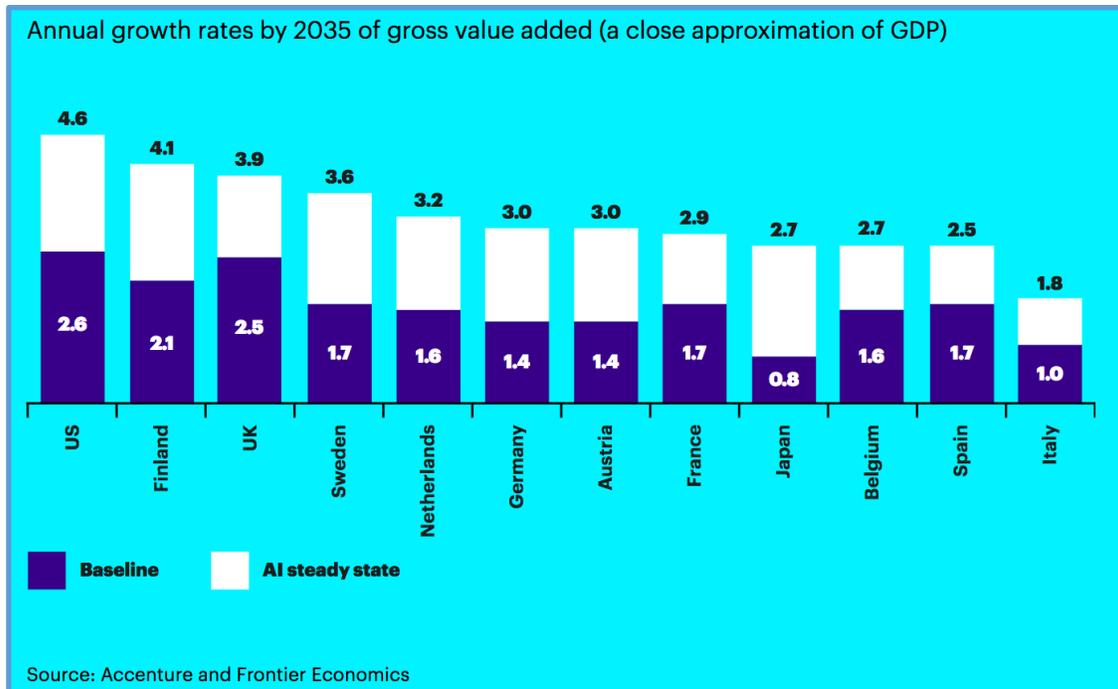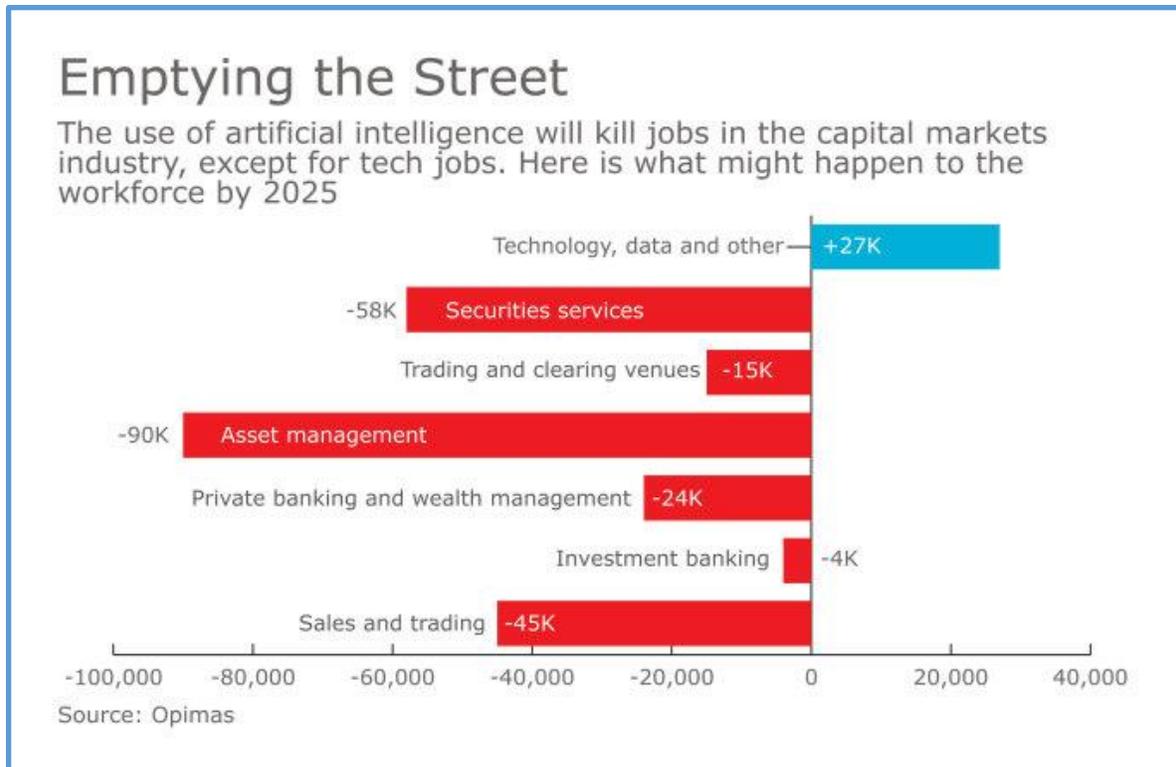
Annual growth rates by 2035 of gross value added (a close approximation of GDP)

