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Overview of Administration Activities in Artificial Intelligence

Lynne Parker, Ph.D.
Assistant Director for Artificial Intelligence
Office of Science and Technology Policy
The White House

March 27, 2019

Artificial Intelligence: an Administration Perspective

"***We're on the verge of new technological revolutions*** *that could improve virtually every aspect of our lives, create vast new wealth for American workers and families, and open up bold, new frontiers in science, medicine, and communication."*

- President Donald J. Trump

"***Artificial intelligence holds tremendous potential as a tool to empower the American worker, drive growth in American industry, and improve the lives of the American people.*** *Our free market approach to scientific discovery harnesses the combined strengths of government, industry, and academia, and uniquely positions us to leverage this technology for the betterment of our great nation."*

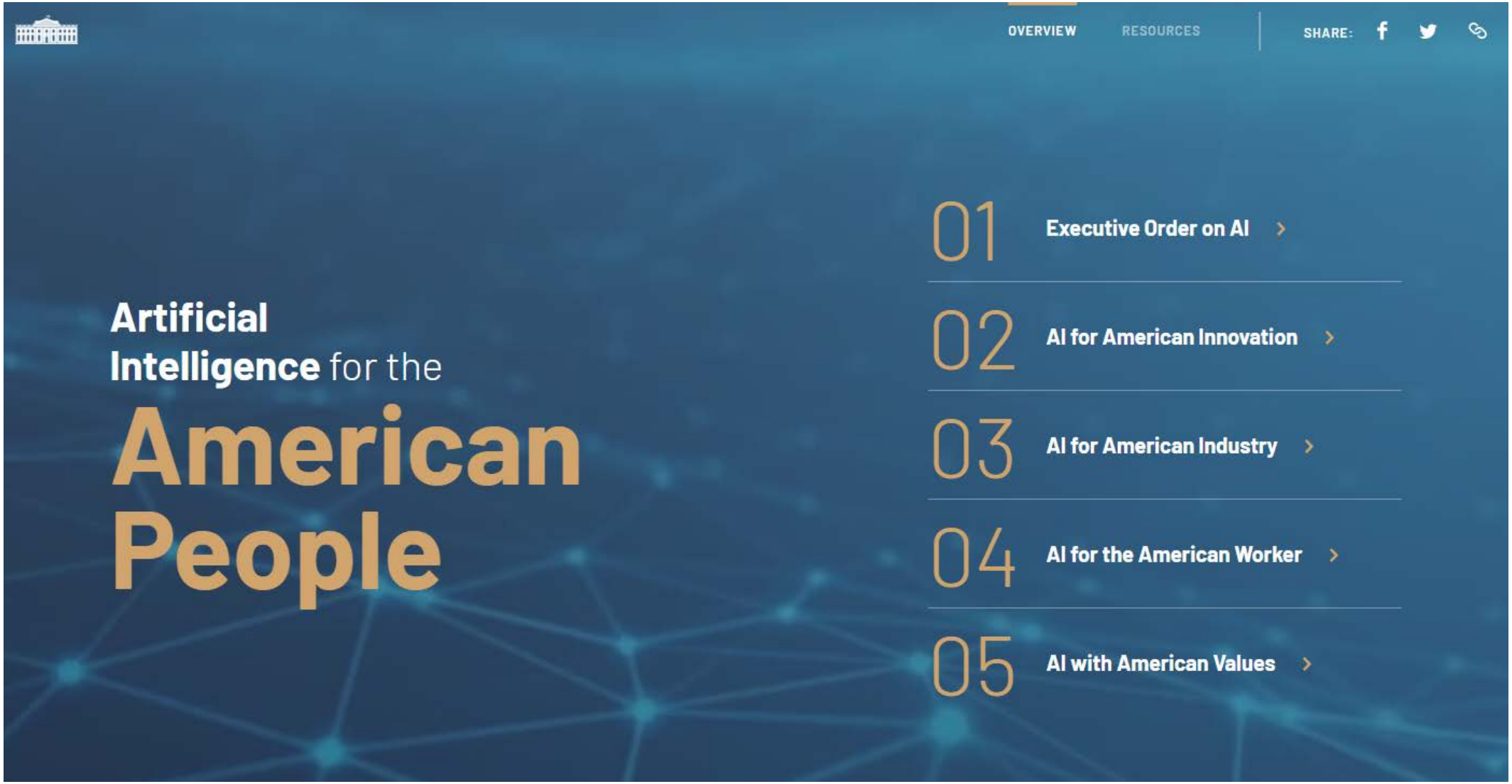
- Michael Kratsios, Deputy Assistant to the President for Technology Policy

President's Executive Order: Maintaining American Leadership in Artificial Intelligence

- Establishes the *American AI Initiative* to promote and protect national AI technology and innovation
- Multipronged approach:
  - Prioritizing sustained AI R&D
  - Enhancing access to high-quality data and cyberinfrastructure
  - Removing regulatory barriers
  - Ensuring leadership in technical standards
  - Providing education & training
  - Developing action plan to protect technological advantage in AI

