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October 14, 2020

P. Jonathon Philips, Et Al.
Information Access Division
National Institute of Standards and Technology
44100 Bureau Drive (Mail Stop 8940)
Gaithersburg, MD 20899

Re: *Draft NISTIR 8312, “Four Principles of Explainable Artificial Intelligence”*

Dear Mr. Philips,

As the leading trade association representing the manufacturers of medical imaging equipment and radiopharmaceuticals, the Medical Imaging & Technology Alliance (MITA) believes in the importance of innovative artificial intelligence (AI) applications to empower the healthcare sector. MITA Members have decades of experience developing and deploying AI which learns and performs specialized tasks for patients. As leaders in the field, we support the National Institute of Standards and Technology (NIST) in its pursuit of its goal to clarify explainability for AI applications and enable public trust in AI technology. The following comments, including those enumerated in Appendix A, are provided in support of that goal.

One difficulty we encountered in the draft document was clarity surrounding the chosen terminology for each pillar. “Explanation” as a pillar of explainability was particularly challenging. We would recommend NIST consider revising the label of each pillar to more accurately reflect the achievement of the characteristics highlighted in each pillar concept: Does an explanation exist? Is it meaningful? Is it accurate? Does it contain knowledge limits? For example, “Explanation” could be rewritten “Explanation Generated”. Additionally, NIST should consider moving “Explanation Accuracy” to be next to the “Explanation” section as they are closely related to each other.

We also suggest that the definition of Knowledge Limits on line 169 be aligned with the definition on line 228. The current phrasing on line 169 focuses on what the application can do, but since the term is “Knowledge Limits”, we believe the focus should be on what the product cannot do. We suggest using the text from 228 in line 169: “The systems identify cases they were not designed or approved to operate, or their answers are not reliable.”

Similarly, the types of explanations iterated in section 3 (line 245) seem to refer to types, or kinds, of explanation, but instead give examples of instances where an explanation might be necessary. We would recommend that NIST consider renaming the section to clarify that these

are instances of explanation and separate the latter portion of the section (from line 299) to discuss explanation detail level.

We found Sections 5 and 6 to be both accurate and informative. The evaluation of machine explainability and human explainability provided clear support for what is reasonable to expect from machine learning algorithms. We encourage NIST to incorporate the conclusions drawn from these sections into the introduction.

Innovative AI applications have the power to significantly improve patient care. This publication will be an important step to foster innovation. We support NIST in its efforts and look forward to continued engagement across the Federal government to ensure the primacy and excellence of AI in the United States healthcare sector.

Sincerely,

A handwritten signature in black ink, appearing to read "Patrick Hope". The signature is fluid and cursive, with a large initial "P" and "H".

Patrick Hope
Executive Director, MITA

MITA is the collective voice of medical imaging equipment and radiopharmaceutical manufacturers, innovators and product developers. It represents companies whose sales comprise more than 90 percent of the global market for medical imaging technology. These technologies include: magnetic resonance imaging (MRI), medical X-Ray equipment, computed tomography (CT) scanners, ultrasound, nuclear imaging, radiopharmaceuticals, radiation therapy equipment, and imaging information systems. Advancements in medical imaging are transforming health care through earlier disease detection, less invasive procedures and more effective treatments. The industry is extremely important to American healthcare and noted for its continual drive for innovation, fast-as-possible product introduction cycles, complex technologies, and multifaceted supply chains. Individually and collectively, these attributes result in unique concerns as the industry strives toward the goal of providing patients with the safest, most advanced medical imaging currently available.

<i>Line #</i>	<i>COMMENTS</i>	<i>Proposed change (if any)</i>
254-258	<p>Explainability for societal acceptance is in line with the European Commission's definition of principle of explainability: Explicability is crucial for building and maintaining users' trust in AI systems. This means that processes need to be transparent, the capabilities and purpose of AI systems openly communicated, and decisions – to the extent possible – explainable to those directly and indirectly affected. Without such information, a decision cannot be duly contested. An explanation as to why a model has generated a particular output or decision (and what combination of input factors contributed to that) is not always possible. These cases are referred to as 'black box' algorithms and require special attention. In those circumstances, other explicability measures (e.g. traceability, auditability and transparent communication on system capabilities) may be required, provided that the system as a whole respects fundamental rights. The degree to which explicability is needed is highly dependent on the context and the severity of the consequences if that output is erroneous or otherwise inaccurate." It is recommended to capture explainability concepts from the European Commission's Ethics Guidelines for Trustworthy AI</p>	<p>Capture explainability concepts from the European Commission's Ethics Guidelines for Trustworthy AI</p>

160	<i>"output is the result of a query to an AI system": The output of and AI system is not necessarily as result of a query, could be a periodic output also, unqueried.</i>	Change sentence to: "The output may the result of a query or may be a periodic output (unqueried)."
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