

AMERICAN ARTIFICIAL INTELLIGENCE INITIATIVE

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The White House



AI: An Administration Perspective

This Administration is committed to continued U.S. leadership in AI and ensuring AI benefits the American people and reflects American values.

*“**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

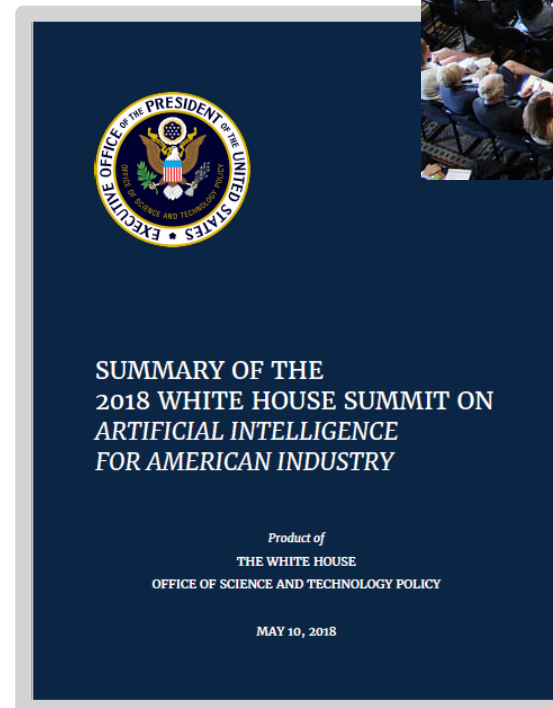


Feb. 11, 2019



AI Initiative builds upon important feedback from 2018 White House AI Summit

- White House AI for American Industry Summit
 - May 10, 2018
 - 100+ participants:
 - senior government officials
 - top AI academics
 - heads of industrial research labs
 - American business leaders
- AI Summit defined key directions reflected in AI EO