Feb. 11, 2019

AI.gov –
"All of government" portal for Federal AI activities



AI for the American People

Prioritize AI R&D
Grow and sustain American research leadership and capacity

Remove barriers to innovation
Modernize governance for AI-powered technologies

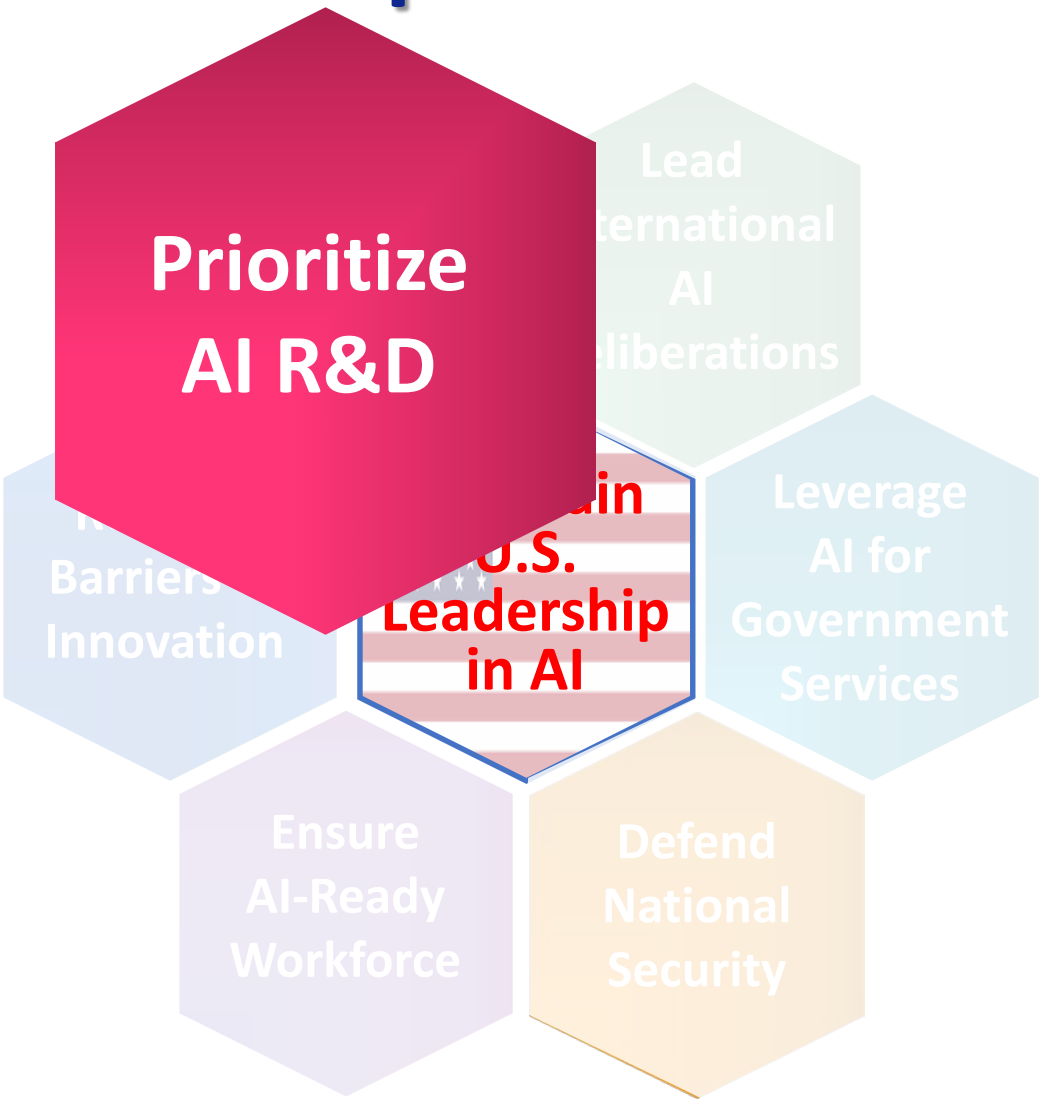
Ensure AI-Ready Workforce
Provide AI-ready education at all levels: K-12, college, re-training, re-skilling, R&D workforce

Lead international AI deliberations
Work with like-minded partners to recognize potential benefits of AI and promote AI R&D

Leverage AI for government
Apply AI to improve provision of government services

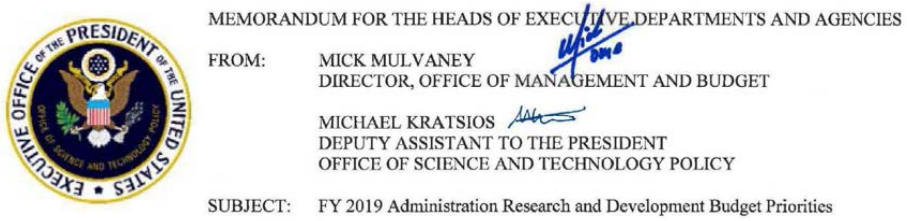
Defend national security
Lead in responsible use of AI to ensure continued national security

AI for the American People



AI EO: Prioritizing Funding for AI R&D

The Federal Government serves a critical role in supporting long-term fundamental R&D that drives future technological breakthroughs.


MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

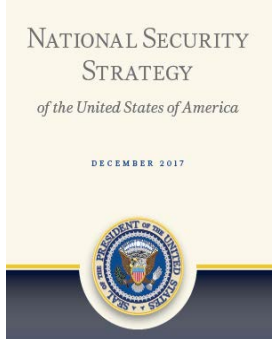
FROM: MICK MULVANEY
DIRECTOR, OFFICE OF MANAGEMENT AND BUDGET

MICHAEL KRATSIOS
DEPUTY ASSISTANT TO THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY

SUBJECT: FY 2019 Administration Research and Development Budget Priorities

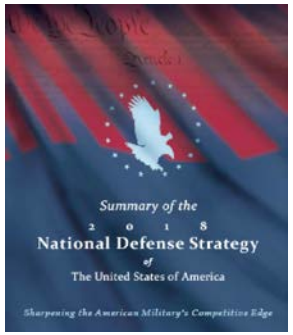
FY 2019 R&D Budget Priorities memo

"autonomous systems, … machine learning, and quantum computing ….. coordinated interagency initiatives, … STEM education, including computer science education "



National Security Strategy

"prioritize emerging technologies critical to economic growth and security, such as data science, encryption, autonomous technologies,… advanced computing technologies, and artificial intelligence. "



National Defense Strategy

".. invest broadly in military application of autonomy, artificial intelligence, and machine learning, including rapid application of commercial breakthroughs."

Coordinating Federal AI R&D

White House Office of Science and Technology Policy

National Science and Technology Council

Select Committee on AI:

- Most senior Federal R&D leadership
- Advises White House on interagency AI R&D priorities
- Identifies opportunities to improve coordination of AI R&D, including ways to leverage Federal resources

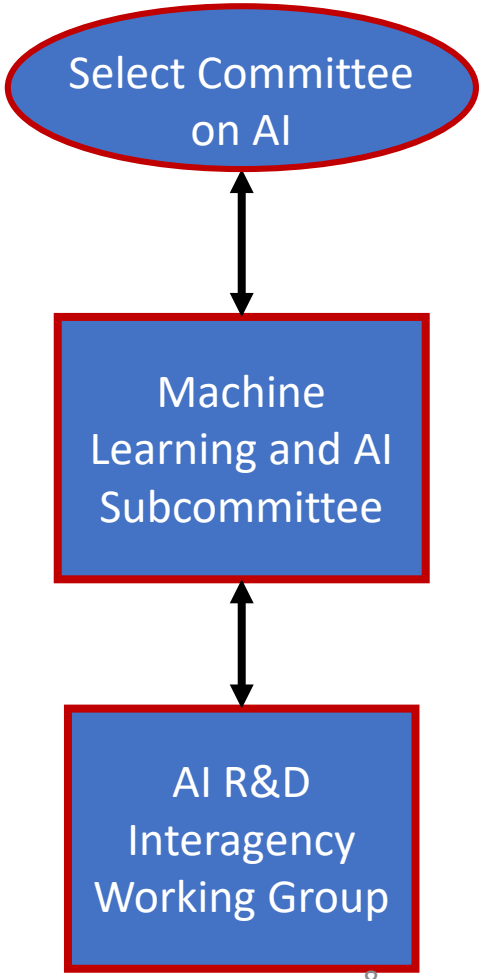
Machine Learning and AI Subcommittee:

- Senior Federal leaders with AI R&D budget authority
- Operational and implementation arm of Select Committee

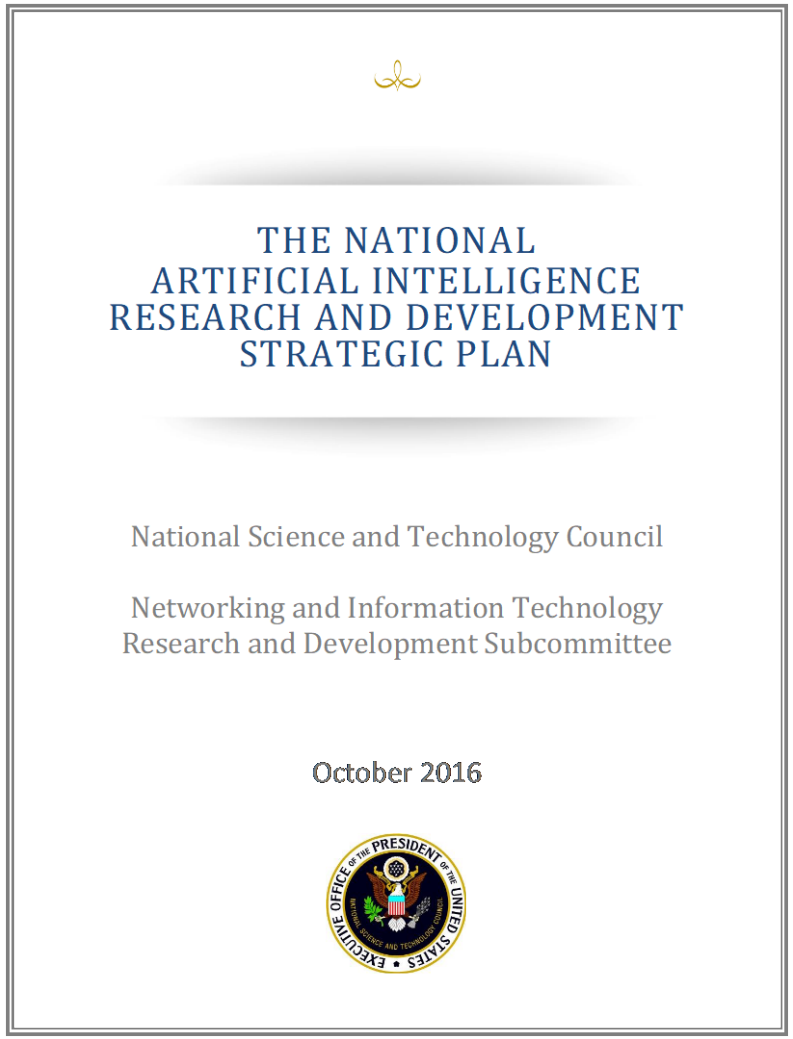
AI Interagency Working Group:

- AI experts across Federal agencies
- Community of practice

Select Committee on AI
November, 2018



Guiding R&D Investments:
National AI R&D Strategic Plan


THE NATIONAL
ARTIFICIAL INTELLIGENCE
RESEARCH AND DEVELOPMENT
STRATEGIC PLAN

National Science and Technology Council

Networking and Information Technology
Research and Development Subcommittee

October 2016

In process: 2019 update to the *National AI R&D Strategic Plan* (2016), to ensure that the U.S. continues to lead in cutting edge AI innovations.