Country	Baseline	AI steady state (total)
US	2.6	4.6
Finland	2.1	4.1
UK	2.5	3.9
Sweden	1.7	3.6
Netherlands	1.6	3.2
Germany	1.4	3.0
Austria	1.4	3.0
France	1.7	2.9
Japan	0.8	2.7
Belgium	1.6	2.7
Spain	1.7	2.5
Italy	1.0	1.8

Source: Accenture and Frontier Economics

Figure 1. Growth Rates of Nations by 2035 (Baseline & AI)

3. Societal Challenges

Labor

One of the major impacts on labor from AI is the diminishing availability of entry-level jobs (TechRepublic, 2016). One surprising aspect of this impact is that entry level jobs at many levels, including highly skilled levels, may diminish. For example, in financial services, the number of skilled labor jobs in asset management is expected to shrink by 90,000 (Crossman, 2017) (Figure 2). Similar predictions have been made for other highly skilled jobs, particularly those that are based on established rule-based decision-making (many accountants, lawyers, and physicians would be in this category). However, arguments are clearly in favor of machine intelligence and human intelligence working together in new ways to accomplish things that we currently cannot do (Ovaska-Few, 2017). On the positive side, we would expect new job-creation that will allow for improved human participation in work.

Emptying the Street

The use of artificial intelligence will kill jobs in the capital markets industry, except for tech jobs. Here is what might happen to the workforce by 2025

- Technology, data and other — +27K
- Securities services — -58K
- Trading and clearing venues — -15K
- Asset management — -90K
- Private banking and wealth management — -24K
- Investment banking — -4K
- Sales and trading — -45K

Source: Opimas

Figure 2. The impact of AI on Financial Services

Privacy and Safety

The increase in data collection, aggregation, process, and sharing will bring with it new challenges. Legal and regulatory frameworks will have to be updated quickly. Also, one would expect price discrimination to become common and, therefore, new regulation must be put in place to safeguard the consumer. Additionally, we will experience many consumer related issues related to AI automated functions, across various fields such as robotics, finance, health-care, transportation, and cyber-security.

