CREATE AI Act of 2023: Building Tomorrow's Computer Lab

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Executive Summary

- In response to rising costs to train next-generation artificial intelligence (AI) models and increasing talent concentration in AI research and development, a bipartisan, bicameral group of lawmakers introduced the "Creating Resources for Every American To Experiment with Artificial Intelligence Act of 2023" (CREATE AI Act) to expand resources and funding to lower market barriers to entry for AI research and development.

- The CREATE AI Act would direct two agencies to establish and oversee the National Artificial Intelligence Research Resource (NAIRR), designed to promote AI innovation, capability, and capacity and diversify and increase opportunities for AI research and development.

- As Congress debates the bill, it should consider how overlapping responsibilities for funding and oversight of the NAIRR – and possible requirements related to diversity, equity, inclusion, and accessibility – could inhibit the resource's effectiveness.

Introduction

In response to rising costs to train next-generation artificial intelligence (AI) models and increasing talent concentration in AI research and development (R&D), a bipartisan, bicameral group of lawmakers introduced the "Creating Resources for Every American To Experiment with Artificial Intelligence Act of 2023" (CREATE AI Act). The bill directs two agencies to establish a National Artificial Intelligence Research Resource (NAIRR) to expand access to and implementation of AI research and development. Building larger, more powerful models currently requires more computing power, more advanced semiconductors, and more data. Some researchers and business leaders have highlighted high upfront costs associated with training frontier models – the next generation of large-scale general purpose machine learning (ML) models – noting it may become harder for small firms to compete with established players and for startups and academics to contribute to future advances. These factors could entrench cutting-edge AI research and development (R&D) within a few firms.

The CREATE AI Act would establish processes to create and oversee the NAIRR, which would be tasked with increasing U.S. AI research capacity and capabilities. Rather than create a new AI-focused agency, the legislation proposes a diffuse approach to oversight and funding of the NAIRR. The NAIRR would make resources such as computing power and cloud storage, high-quality data sets, and educational materials available to researchers and students to spur innovation, allow more individuals to create and improve AI, and encourage responsible uses of AI/ML in the public and private sectors.

Members of Congress should be aware of potential structural weaknesses within the construction, oversight, and implementation of the NAIRR. One potential pain-point stems from federal agencies' overlapping responsibilities for funding and oversight. Another potential concern relates to possible requirements for

diversity, equity, inclusion, and accessibility (DEIA) within the NAIRR, which could run afoul of the recent Supreme Court decision banning certain types of affirmative action and detract from the NAIRR's other goals. Further, the diffuse funding structure could be undermined by uncertainty of non-defense discretionary funding levels.

Concentration Concerns with Foundational and Frontier AI Models

While many of the most advanced AI models are available in some form for free, including open-source options such as Meta's Llama-2 and the United Arab Emirates' Falcon, firms are spending millions to billions of dollars bringing them to market. These "foundation models" – large-scale, general purpose machine learning models that serve as a foundation for downstream tasks – are growing in terms of capabilities and costs.

There is no consensus on how much it costs to train a "frontier model" – the next generation of a foundation model – but estimates are as low as $5 million and as high as $200 million. Some researchers predict that as models continue to advance, the cost of building and training models will rise accordingly, with one source forecasting that building a cutting-edge system could cost $500 million by 2030.

Complementing the rising costs to build new models is the growing role that industry is playing in new research related to AI. High upfront capital costs to build larger and more complicated models mean that if researchers want to work on the latest technology, there is a limited number of places where such research is possible. Industry leading the charge on research is not necessarily a problem, but this dynamic could limit future breakthroughs to just a few firms, as well as potentially minimize the ability of academics or startups to contribute to the field.

Concerns about concentration in the tech industry are not new, even in the field of AI. The Federal Trade Commission recently opened an inquiry into OpenAI and has sought to block mergers and open inquiries touching technology such as virtual reality, cloud computing, and video games. The CREATE AI Act is intended to extend access to the resources necessary to build, test, and understand the frontier models going forward.

Schematics for the NAIRR

The CREATE AI Act calls for the creation of a National Artificial Intelligence Research Resource to ensure researchers, educators, and students have access to computational resources, high-quality data, educational tools, and user support. A report on creating the NAIRR published in January 2023 establishes four key goals the investment seeks to accomplish: spur innovation, increase diversity of talent, improve capacity, and advance trustworthy AI. Proponents argue that the NAIRR can help lower barriers to participation in the AI research sector and increase capacity and capabilities in the United States.

The structure of the NAIRR outlined in the bill proposes a diffuse approach to funding, oversight, and authority. There are three main structural components: first, a steering committee, created and chaired by the director of the Office of Science and Technology Policy (OSTP), which will set the strategic direction and help coordinate procurement for the NAIRR; second, a program management office (PMO), established by the director of the National Science Foundation (NSF) to oversee day-to-day functions of the NAIRR; third, the operating entity, which will be in charge of operating the NAIRR. The NAIRR itself can be an individual entity or consortium of entities, such as universities, federally funded research and development centers, and public or private laboratories responsible for building out the cyberinfrastructure – the infrastructure, hardware, and software

necessary to research and build AI/ML systems – and overseeing day-to-day operations to achieve the goals defined in the bill.