AI EO: Unleashing AI Resources

Data:

- Directs agencies to make Federal data and models more available to America's AI R&D experts, researchers, and industries.
- RFI to gain info on which Federal data would be most useful for AI R&D.
- Agencies identify barriers to increased access, such as privacy, security, data documentation, formatting.
- Agencies prioritize data in light of AI R&D impact and barriers

Cyberinfrastructure for AI:

- Directs DoD, DOC, HHS, DOE, NASA, NSF to prioritize allocation of HPC resources for AI-related applications
- Directs agencies to recommend ways to better use cloud computing for Federally-funding AI R&D

Accelerating Access to AI Infrastructure

Data: NSF's "Big Idea":
Harnessing the Data Revolution

Engage research community in:

- Advancing fundamental data-centric research and data-driven domain discoveries
- Building data infrastructure for research
- Developing 21st-century data-capable workforce

Cyberinfrastructure for AI:

ORNL's Summit supercomputer –June 2018

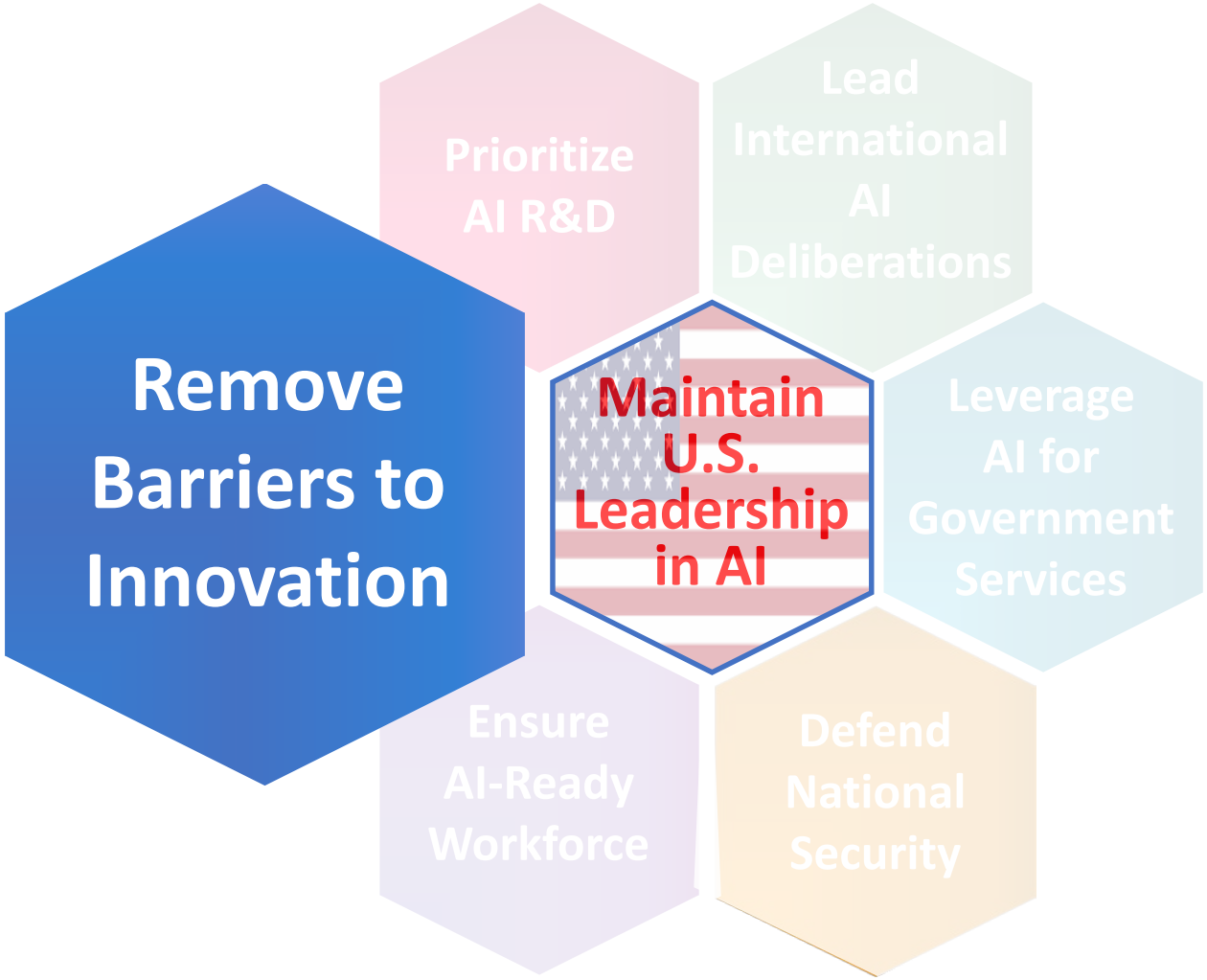
- Designed to advance science and AI research in AI
- Over 27,000 NVIDIA GPUs, plus IBM's Power9 chips designed for AI

Other AI hardware of interest: neuromorphic computing, hardware accelerators for ML, embedded systems, parallel architectures, …

Key Messages:

1) AI R&D funding must be (and is) prioritized by the Administration.
2) We must accelerate development of enabling infrastructure for complete AI systems.