Equity, Justice and Innovation

Traditional employment relationships will likely follow the current trend: that is, we will see an increased participation in the "gig economy" (i.e., independent workers engaged in temporary positions and short-term assignments). Thus, we expect to see a loss of social safety nets due to deterioration of traditional employment relationships. Those safety nets include major benefits such as healthcare and retirement, and may further contribute to the wealth gap. The economy of California depends heavily on innovation and entrepreneurial activity. Innovative activities are resource intensive, and have uncertain outcomes. Research has found that social safety nets provide an insurance against negative outcomes (Ashraf, 2014). The resulting sense of security allows entrepreneurs the freedom to continue their innovative activities, and also invites others to join in. From increased activities related to innovation, we also expect higher economic growth.

In addition, with the increasing dependency (and power) of data, there is a high probability for development of winner-take-all markets, where a single entity controls an entire industry (examples: Google, Uber, Amazon, Rocket Mortgage, Quicken), and thus regulations must be modernized to help equalize such markets.

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4. Recommended Actions

There is a real need for structural, regulatory, and policy changes across the State of California in preparation for the fourth industrial revolution. Based on the challenges outlined above, we propose the following broad initiatives:

Create Social Safety Nets that Enable Innovation and Labor Market Expansion

Prepare for the creation of social and health safety-nets to enable people to participate in the current labor market. This not only increases innovation activities, but also lessons the threshold for new job creation (as people have a basic safety-net offered by the state).

Invest in STEAM, Ethics, and Educational Agility

Innovation, including technology innovation, requires diverse skillsets. Continue to build educational programs that focus on the STEAM fields (science, technology, engineering, arts, and mathematics). California needs both technical and creative talent in order to continue its broad leadership in innovation!

The ethical challenges associated with AI and the blending of physical, digital, and biological systems will pose increasing ethical challenges for our society. Invest in ethics education starting at the earliest possible level of elementary education.

Create incentives for the State's institutions of higher learning to become change leaders, and to create highly agile educational organizations and programs that can quickly adapt to future needs.

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Mark Purdy, P. D. (2017). *How AI Boosts Industry Profits and Innovation.* Accenture & Frontier Economics. Accenture & Frontier Economics.

Ovaska-Few, S. (2017, October 10). How artificial intelligence is changing accounting. *Journal of Accountancy*.

TechRepublic. (2016, 5). AI will destroy entry-level jobs - but lead to a basic income for all. *TechRepublic, May 5*.

The Economist. (2017, May 6). The world's most valuable resource is no longer oil, but data. *The Economist*.

For a comprehensive library of curated articles related to this report, see Rolland, E. and Patterson, R., The Future of Work, FlipBoard, https://flipboard.com/@erikrolland2015/the-future-of-work-ren53dray

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California State Polytechnic University, San Luis Obispo

Follow-up Contact at SLO: Chief of Staff to the President, Jessica Darin darin@calpoly.edu; (805)756-6002

Thoughts from:

      Patrick Lin, Ph.D.
      Director, Ethics + Emerging Sciences Group
      California Polytechnic State University College of Liberal Arts
      Philosophy Department
      San Luis Obispo, CA 93407
      [p] 805.570.5651
      [e] palin@calpoly.edu
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In the Philosophy Department Faculty have not yet focused much on this particular subject; their work is more focused on AI ethics and risk, as well as on robot ethics more broadly. But we are familiar with the general issues, some of which we describe below. If I were to design a study on the subject, it might have three phases—(1) fact-finding and forecasting of impacts; (2) analysis of ethics/risk; and (3) design and evaluation of actionable proposals—as follows, with representative questions but not limited to only these:

1.   DISCOVERY: IMPACT OF AI

     A. What are the critical social problems with which AI can help? For instance, AI could help predict which pregnant women and kids may be at risk for serious medical conditions, hunger, etc.

     B. What are the critical social issues that AI can make worse? For instance, combined with large datasets, AI could potentially de-anonymize information and erode privacy. It could, for instance, enable employers to discover private medical information gleaned from other activities, or enable other kinds of discrimination against traditionally disadvantaged communities.