AI for the American People

Prioritize AI R&D

Grow and sustain American research leadership and capacity

**Prioritize
AI R&D**

**Lead
International
AI
Deliberations**

Lead international AI deliberations

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

Remove barriers to innovation

Modernize governance for AI-powered technologies

**Remove
Barriers to
Innovation**

**Maintain
U.S.
Leadership
in AI**

**Leverage
AI for
Government
Services**

Leverage AI for government

Apply AI to improve provision of government services

Ensure AI-Ready Workforce

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

**Ensure
AI-Ready
Workforce**

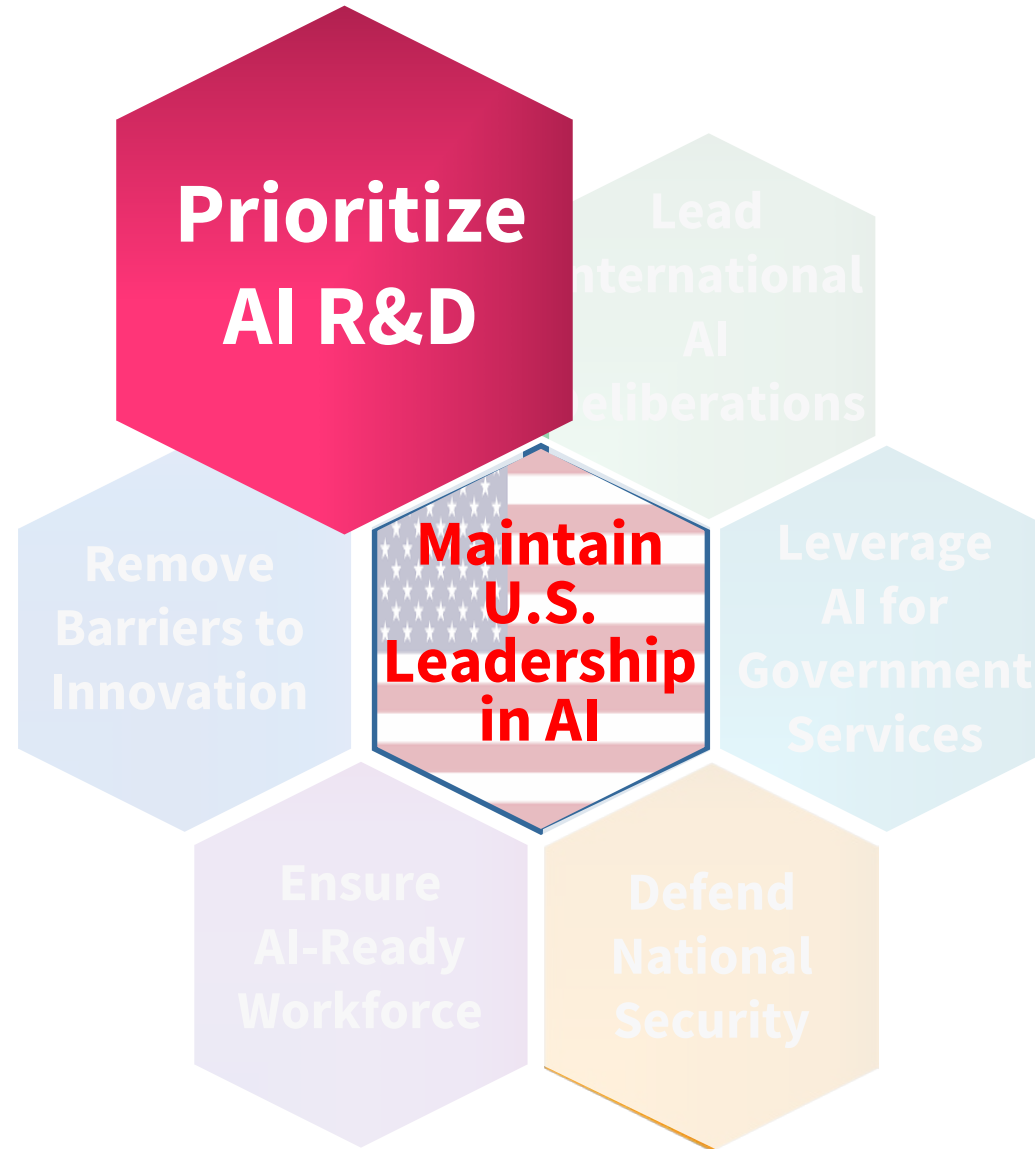
**Defend
National
Security**

Defend national security

Lead in responsible use of AI to ensure continued national security



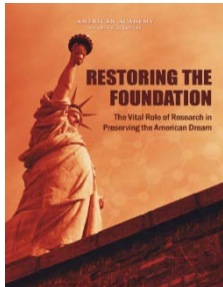
AI for the American People



The Innovation Ecosystem for AI in America

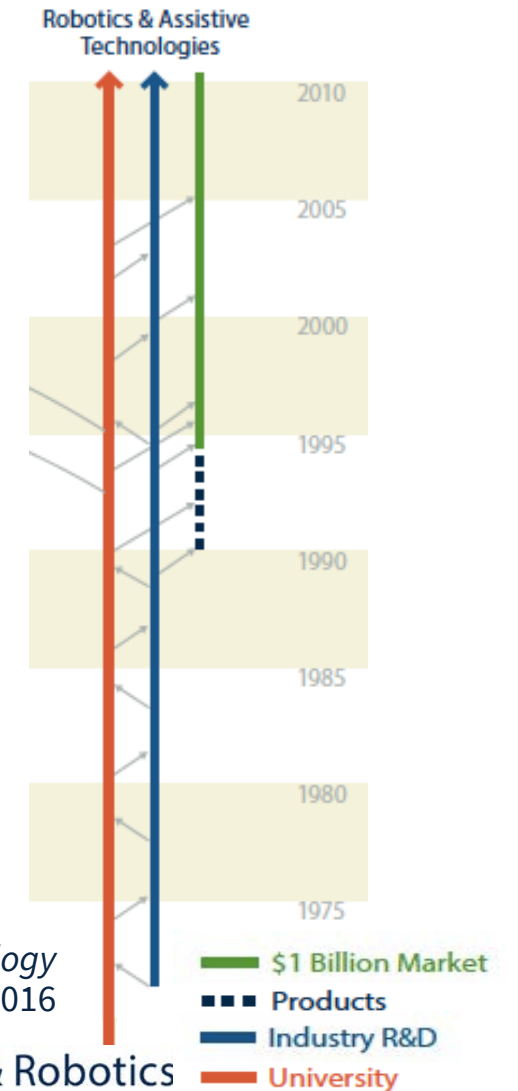
Strengthen and leverage uniquely American government, industry, academic partnerships

- 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



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 ”

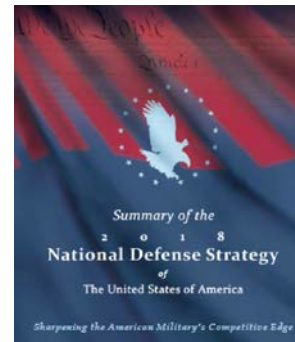
NATIONAL SECURITY
STRATEGY
of the United States of America