AI for the American People



Removing Barriers to AI Innovation

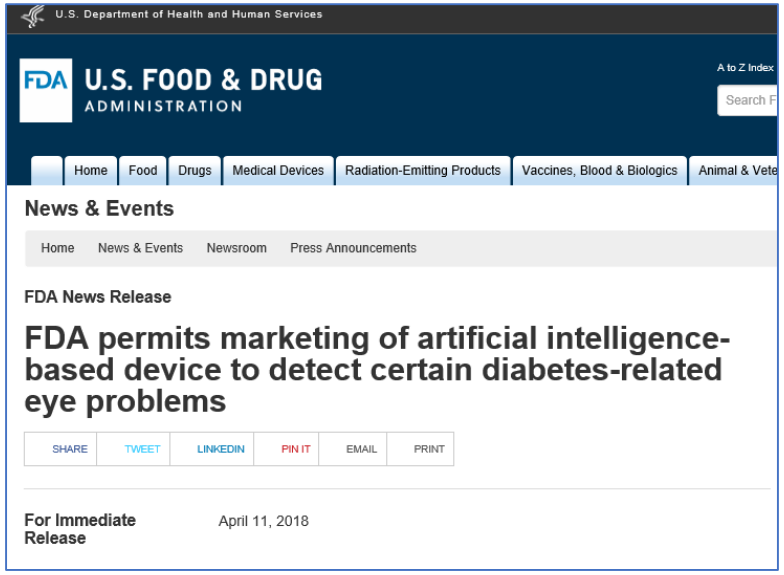
Government regulations must be modernized for AI – supportive of innovation while maintaining civil liberties, privacy, and American values.

DOT policy for Automated Vehicles

Oct. 2018

FAA Pilot program for drones

Oct. 2017



FDA permitting AI-based medical tool

April 2018

AI EO: Setting AI Governance Standards

- **Overall guidance:** Federal agencies will foster public trust in AI systems by establishing guidance for AI development and use across different types of technology and industrial sectors
- **Agency approaches:** Guidance will help Federal regulatory agencies develop and maintain regulatory and non-regulatory approaches for safe and trustworthy creation and adoption of new AI technologies
- **Technical standards:** NIST will lead in development of appropriate technical standards for reliable, robust, trustworthy, secure, portable, and interoperable AI systems

Key Messages:

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AI for the American People

AI EO: Educating and Training AI-Ready Workforce

AI promises great benefits for workers, with the potential to improve safety, increase productivity, and create new industries of the future.

However, our Nation urgently needs workers who are skilled in STEM.

Increasing Access to STEM+C

- Sept '17 PM calls Dept. of Educ. to devote $200M to STEM+C education
- Industry also committed $300M

PRESIDENTIAL MEMORANDA

Presidential Memorandum for the Secretary of Education

EDUCATION | Issued on: September 25, 2017

SUBJECT: Increasing Access to High-Quality Science, Technology, Engineering, and Mathematics (STEM) Education

Prioritize existing fellowship and training programs for AI

- AI EO directs agencies prioritize opportunities and communicate plans annually to co-chairs of Select Committee

EXECUTIVE ORDERS

Executive Order on Maintaining American Leadership in Artificial Intelligence

INFRASTRUCTURE & TECHNOLOGY | Issued on: February 11, 2019

Educating and Training AI-Ready Workforce

Creation of National Council for American Worker

- July '18 EO establishes Council to address workforce changes caused by AI and automation

EXECUTIVE ORDERS

Executive Order Establishing the President's National Council for the American Worker

ECONOMY & JOBS | Issued on: July 19, 2018

AI EO directions to Select Committee:

- Technical expertise to National Council for American Worker
- Recommendations to NSTC Committee on STEM Education regarding AI-related educational and workforce development considerations

R&D to Address Workforce Impacts of AI

- AI technologies offer many potential benefits:
  - Creation of new industries and occupations
  - Increased opportunities for innovation
  - Increased productivity
- However, AI technologies are changing the nature of work, and have caused some concerns:
  - Possibility of lost jobs
  - Mismatch between available occupations and skills of the workforce
- NSF R&D: *The Future of Work at the Human-Technology Frontier*:
  - Increase understanding of human-technology partnership and emerging socio-technological landscape
  - Create new technologies to augment human performance
  - Foster livelong and pervasive learning with technology.

NSF's Big Idea on Future of Work at the Human-Technology Frontier

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AI for the American People

AI for National Security and Defense

DoD Established Joint AI Center (JAIC)

- Focal point in use of AI for defense missions
- Accelerating delivery of AI-enabled capabilities from lab to application
- Synchronizing DoD's AI activities

DEPUTY SECRETARY OF DEFENSE
1010 DEFENSE PENTAGON
WASHINGTON, DC 20301-1010

JUN 27 2018

SUBJECT: Establishment of the Joint Artificial Intelligence Center

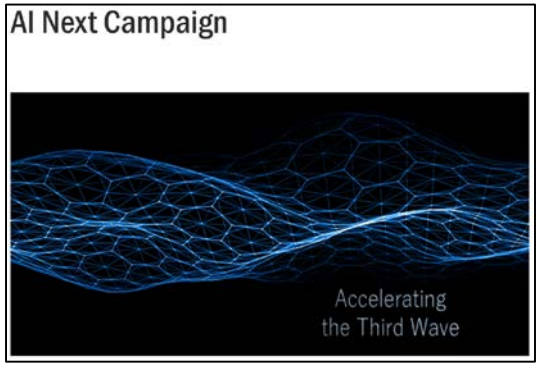
The 2018 National Defense Strategy (NDS) foresees that ongoing advances in artificial intelligence (AI) "will change society and, ultimately, the character of war." To preserve and expand our military advantage and enable business reform, we must pursue AI applications with boldness and alacrity while ensuring strong commitment to military ethics and AI safety. A new approach is required to increase the speed and agility with which we deliver AI-enabled capabilities and adapt our way of fighting.