     C. What are the different impacts AI may have on key industries in California, e.g., transportation and agriculture? This can go beyond loss of jobs but also gains in other areas, e.g., increased demand for leisure travel and entertainment, including new forms of entertainment.

2.   ANALYSIS: JUSTICE AND RISK

     A. How do we best ensure an equitable, fair distribution of the benefits and risks of AI? (This doesn't mean strict equality.) Most of the gains of AI are already accumulating to the best-off sectors of society, which could stifle innovation and competition.

     B. What are the different ways AI decisions can be biased—for instance, in determining criminal sentencing, employer hiring, and bank lending decisions—and how can we address that as a potential source of injustice?

     C. What are the different ways that AI decisions are actually judgment calls—neither clearly right or wrong, but somewhere in between—and how can we address that as a potential source of liability and risk?

     D. What are the key jobs for which human accountability is and should remain critical? For instance, there may be good reasons to not automate the decisions of judges and police officers; but what about teachers, doctors, and caregivers? Even in jobs that remain in control of humans, how much autonomy and authority should AI assistants have?

E. How trustworthy must AI be in various roles? We have a good idea of what trust and trustworthiness means in human relationships, but what do they mean in the context of AI, especially given the "black box problem" of in transparency (whereas people can at least offer explanations, even though we can't see inside their heads)?

3.	ACTION: EDUCATION AND ECONOMICS

A. Inasmuch as experts point to the humanities as the last human advantage over AI—as AI seems to be less creative or flexible than people—what does that mean for future educational priorities?
B. As AI is increasingly able to write its own code and make scientific discoveries—encroaching on even STEM workers—what does that mean for future educational priorities?
C. Retraining and shifting to "higher value" jobs is the standard answer to economic disruption; but how plausible is that if AI is massively disruptive? And how would that work? For instance, there are more than 130,000 truck drivers in California (according to the Bureau of Labor and Statistics), and we can't expect that enough of them can be retrained to become programmers.
D. If retraining is needed, who bears the responsibility for funding this? Should it be society's safety net, already stretched thin and under attack; or should it be the companies whose inventions have helped make hundreds of thousands of jobs obsolete?
E. How feasible are Universal Basic Income schemes or, less radically, stronger social safety nets? How feasible is UBI if it's a California-only policy and not a federal program, i.e., given unrestricted immigration from other states?
F. How feasible are the various tax proposals on AI, to help distribute benefits? For instance, AI as software can be based or run from anywhere geographically; so if AI operations are taxed, they may move out of state. Robotics, as AI plus hardware, are harder to move out of state, though. California obviously has natural incentives for people and companies to remain in-state; can these be promoted to counterbalance any incentive to avoid taxes by leaving the state?

For more information, several excellent reports have been drafted in the last couple years, engaging economic issues and others. These include:

•	AI100 report: http://ai100.stanford.edu/2016-report
•	White House (Obama admin.) OSTP report: http://obamawhitehouse.archives.gov/blog/2016/12/20/artificial-intelligence-automation-and-economy (see inside for link to earlier, more general report on AI)
•	IEEE report on ethics and autonomous systems: http://standards.ieee.org/develop/indconn/ec/autonomous_systems.html

Here in the Ethics + Emerging Sciences Group, we're internationally known for our work in AI and robot ethics. With my colleagues in the Philosophy Department—Ryan Jenkins and Keith Abney (who have both given input into this letter)—we've done much work in the field. This includes organizing expert meetings in Geneva, Annapolis, Reykjavik, Palo Alto, San Francisco, and other key cities. We've published two influential edited volumes: Robot Ethics (MIT Press, 2012) and Robot Ethics 2.0 (Oxford Univ. Press, 2017). Currently, I'm on the standing committee for the 100 Year Study on AI (based at Stanford) and on the World Economic Forum's Global Future Council for AI and Robotics. Dr. Ryan Jenkins is co-chair of IEEE's Technical Committee on Robot Ethics and is a PI on a new NSF grant on autonomous vehicles and ethics, among several other funded projects we've had previously, e.g., from NSF, Office of Naval Research, and others.