Strengths and Weaknesses of the NAIRR

Strengths

One strength of the NAIRR is the emphasis on interagency coordination to fund R&D. One of the steering committee's main responsibilities is to help coordinate procurement for the NAIRR and build multi-agency funding strategies. The federal government spent more than $2.5 billion on AI-specific R&D in FY 2022 and requested $2.94 billion for FY 2023. Multi-agency projects can attempt to minimize duplicative funding and promote collaboration between agencies to maximize federal R&D dollars and create positive spillovers across the federal government. Such benefits are difficult to capture, however, so the PMO and steering committee should consider how to measure and evaluate the costs and benefits of the program structure within the required yearly performance reports of the NAIRR and steering committee.

Another beneficial aspect of NAIRR is the emphasis on fortifying talent pipelines and expanding access to cutting-edge computational resources and high-quality data. While companies across the U.S. economy are attempting to adopt various AI-powered technologies, some are highlighting the shortage of workers with the requisite skills to meet growing demand. A constrained supply of AI-trained workers will raise the wages firms are willing to pay for top talent, which could lead to further depletion of skilled AI/ML researchers working within academia, the public sector, and for small businesses. Making cutting-edge computing infrastructure and data available to researchers could help retain talent within academia and the public sector, lower barriers to entry for young researchers and future entrepreneurs, as well as expand opportunities for more AI/ML researchers now and moving forward.

By diffusing responsibilities related to procurement, oversight, and strategic planning, the NAIRR's structure can benefit from OSTP and NSF's comparative advantages within the federal R&D portfolio. OSTP's expertise in crafting federal strategies for science and technology policy for the federal government and facilitating collaboration across agencies should be an asset to the steering committee. NSF's experience issuing and managing federal R&D grants, particularly with universities and federally funded research and development centers, makes it a suitable body to interact with and oversee the NAIRR. In this context, the PMO can focus on coordination, procurement, and evaluation of key metrics, allowing the NAIRR to concentrate on day-to-day operations.

Weaknesses

While the NAIRR's emphasis on collaboration has benefits, it also includes many veto points and overlapping responsibilities that could undermine the resource's functionality. The legislation's structure vests various levels of authority and decision rights within the steering committee, PMO, and the NAIRR. Within each of these bodies, however, there are additional subcommittees, advisory committees, and other bureaucratic layers that will have input into procurement, creating key performance indicators, and asset allocation. Reviews related to procurement or asset allocation could become bogged down because of overlapping authority. This could degrade the effectiveness of the NAIRR by impeding resource procurement and extending the time it takes to make strategic decisions.

Another potential weakness stems from how DEIA mandates could be incorporated within the NAIRR,

including the products of AI R&D. The bill's text does not specify how the NAIRR should advance priorities for diversity and historically underrepresented groups. The NAIRR implementation report, however, recommends the NAIRR incorporate DEIA in all aspects of the resource, which could create a tradeoff impacting other goals such as increasing AI capacity and capabilities and boosting innovation. For example, if the NAIRR were to require a disparate impact standard for any research or product developed with NAIRR funding, this could reduce the production of potentially beneficial insights and capabilities. The recent Supreme Court ruling curtailing affirmative action within college admissions could impact efforts related to resource allocation and admissions criteria for the NAIRR considering the important role university-affiliated researchers are likely to play in contributing to and utilizing the resource. Lawmakers could consider how merit-based standards currently used by federal agencies in the context of DEIA and experience in building beneficial research partnerships can ensure scarce assets are being allocated efficiently and equitably to avoid potential legal problems while still expanding access to AI R&D.

Finally, the federated nature of resource procurement could undermine stability of financing for projects housed within the NAIRR. The legislation specifies that funding for projects housed within the NAIRR are procured from agency budgets, which means researchers and institutions may face variability and funding shortfalls depending on which agency underwrites their research. Cutting non-defense spending has been a focus for some members of Congress and other efforts to boost federal R&D spending have faced roadblocks and shortfalls. This uncertainty could act as a disincentive for some researchers to utilize the NAIRR due to a lack of funding security compared to private sector alternatives. Further, agencies with larger budgets could have an outsize influence on the types of research and researchers who receive funding. It will be up to the NAIRR's advisory committee(s), the PMO, and steering committee to accurately track agency investment to ensure the goals of the NAIRR are being met.

Conclusion

The beneficial aspects of the NAIRR structure can help ensure the drafters' goals of expanding access to cutting-edge computational resources and high-quality data for the design of future AI are met. Nevertheless, lawmakers should be cognizant of the tradeoffs these structures create, in particular, how overlapping responsibilities, DEIA provisions, and funding variability could inhibit the NAIRR from achieving its stated goals.