Establishing DoD's AI principles

- Defense Innovation Board is engaging with stakeholders to inform development of principles for ethical use of AI
- DoD's AI principles will demonstrate DoD's commitment to use AI responsibly and ensure the protection of civil liberties and the rule of law

DARPA investing in "3rd wave" AI

- $2B AI Next Campaign
- Focus is on robust, secure, safe, explainable AI



AI EO: Protecting National AI Advantage

- National Security Presidential Memorandum (Feb. 11, 2019) – "Protecting the United States Advantage in Artificial Intelligence and Related Critical Technologies"
- Directs Federal agencies to develop and implement an action plan to protect our national and economic security interests against strategic competitors and foreign adversaries.

Key Messages:

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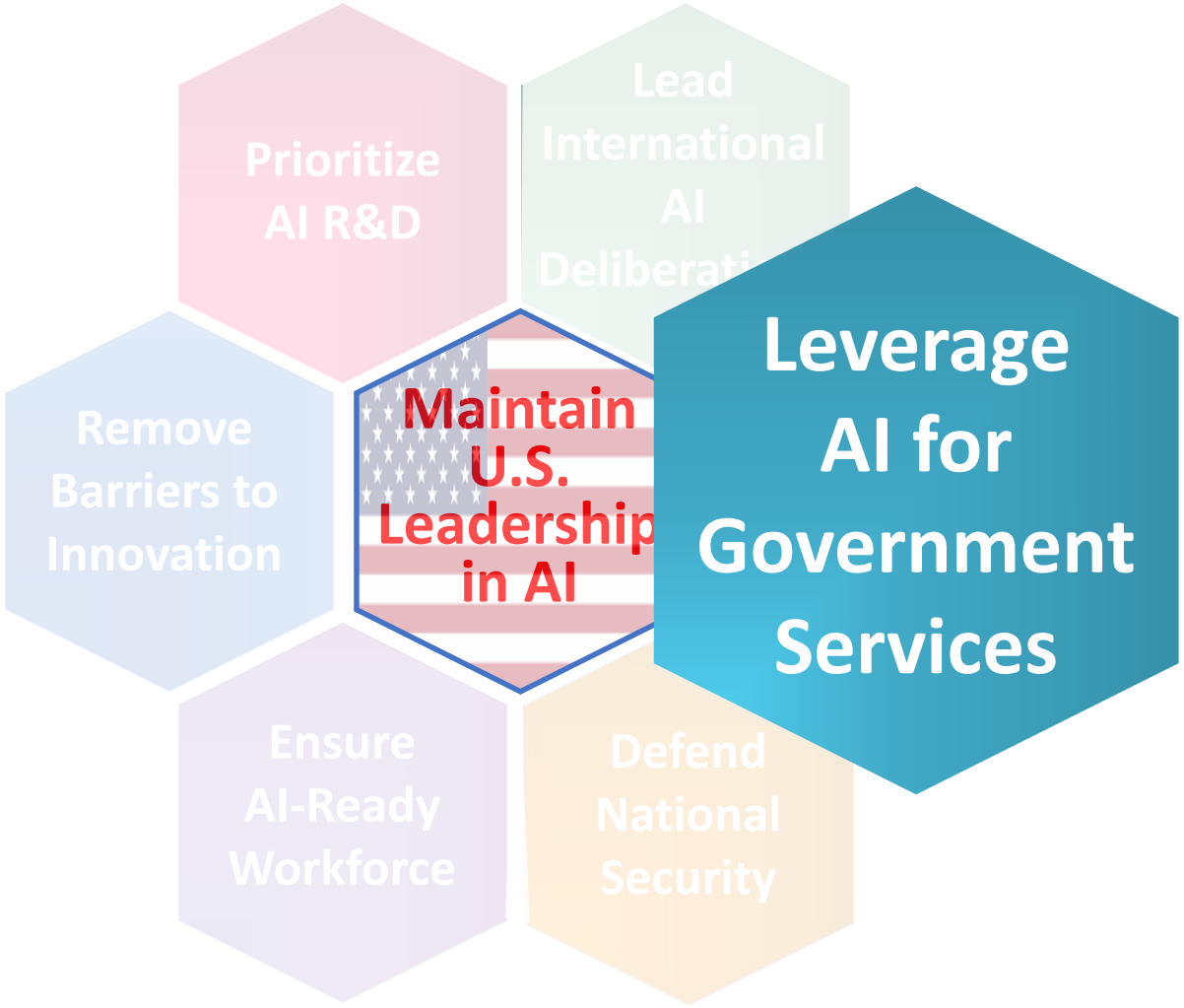
5) We must accelerate the adoption of AI for national defense and security, while also ensuring responsible use of AI.