DECEMBER 2017



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

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

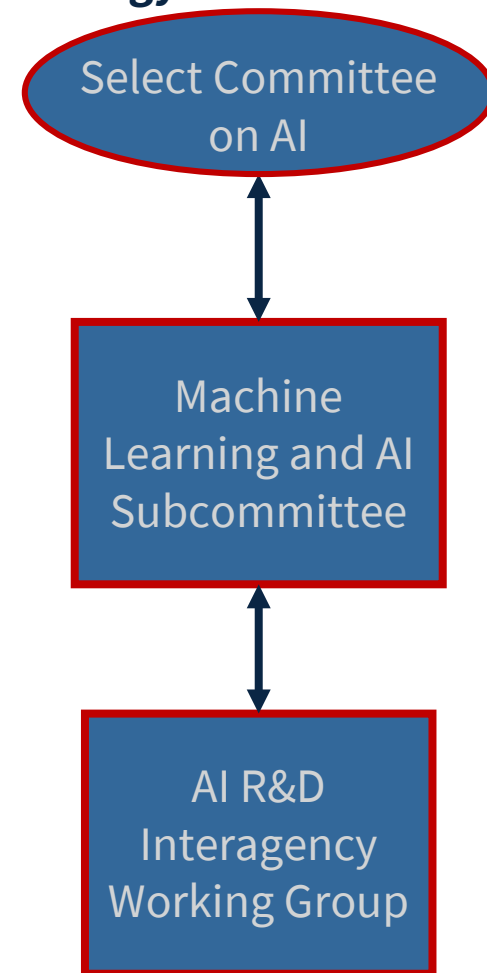


White House Office of Science and Technology Policy

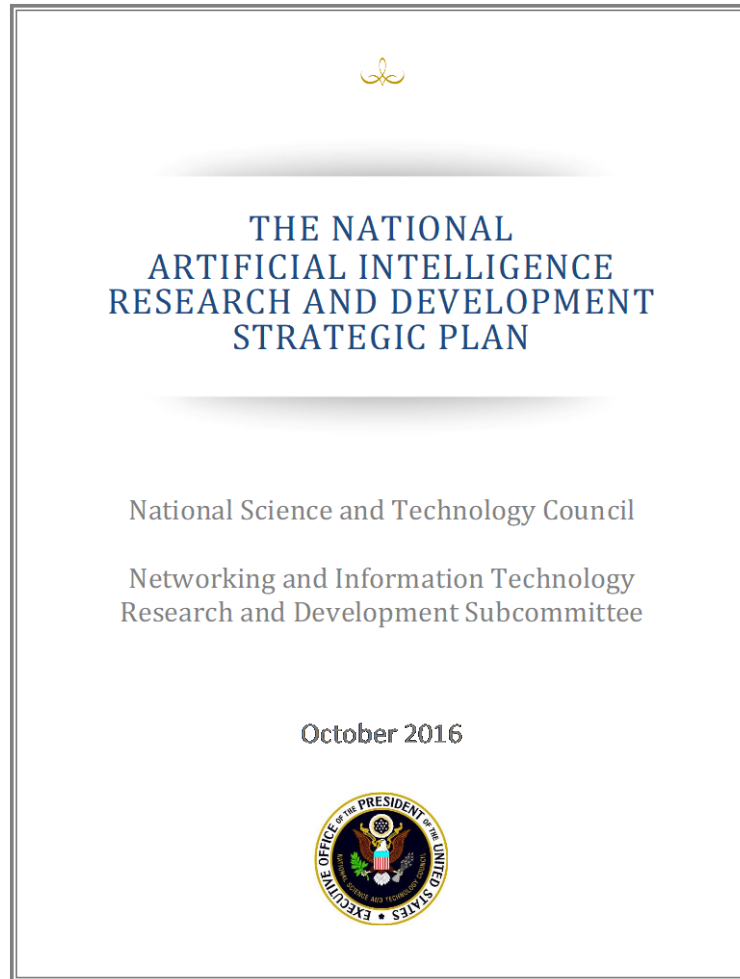
National Science and Technology Council



Select Committee on AI
November, 2018



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



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.

The image is a screenshot of a Federal Register notice. At the top left is the National Archives logo with the text "NATIONAL ARCHIVES". To its right is the "FEDERAL REGISTER" logo, with the tagline "The Daily Journal of the United States Government". Further right is the seal of the "ARCHIVES AND RECORDS ADMINISTRATION" with the year "1985". A blue horizontal bar contains a white circle with an "N" and the word "Notice". The main title of the notice is "Request for Information on Update to the 2016 National Artificial Intelligence Research and Development Strategic Plan". Below the title, it says "A Notice by the National Science Foundation on 09/26/2018". At the bottom, there is a comment period notice: "This document has a comment period that ends in 29 days. (10/26/2018)" and a green button labeled "SUBMIT A FORMAL COMMENT".



