



Engine's response to the White House Office of Science and Technology Policy's request for information on artificial intelligence (AI)

Engine appreciates this opportunity to provide input on the promise of Artificial Intelligence (AI) technologies and the challenges and benefits that they present.

Topic One: The legal and governance implications of AI

In Engine's work with startups at the forefront of innovation, we regularly consider how policymakers should interact with emerging technologies that present new opportunities and challenges. Since technological innovation typically moves at an exponentially quicker pace than policymaking, government officials often find themselves reacting to new innovations without a full understanding of the technologies at issue or the consequences of their proposed laws or regulations. As such, we appreciate the White House's efforts to learn more about this emergent technology and believe it is important that the government continue its engagement with stakeholders on these important issues.

Academics and researchers have been exploring AI for decades, but thanks to recent advances in computing power, internet connectivity, cloud computing, and access to data, what was once just a theoretical endeavor has edged closer to reality. While the full potential of AI has not yet been realized, certain AI technologies are already a part of our everyday lives, delivering benefits to consumers and businesses through applications and techniques like smartphone speech recognition, form auto-completion, e-commerce recommendations, spam filtering, and facial recognition. AI is also powering emerging industries like robotics, unmanned aircraft systems, and self-driving cars.

While some of these advancements have been led by larger technology companies, many of the breakthroughs in AI are being driven by startups. As nimble businesses with the ability to act quickly and focus on riskier ideas, startups are well-positioned to lead in some of the most innovative applications of AI. Additionally, investor interest in AI ventures is at an all-time high, making it easier for startups to more effectively compete with larger players in the AI space. According to market research firm CB Insights, funding for AI startups increased by more than 400% between 2011 and 2015. The firm estimates that investments will continue to increase, growing 76 percent to \$1.2 billion this year. Additionally, over the past 5 years, larger corporations have acquired more than 30 startups working on AI technologies.

AI has potentially limitless applications across numerous sectors. Below are examples of startups that are already harnessing the power of AI to disrupt and transform existing industries:

Healthcare: The startup Enlitic is using deep learning and image analysis to help doctors spot abnormalities in medical images like x-rays and CT scans to make faster, more accurate medical diagnoses. Another startup, Sensely, has used AI to create a virtual nurse that helps clinicians manage their chronic care patients between appointments.

Transportation: The startup comma.ai is developing an autonomous car kit that will allow drivers to transform any non-autonomous vehicle into a self-driving car. Civil Maps is working on 3-D maps, powered by AI, to help autonomous vehicles navigate roads more easily and safely.

Energy: Verdigris installs sensors in commercial facilities to learn how energy is used and applies machine learning and AI to optimize energy consumption and operational efficiency.

Cybersecurity: Red Owl is using AI and machine learning to help businesses detect insider threats and Cylance is applying the same technologies to predict and combat advanced cyber threats.

Financial Services: The startup Neurensic is using AI and machine learning to help identify and prevent financial fraud and market manipulation.

Education: Volley Labs has created a software that layers machine learning over materials like textbooks and homework assignments to pull out key details, identify additional resources for learning, and even create quizzes or study guides. Cognii is using an AI technology known as natural language processing to help evaluate and grade essays.

These are just a few examples of how startups are driving innovation across industries. They not only illustrate the positive impact that AI is already having, but also foreshadow an exciting future. The applications of AI with the most promise have likely not even been conceived of yet. As research and development of AI technologies advance, innovators will build on this progress to create incredible new products and services that provide value to consumers and improve lives.

Policymakers should keep this tremendous potential in mind when approaching AI and establish a legal framework that encourages innovation and growth. America led the world in the personal computing and Internet revolutions. The policies pursued today will directly impact the future ability of the U.S. to remain a global leader in the emerging field of AI. Policymakers should keep the following points in mind as they consider the legal and governance implications of AI.