If the Little Hoover Commission is looking to engage experts, feel free to point them to our Cal Poly biosketches for more information on our background and expertise: Patrick Lin and Ryan Jenkins.

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San Jose State University

Follow-up Contact at San Jose: Chief of Staff to the President, Jaye Bailey: jaye.bailey@sjsu.edu; (408)924-1177

Very encouraged to see this forward-looking focus on AI for the State of California. I agree with the Little Hoover Commission that the social and economic impacts of AI will have a significant effect on our students, faculty, and staff. A few additional thoughts below.

· Universities and colleges are not producing enough data scientists that can keep pace with the growth of AI. The speed at which data scientists graduate doesn't begin to come within reach of the growth rate we see. This gives us the opportunity to put our CSU students at the forefront of this technology.

· Another significant opportunity for us is to expand AI knowledge beyond the data scientist and drive that knowledge into many of our disciplines. Data scientists intensely focus on AI technology itself, but they are not subject matter experts in business or social challenges. We should think about creating a supporting ecosystem around AI that brings knowledge to everyone that will be part of building solutions. For example, you can have product managers, doctors, social workers, designers, engineers, project managers, etc. who have both the subject matter expertise and foundational AI knowledge that will allow organizations to create comprehensive solutions.

Some additional thoughts given SJSU's specific location in the Silicon Valley

· Accelerating rate of investments and demand for AI technologies from start-ups to Fortune 500 companies here in Silicon Valley. AI is already a very disruptive technology across our society and all industry sectors. It will have the same broad-ranging impact on society as the Industrial Revolution, and the Digital Revolution had. Thousands of companies already use AI, but the most significant opportunities have not been tapped yet. This is an excellent time to think about how we will be key partners in the evaluation of AI.

· Public/private partnerships creating AI incubators on university campuses. We will use our faculty and staff as advisors and consultants. Students will get hands-on experience and work with the latest technologies, helping create a talented labor pool for next-generation workforce solutions

· Focus on Open Source solutions for AI, where groups share their developments in a collaborative public manner creating solutions. This generates an increasingly more diverse scope of design than any one organization is capable of developing, sustaining, and supporting long term. This is the best way to combine the talents within and outside California to drive quick change at much lower cost. In addition, AI open source solutions level the playing field for anybody interested in creating and improving on this technology space.

Lastly, These AI technologies will be very disruptive, and they will require enterprise-level investments for the University. We should also think about how California will fund the investment necessary for this effort.

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California State University, Sacramento

Follow-up Contact at Sac State: Chief Communications Officer to the President, Cely Smart: cely.smart@csus.edu; (916)278-7737

The Department of Computer Science at Sacramento State regularly offers the following three courses in field of Artificial Intelligence (IA), per Lorenzo M. Smith, Ph.D., Dean, College of Engineering and Computer Science:
•   CSC 180 Intelligent Systems (undergraduate level)
•   CSC 215 Artificial Intelligence (graduate level)
•   CSC 219 Machine Learning (graduate level)

Artificial Intelligence, including Deep Learning, is more firmly than ever underpinning technology advances in all fields of engineering. Advances in AI and advances in its peripherally related fields of software engineering, data base management, data science, cloud computing, mobile computing and networking play a major role in opening new frontiers for technology development in the fields of engineering and construction management. This is manifested in the explosion of innovative engineering products, structures, and systems including, Smart Bridges, Smart Homes, Robotic Food Harvesting, Robotic Surgery, Autonomous Vehicles, and Smart Factories. The emergence of these innovations is now requiring our college to re-examine our curriculum with an increased sense of urgency, not just for Computer Science, but for Construction Management and Engineering as well – in large part because of rapid technological advances in AI and its related fields.