Unique AI contributions of Federal Agencies

- **National Science Foundation:** funds long-term transformative fundamental AI research in AI
- **Defense Advanced Research Projects Agency:** invests in pioneering in AI research, e.g., “third wave” of AI systems
- **Department of Defense:** established Joint Artificial Intelligence Center to translate AI research into use
- **Intelligence Advanced Research Projects Activity:** invests in AI for intelligence challenges
- **National Institute for Standards and Technology:** conducts R&D for technical standards for trustworthy AI
- **Department of Energy:** develops high-performance computing infrastructure supporting AI research.
- **Department of Veterans Affairs:** explores (with DOE) secure analysis of large digital health and genomic data
- **National Institutes of Health:** studies use of AI in medicine, e.g., diagnosing illnesses or personalizing treatments
- **Department of Transportation:** develops guidance for safe integration of AI-based driverless vehicles
Departments of Labor, Commerce, and Health and Human Services: studies workforce implications
- **National Oceanic and Atmospheric Administration:** uses AI for weather and environmental applications



Collectively, these and other Federal agencies provide critical expertise and leadership in AI.

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 (forthcoming).
- 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-funded 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 – June '18

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



DOE/Cray Frontier Supercomputer at ORNL

- Exascale computer (>1.5 exaflops)
- 2nd Gen AI system, providing capabilities for deep learning, ML, data analytics

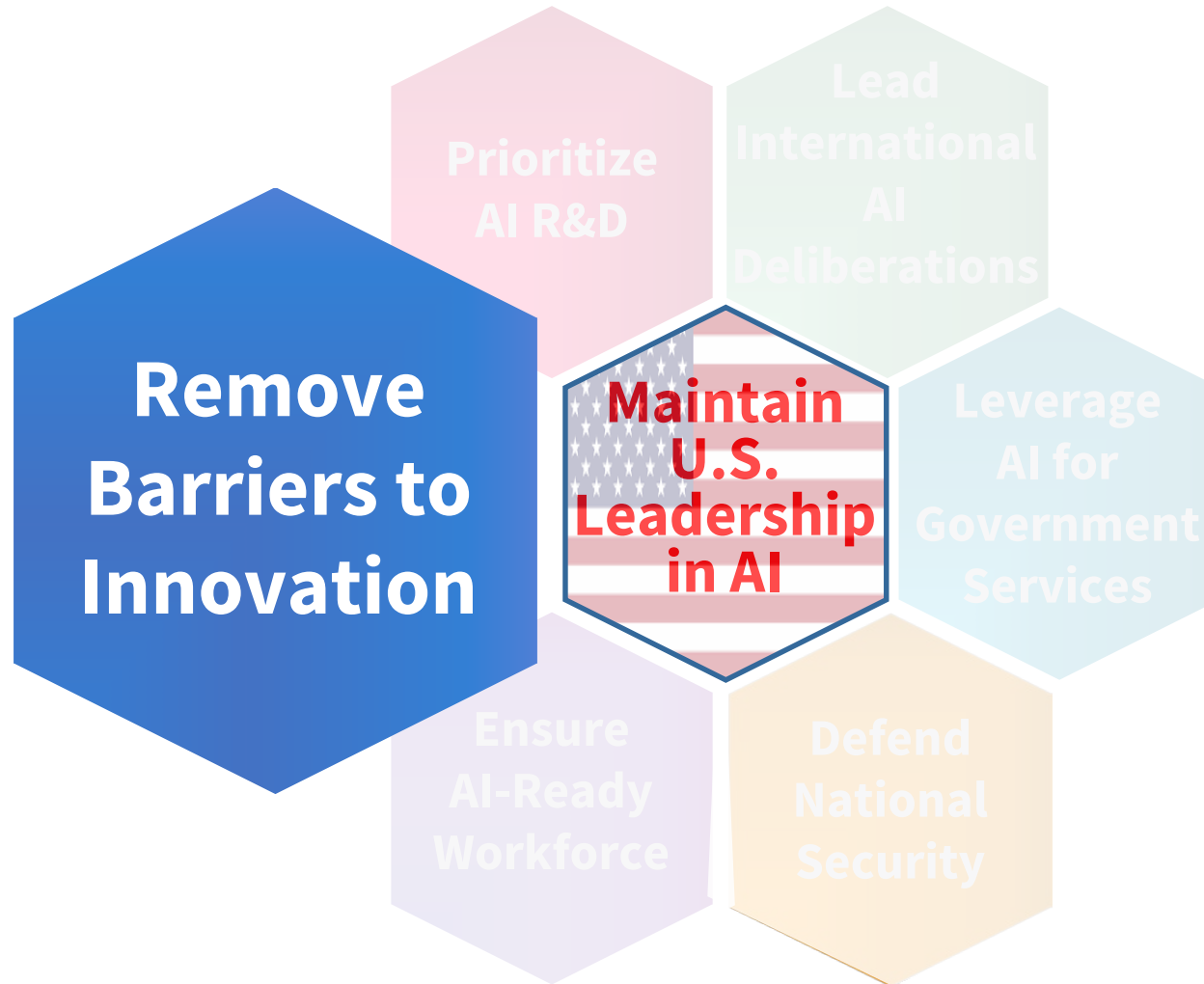
Other AI hardware of interest: neuromorphic computing, hardware accelerators for ML, embedded systems, parallel architectures, ...