1. AI technologies are diverse.

At the highest level, policymakers should recognize the diversity of emerging AI applications and avoid uniform, one-size-fits-all rules that do not lend themselves to the complexity of AI. For example, regulations around autonomous vehicles should look markedly different than rules governing the application of AI in healthcare. The term AI itself is incredibly broad, covering everything from content recommendation engines to the hypothetical sentient beings that dominate science fiction and the popular imagination. Speculative concerns about the latter should not unduly deter progress in the former.

2. Policies should encourage growth, not hamper progress.

Policymakers should also weigh the costs and benefits of potential rules, avoiding overly burdensome regulations and reactionary policies that inhibit the growth of AI. Just this week, the U.S. Department of Transportation hinted that it might pursue new rules that would require pre-approval of autonomous vehicle technologies before they reach the road. While the government has an important role in ensuring quality and safety, certain policies have the potential to drastically slow the development and adoption of transformative technologies. Since many AI applications depend on machine learning algorithms to improve their functioning, restricting their deployment may actually slow down the development of safety protocols. The direct and indirect impacts of any policy should be carefully considered before acting.

3. There is an existing body of law that already governs AI.

Among the more imminent issues surrounding the development of AI technologies are questions about how data is captured, used, treated, and protected. AI technologies enable and sometimes require the collection and analysis of massive amounts of data. This understandably raises questions around privacy and security. While appropriate safeguards are essential, we believe that laws and regulations already exist that can adequately govern emerging AI technologies. Concerns around privacy and security are related to the data inputs of AI systems, not the AI technologies themselves. The amount of data processed by AI systems may be greater than what is needed for most technologies, but AI systems do not implicate privacy or security threats of a sufficiently different kind than existing non-AI systems to warrant creating a separate regulatory structure. A body of constitutional, federal, state, and common law, as well as numerous principles and industry best practices have developed over the years that protect individual privacy and data security while supporting an environment where innovation can flourish. AI is well covered by these existing laws, regulations, and industry best practices. Attempting to create new rules tailored to AI will only delay the growth of AI technologies with no real public benefit.

4. Openness and collaboration will foster growth.

Finally, the government should support policies that promote openness and collaboration in AI. Not only does an open approach accelerate the evolution of AI and foster breakthroughs, it may also protect against some of the potential “threats” of AI down the road. As the experience of the open source software development has shown, greater participation from a wide range of individuals can greatly mitigate security risks and generate unanticipated use cases. Many companies have already taken a transparent and inclusive approach to AI on their own. For example, Google has open sourced its machine learning platform TensorFlow to make its tools broadly available. According to Greg Corrado, Senior Research Scientist on Google’s Machine Learning Team, the company chose to do this because “it’s valuable for the community overall to establish standards in this space. Machine learning will be a new fundamental technology, so the sooner the engineering community agrees on standards for how we build these kind of systems, the better it is for everyone.” Facebook has similarly open sourced its AI hardware design and deep-learning modules. Some leaders in AI have gone even further, creating OpenAI, a non-profit with a mission of advancing AI research and making their findings accessible to anyone. These steps are significant for startups, giving them a base to build

upon and fostering continued growth. Promoting open systems—including making certain government AI endeavors open-source—will greatly increase the pace of development in the sector.

AI technologies are quickly evolving and policymakers should be nimble in their approach. American startups have an opportunity to lead in the AI revolution as they have in all of the other major technological breakthroughs of the past decades. A similar light-touch regulatory approach and a commitment to collaboration and cooperation between the government and stakeholders will ensure the U.S. remains at the forefront of innovation.

Topic Four: The social and economic implications of AI

According to the firm Venture Scanner, there are currently 499 AI companies in the U.S., 415 of which are startups, and \$4.2 billion in VC funding for these companies. The same firm estimates that about 55 percent of these companies have 1-10 employees, 35 percent have 11-50 employees, and 10 percent have over 50 employees. Tens of thousands more work at startups that incorporate and/or leverage AI or machine learning but don't necessarily have it as a core business product. Going forward, as startups working on AI technologies grow in number and size, they will add thousands of jobs to our economy.