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California State University, Chico

Follow-up Contact at Chico: Special Assistant to the President, Lori Miller llmiller@csuchico.edu; (530)898-4073

Thank you for the opportunity to share research and potential resources for the Little Hoover Commission's project on artificial intelligence. Two faculty with expertise in AI:

Patrick J. Donnelly, assistant professor, Computer Science; pjdonnelly@csuchico.edu .
Dr. Donnelly focused on supervised machine learning as part of the Numerical Intelligent Systems Lab at Montana State. Prior to joining Chico in 2017, he was a postdoctoral researcher in the Emotive Computing Laboratory at the University of Notre Dame, working on research to analyze teachers' instructional practices using acoustic signal processing and machine learning.
Dr. Donnelly's primary research interests are: deep learning from audio, educational data mining, large imbalanced datasets, multi-label classification, and machine learning in the musical domain.

Elena Y. Harris, assistant professor, Computer Science; Eyharris@csuchico.edu
Dr. Harris has been involved in research projects primarily focused on developing learning and bioinformatics methods and software tools in support of molecular biology studies. Her current research, supported by a grant from the National Institutes of Health, uses data mining and machine learning approaches to analyze gene expression and association between gene expression and hematopoiesis in zebrafish. She has taught Artificial Intelligence courses since 2013.
Dr. Harris' research interests are: bioinformatics, data mining, algorithms, and machine learning.

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California State University, Los Angeles

Follow-up Contact at LA: Assistant to the President, Ana G. Caudillo acaudillo@calstatela.edu; (323)343-3030

CSULA has a machine learning expert in the College of Engineering, Computer Science, and Technology:
Mohammad Pourhomayoun: mpourho@calstatela.edu

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California State University, Northridge

Follow-up Contact at CSUN: Director of Administrative Operations*,* Randy Reynaldo randy.reynaldo@csun.edu; Director of Administrative Operations Director of Administrative Operations, (818)677-2121

Scott Kleinman (College of Humanities, Department of English, scott.kleinman@csun.edu). Two research projects: (1) Text mining that uses machine learning to better understand public discourse about the Humanities. Relies on topic modeling of large sets of newspaper articles. The "WhatEvery1Says" project is a collaboration with UC Santa Barbara and the University of Miami and is funded by a $1.1 million grant from the Andrew W. Mellon Foundation; (2) using AI to decipher medieval manuscripts, which resist optical character recognition (likely due to lack of training algorithms). Includes the potential of developing methods for AI to deal with small and unusual datasets.

Ellie Kazemi (College of Social & Behavioral Sciences, Department of Psychology, ellie.kazemi@csun.edu). Research focuses on simulation-based learning for human care service providers. Investigates the potential for AI and voice-recognition capability to power human-like behaviors in robots to provide simulations for developing either provider-child (performance-based practical skills) or provider-parent (professionalism and communication skills) interactions. Also interested in using AI to develop simulation-based training for fire and burn prevention safety.

Mariano Loza-Coll (College of Science & Math, Department of Biology, mariano.lozacoll@csun.edu). Working on development of AI-enabled "Teaching-Bot" (or T-Bot) incorporating natural language understanding, smart-text searches, speech recognition, and machine learning to create a chatbot that can handle ill-formulated or conceptually confused questions from students. Ultimate goal is to create tools and approaches that can help students seek and obtain useful information to assist them in their learning.

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San Francisco State University

Follow-up Contact at SFSU: Executive Assistant to the President, Leshia Claudio; leshia@sfsu.edu (415)338-1381

With research interests in machine learning:
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>Professor and Associate Chair, CS Department, SFSU
>Director, SFSU Center for Computing for Life Sciences
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Sonoma State University
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Sonoma State has three Artificial Intelligence Experts, which are listed below:

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** Note: Robotics, Artificial Intelligence, Ethics; Professor Sullins has served in numerous advising and consulting roles regarding these questions. He has been recognized nationally and internationally for his expertise.