Key Messages

- 1) AI R&D funding must be (and is) prioritized by the Administration.
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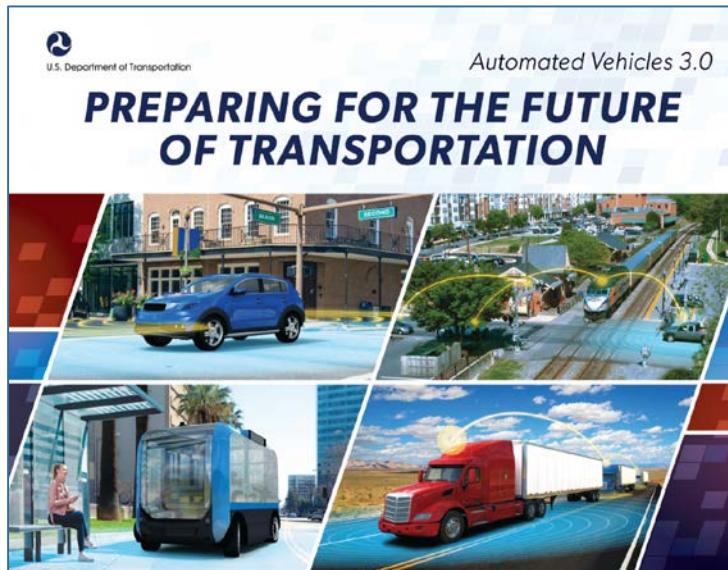


AI for the American People



Removing Barriers to AI Innovation

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



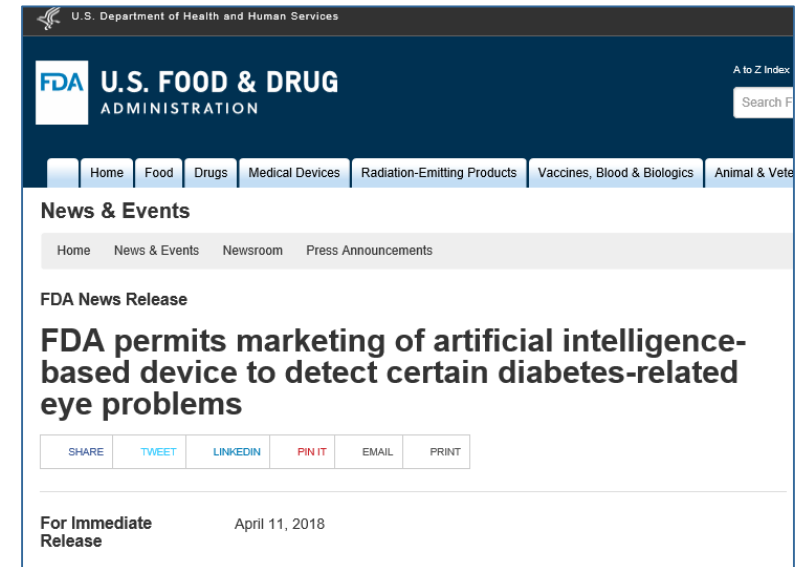
DOT policy for
Automated Vehicles

Oct. 2018



FAA Pilot program for
drones

Oct. 2017



FDA permitting AI-
based medical tool

April 2018



AI EO: Creating AI Guidance for Federal Agencies

- **Overall guidance:** American AI Initiative directs OMB/OIRA (with OSTP and others) to issue memo to heads of all agencies that:
 - Informs development of regulatory and non-regulatory approaches to AI
 - Considers ways to reduce barriers to the use of AI to promote their innovative uses while protecting civil liberties, privacy, American values, and U.S. economic and national security
 - Draft version of memo will be published for public comment (~June 2019)
- **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