AI for the American People

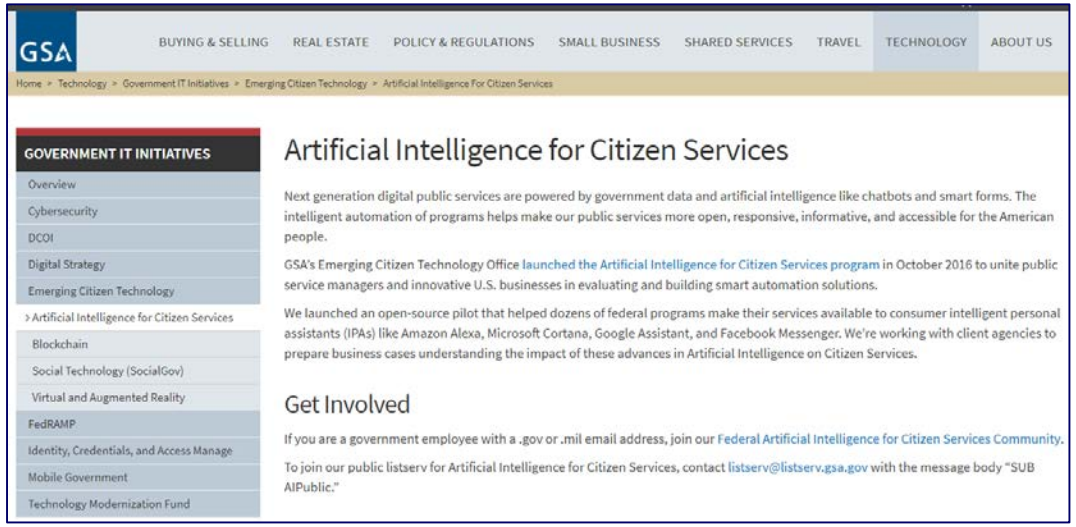


Leverage AI for Government Services

Accelerate effective use of AI for improved government services.

GSA helping government use AI

- Emerging Citizen Technology Office is exploring several pilots to help use AI tools for providing Federal services



Federal Data Strategy: Using Data as a Strategic Asset

- Developing a coordinated and integrated approach to the use of data
- Federal Data Strategy will define principles, practices, and action plan for Federal data stewardship, use, and access

`https://strategy.data.gov/`

Federal Data Strategy
Leveraging Data as a Strategic Asset

Key Messages:

1) The United States must strengthen and leverage our unique and vibrant American R&D and innovation ecosystem.
2) AI R&D funding must be (and is) prioritized by the Administration.
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6) We must accelerate the adoption of AI for national defense and security, while also ensuring responsible use of AI.
7) Federal government should use AI to improve the provision of government services.

AI for the American People

AI EO: Promoting International Environment Supportive of American AI Innovation

The U.S. promotes an international environment supportive of American AI innovation, with a focus on fostering trust and adoption.

USG engages internationally on AI

- Many venues are discussing issues of AI
- USG actively engages to develop approaches for AI innovation that lead to economic growth, while also protecting American values

G7 Innovation Ministers' Statement on AI (2018)

- Supporting economic growth from AI innovation
  - Using AI applications to help improve economic performance.
- Increasing trust in and adoption of AI
  - Necessary ingredients for economic growth and the fuel for future innovations
- Promoting inclusivity in AI development and deployment
  - Critical to ensuring broad public support for AI adoption and ensuring all members of society can benefit from this technology.

U.S. has been deeply engaged in development of OECD AI Principles

- AI Expert Group worked Sept ‘18 – Feb ‘19 to craft draft AI principles
- OECD Committee on Digital Economy Policy discussed and approved a draft Recommendation of the OECD Council in March 2019
- Anticipated approval by OECD in May 2019

OECD
BETTER POLICIES FOR BETTER LIVES

Draft OECD Recommendation on AI

- **Principles for responsible stewardship of trustworthy AI**
  - 1.1. Inclusive growth, sustainable development and well-being
  - 1.2. Human-centred values and fairness
  - 1.3. Transparency and explainability
  - 1.4. Robustness, security and safety
  - 1.5. Accountability

- **National policies and international cooperation for trustworthy AI**
  - 2.1. Investing in AI research and development
  - 2.2. Fostering a digital ecosystem for AI
  - 2.3. Providing an enabling policy environment for AI
  - 2.4. Building human capacity and preparing for labour transition
  - 2.5. International cooperation

If approved, would be the first international, consensus statement of AI principles.

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7) The United States must engage with like-minded international partners to realize the full potential of AI and address key challenges.

Summary of Key Messages:

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Work with like-minded partners to recognize potential benefits of AI, and promote AI R&D

Leverage AI for government
Apply AI to improve provision of government services

Defend national security
Lead in use of AI to ensure continued superiority

Thank you

We're always open to good ideas – engage with us!

