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Elham Tabassi
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100 Bureau Drive, Stop 200
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Dear Ms. Tabassi,

On behalf of Arm, I am pleased to provide comments in response to the request for information from the National Institute of Standards and Technology (NIST) on artificial intelligence (AI) standards.¹

Arm is the leading provider of intellectual property for semiconductor designs in the world and has driven significant advancement in AI and machine learning (ML) capabilities in smartphones and many other platforms.² Given Arm's common architecture, the company enables AI capabilities from the data center to the most highly constrained edge device, and everywhere in between. Arm also utilizes ML in the Pelion IoT platform, processing metadata from several areas - connectivity, operating systems, and applications - to detect cybersecurity threats, and optimize operations of IoT devices and the networks in which they operate. As such, Arm is squarely in the center of AI and ML development and deployment, and has a vested stake in seeing widespread utilization of the technology.

AI has the potential to provide immense benefits to productivity and innovation, so long as there is trust in the technology and it can ultimately be widely deployed. Consensus-based, voluntary, international standards underpin that trust and we are pleased NIST is soliciting input and establishing a plan for engagement in the development of these standards. As with all technologies, government engagement, understanding, support for and ultimately early adoption and utilization of AI can have tremendous benefits to consumer and broader market adoption. We therefore are pleased to provide comments on the standards efforts and similar in vain global efforts we believe are worth NIST and US government engagement.

Given the broad applicability envisioned for AI, strong technical standards will be important to ground the technology in fundamental areas including interoperability, reliability, safety and other essential norms. Given the known

¹ "Artificial intelligence Standards," Federal Register, May 1, 2019, <https://www.federalregister.gov/documents/2019/05/01/2019-08818/artificial-intelligence-standards>

² See <https://www.arm.com/solutions/artificial-intelligence>

capabilities of AI, standards that increase technology around the technology and the quality of such products will likely help to reduce public resentment to it. The ISO/IEC JTC 1/SC 42 standards committee is working on the development of standards across the AI ecosystem.³ This work will include foundational standards work, as well as related work not specifically in the technical standards space. Three standards have been published, and 11 more are in development.⁴ This seems like relevant work for NIST to engage.

Further, because of the wide range of use cases and the fact that AI systems will ultimately be replacing some level of human decision-making, significant focus has been paid to “ethical” guidelines, or as the Center for Data Innovation correctly phrased it, “oversight of AI systems.”⁵ While significant attention in the press, in the public sphere, and elsewhere has been paid to this, it is promising to see IEEE undertaking development of ethical standards in a similar manner it has approached technical standards through its P7000 series of standards development.⁶ The work has already produced a first edition publication on *Ethically Aligned Design*.

Given the heavy reliance on quality data to complement the algorithms in decision-making in AI systems, standards on data completeness and quality will also be important. The ISO 8000 series of standards may be applicable in some instances, in particular parts 120, 130, and 140 on provenance, accuracy, and completeness, respectively, but were not developed specifically for AI and ML. As such, future standards activity on data will be very important to AI and ML.

While not technical standards development, we do believe work like that being done by the Defense Advanced Research Projects Agency on explainable AI will be important.⁷ To that end, we commend NIST for its work on the recently released draft approach to explainable AI and ML.⁸ Explainability and transparency will be essential to building trust, as discussed earlier.

Important to stakeholders of NIST, such as Arm, is the harmonization of AI standards throughout the world. To that extent, Arm believes it is critical for the United States to work in coordination with similarly situated bodies addressing this issue. For example, in Europe, the United Kingdom’s Information Commissioner’s Office released on March 18, 2019 a request for comments as it would like a “framework will give us a solid methodology to audit AI applications

³ See <https://jtc1info.org/technology/artificial-intelligence/>

⁴ See <https://www.iso.org/committee/6794475.html>

⁵ See comments of Center for Data Innovation; May 10, 2019; <http://www2.datainnovation.org/2019-nist-ai-standards.pdf>

⁶ See <https://standards.ieee.org/industry-connections/ec/autonomous-systems.html>

⁷ See <https://www.darpa.mil/program/explainable-artificial-intelligence>

⁸ See <https://csrc.nist.gov/publications/detail/white-paper/2019/05/22/combinatorial-methods-for-explainability-in-ai-and-ml/draft>

and ensure they are transparent, fair; and to ensure that the necessary measures to assess and manage data protection risks arising from them are in place.”⁹ Though not technically not a “technical standard”, an auditing framework that businesses are subject to could potentially act as a “technical standard”. The Administration’s adoption of the OECD’s Principles on Artificial Intelligence on May 22, 2019 represents a possible vessel for cooperation with other critical OECD member countries such as the United Kingdom, Canada and 39 other countries that all agreed on key principles. The OECD states “[w]hile not legally binding, existing OECD Principles in other policy areas have proved highly influential in setting international standards and helping governments to design national legislation.”

A potential challenge to U.S. effectiveness and leadership in this area is the U.S. system of federalism, which is shared governance between national and state governments. Failure of the federal government to act prominently and prior to states as relates to the governance of AI risks a similar situation to that described above in which various nations enact sometimes contradictory frameworks that companies must adhere to. Such a situation has the potential to exist in privacy laws such as the California Consumer Privacy Act (CCPA) which has placed companies such as Arm in a situation where it has to simultaneously comply with multiple laws such as the CCPA, GDPR and numerous other state and international privacy laws. The costs associated with compliance in multiple jurisdictions are high, but because the regulatory environment associated with AI is still in its infancy, the U.S. has an opportunity to positively lower these costs through a comprehensive and well-coordinated effort with other nations confronting these challenges.

A prominent example of Federal involvement in the standards arena that could serve as a model for the Plan is the U.S. Securities and Exchange Commission’s Office of International Affairs. When describing how it achieves its mission it states that it does it by “advancing international regulatory and enforcement cooperation, promoting the adoption of high regulatory standards worldwide and formulating technical assistance programs to strengthen the regulatory infrastructure in global financial markets.”¹⁰ Within the regulatory arena, the SEC’s Office of International Affairs is commonly lauded for its work to achieve cooperation and consistency with other nations in the areas of anti-bribery/corruption and accounting regulations.¹¹ Similarly, NIST’s Office of International Affairs could take an active role in international policy organizations with an aim toward harmonization and standardization in AI standards as well as with associated enforcement. However, as AI is a general

⁹ <https://ai-auditingframework.blogspot.com/2019/03/simon-mcdougall-director-for-technology.html>

¹⁰ https://www.sec.gov/about/offices/oia/oia_intlorg.shtml

¹¹ <https://www.sec.gov/news/speech/speech-peikin-120318> & https://www.sec.gov/about/offices/oia/oia_regpolicy.shtml



technology, similar to gas, its use is still most likely requires input and oversight from the agencies most closely associated with a particular use case. NIST can be a valuable asset in helping to achieve the installation of common frameworks with the multitude of agencies that will inevitably be impacted by this technology. Such an act would promote consistency, which ultimately promotes commerce and innovation.

In general, the comments in this letter stand for the proposition that any standards put into place by the Federal government, if any, will be most effective if they are put into place in coordination, to the extent possible, with the global commercial community. This coordination with the global community ensures diversity of thought, rigor of analysis and ultimately the wider adoption of U.S. norms in the global commercial system impacted by AI.

Again, Arm appreciates the opportunity to provide feedback and for NIST's important role and leadership in standards development. Please let us know if we can provide additional information in this area.

Respectfully Submitted,

/s/

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