AI EO: Federal Engagement in AI Technical Standards Development

- **Technical standards:**
 - NIST will lead in development of appropriate technical standards for reliable, robust, trustworthy, secure, portable, and interoperable AI systems
- **RFI seeks comment on:**
 - Current status/plans re: AI technical standards
 - Needs/challenges in development of AI standards
 - Current & potential future role of Federal agencies in development of AI standards
- **NIST's May 30 workshop:**
 - Engages private- and public-sector and individuals
 - Outcome: annotated outline of Plan for Federal engagement



The screenshot shows a Federal Register notice titled "Artificial Intelligence Standards" issued by the National Institute of Standards and Technology on 05/01/2019. The notice includes a comment period ending on 05/31/2019 and a "SUBMIT A FORMAL COMMENT" button. The document details section lists the agency as the National Institute of Standards and Technology, U.S. Department of Commerce, and the action as a Notice; Request for Information (RFI). The summary mentions Executive Order on Maintaining American Leadership in Artificial Intelligence (AI) and NIST's role in developing technical standards for trustworthy systems.

RFI issued May 1, 2019

Comments due May 31
June 10



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AI for the American People



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



Prioritize existing fellowship and training programs for AI

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



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



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 lifelong 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.

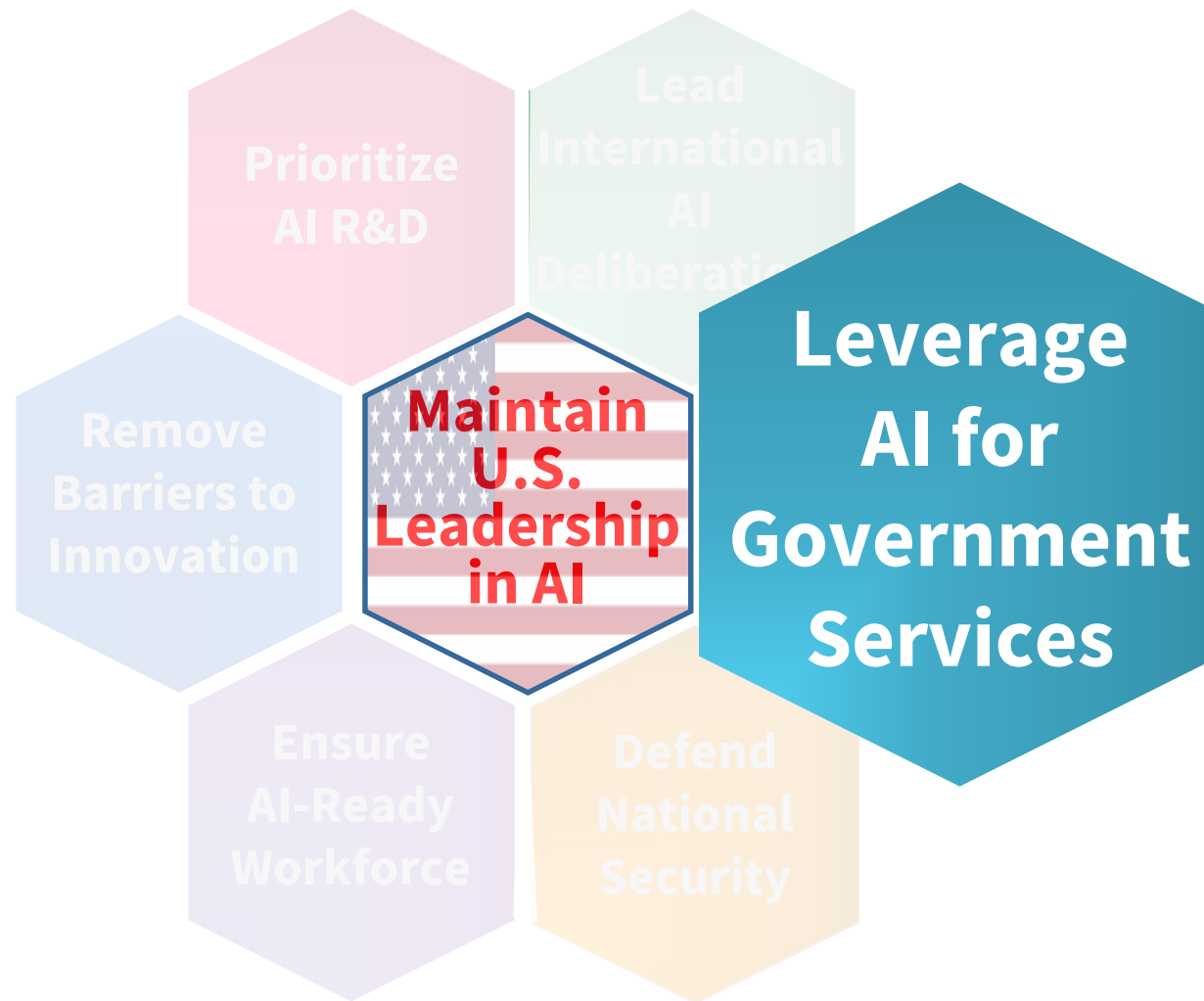


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- 5) We must accelerate the adoption of AI for national defense and security, while also ensuring responsible use of AI.



AI for the American People

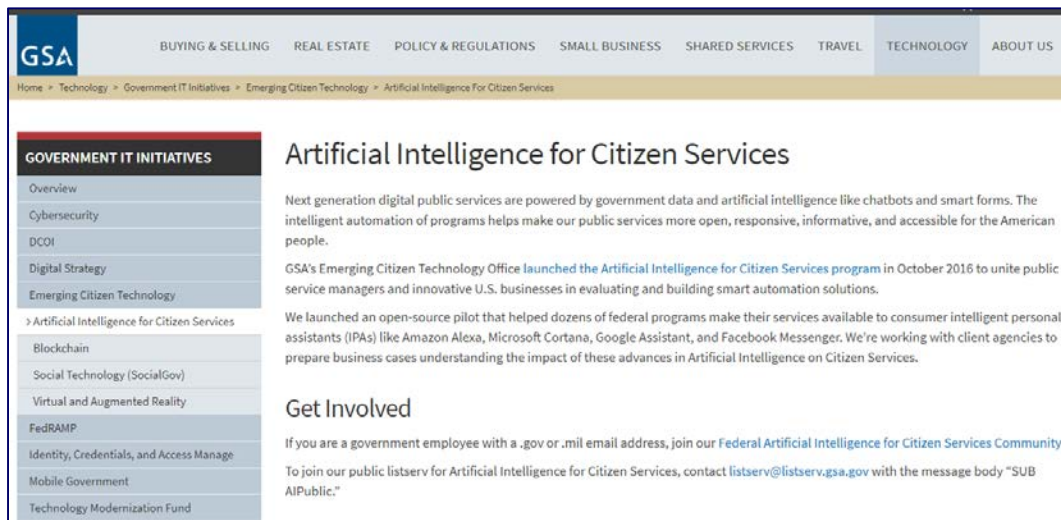


Leverage AI for Government Services

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