Contact info

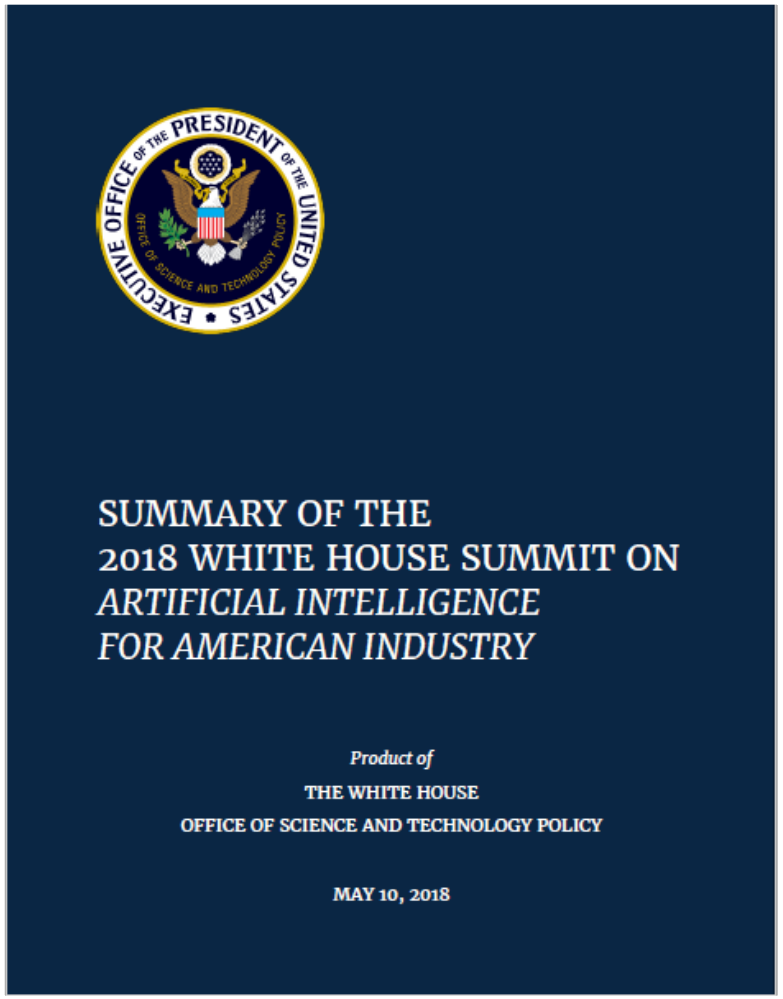
email: Lynne.E.Parker@ostp.eop.gov

office: (202) 456-3608

Backup slides…

2018 White House Summit on AI for American Industry

- May 10, 2018
- 100+ participants: senior government officials, top AI academics, heads of industrial research labs, American business leaders
- two sets of breakout sessions:
  - *cross-cutting issues:* AI R&D, workforce development, regulatory barriers to AI innovation
  - sector-specific applications: food and agriculture, energy and manufacturing, financial services, healthcare, and transportation and logistics



Summary report available:

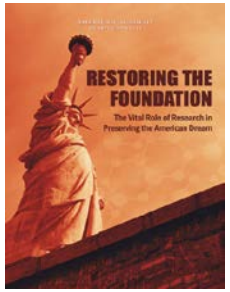
https://www.whitehouse.gov/wp-content/uploads/2018/05/ Summary-Report-of-White-House-AI-Summit.pdf

Report outlines 6 key areas of Administration activities on AI

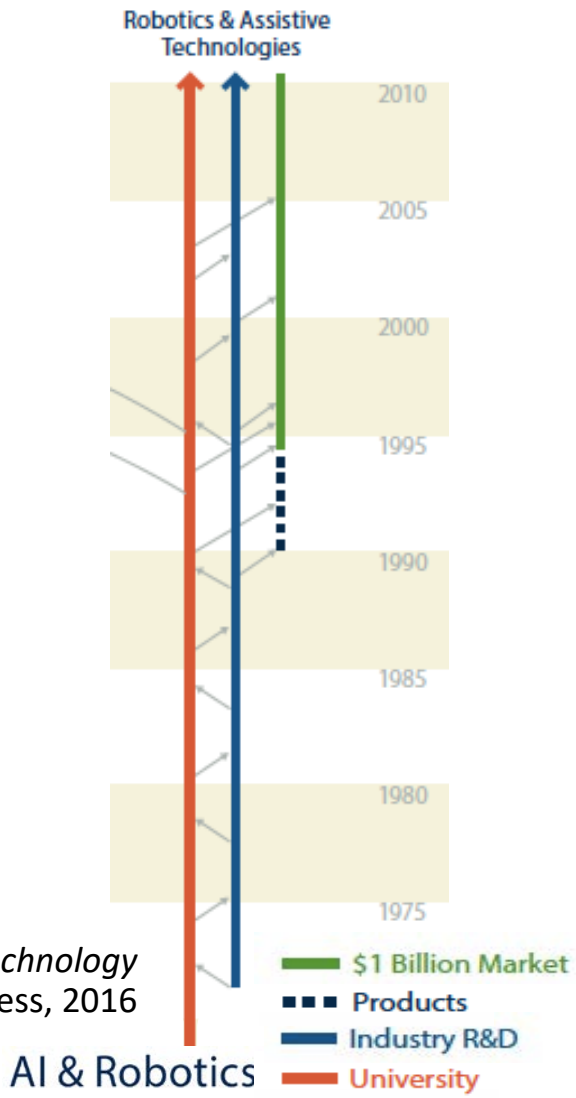
The Innovation Ecosystem for AI in America

Strengthen and leverage uniquely American government, industry, academic partnerships

- Federal Government:
  - New, focused AI investments through key agencies
  - Access to federal data sets and computational resources
- Private sector:
  - Investments matching federal agencies
  - Access to data sets, infrastructure
- Academia:
  - Co-investment at colleges/universities
  - Education of AI-ready workforce



Prescription 3: Establishing a More Robust National Government-University-Industry Research Partnership, *Restoring the Foundation: The Vital Role of Research in Preserving the American Dream, AAAS, 2014*



Continuing Innovation in Information Technology
National Academies Press, 2016