The screenshot shows the GSA website's navigation menu with categories like BUYING & SELLING, REAL ESTATE, POLICY & REGULATIONS, SMALL BUSINESS, SHARED SERVICES, TRAVEL, TECHNOLOGY, and ABOUT US. The breadcrumb trail indicates the path: Home > Technology > Government IT Initiatives > Emerging Citizen Technology > Artificial Intelligence for Citizen Services. The main content area is titled 'Artificial Intelligence for Citizen Services' and includes an overview, a description of the program, and a 'Get Involved' section with contact information for the public listserv.

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.
- 3) We must accelerate development of enabling infrastructure for complete AI systems.
- 4) Government regulations must support innovation while maintaining civil liberties, privacy, and American values.
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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



Lead International AI Deliberations

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.

International Collaboration on AI Governance: *OECD AI Principles*

“For the first time in history, America and likeminded democracies of the world will commit to common AI principles reflecting our shared values and priorities. These principles send a strong message: The OECD countries stand together in unleashing AI innovation, understanding that it is an essential tool to drive economic growth, empower workers, and lift up quality of life for all”.

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



MIT
Technology
Review

22-May-2019

Artificial Intelligence 1h

America and its economic allies announce a “democratic” vision for AI



OECD Recommendation on AI Principles

- AI Expert Group worked over several months to craft draft AI principles (Sept '18 – Feb '19)
- OECD Committee on Digital Economy Policy negotiated final consensus language for the draft AI Recommendation of the OECD Council (March 2019)
- Approved by OECD (May 22, 2019)
 - 36 member nations (U.S., much of Europe, Australia, Canada, Chile, Israel, Japan, Mexico, New Zealand, S. Korea)
 - 6 non-member nations (Argentina, Brazil, Colombia, Costa Rica, Peru, Romania)



OECD Recommendation on AI



- **Principles for responsible stewardship of trustworthy AI**
 - 1.1. Inclusive growth, sustainable development and well-being
 - 1.2. Human-centered 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 labor transition
 - 2.5. International cooperation

An historic 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.



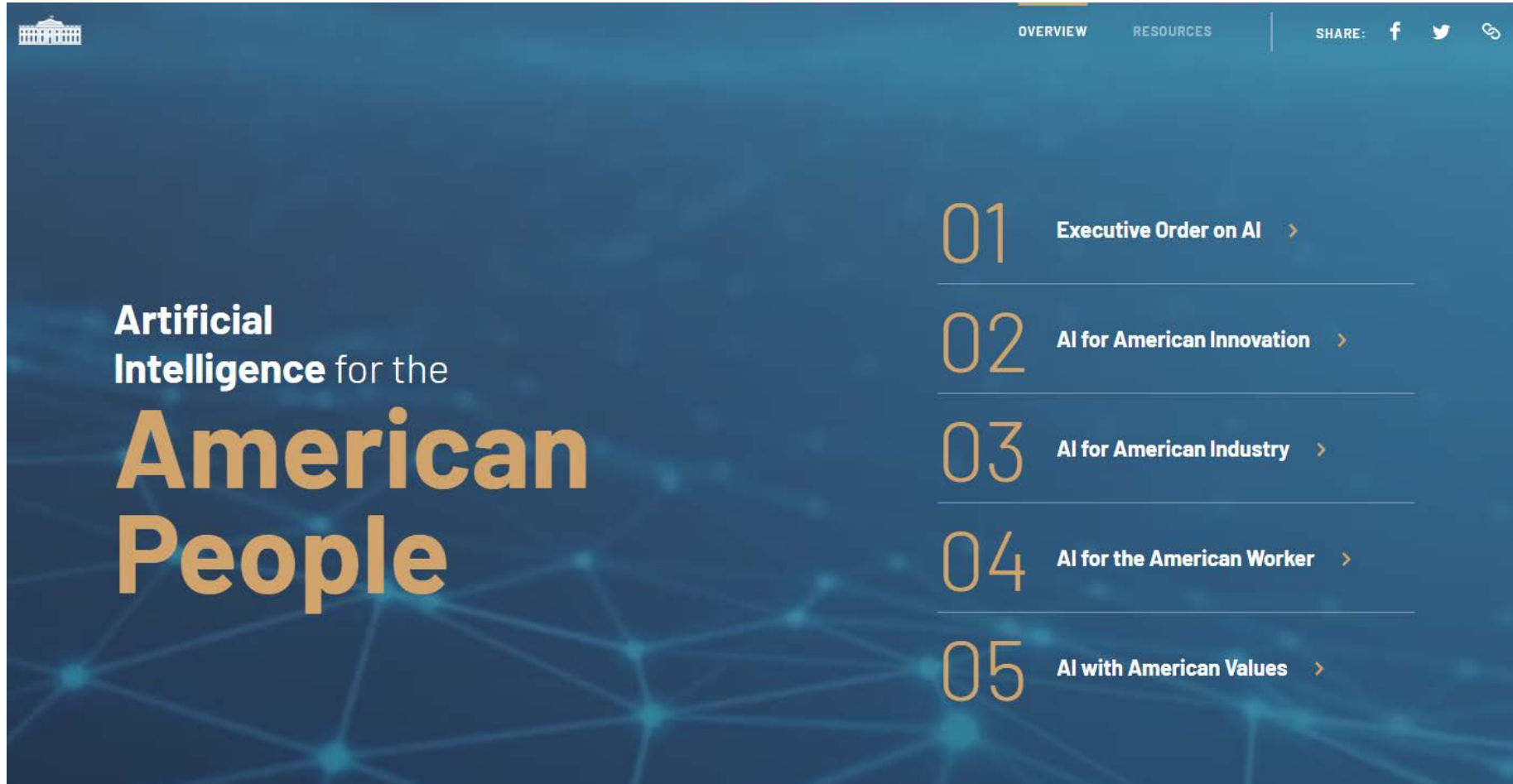
Summary of Key Messages:

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AI.gov – “All of Government” Portal for Federal AI Activities



Artificial Intelligence for the **American People**

- 01 Executive Order on AI >
- 02 AI for American Innovation >
- 03 AI for American Industry >
- 04 AI for the American Worker >
- 05 AI with American Values >

OVERVIEW RESOURCES SHARE: f t l



AI for the American People

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Ensure AI-Ready Workforce

Defend National Security

Defend national security

Lead in responsible use of AI to ensure continued national security



Thank you!

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