116TH CONGRESS
1ST SESSION

S. 2904

To direct the Director of the National Science Foundation to support research on the outputs that may be generated by generative adversarial networks, otherwise known as deepfakes, and other comparable techniques that may be developed in the future, and for other purposes.

IN THE SENATE OF THE UNITED STATES

NOVEMBER 20, 2019

Ms. CORTEZ MASTO (for herself and Mr. MORAN) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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A BILL

To direct the Director of the National Science Foundation to support research on the outputs that may be generated by generative adversarial networks, otherwise known as deepfakes, and other comparable techniques that may be developed in the future, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*

2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the "Identifying Outputs

5 of Generative Adversarial Networks Act" or the "IOGAN

6 Act".

SEC. 2. FINDINGS.

Congress finds the following:

(1) Research gaps currently exist on the underlying technology needed to develop tools to identify authentic videos, voice reproduction, or photos from manipulated or synthesized content, including those generated by generative adversarial networks.

(2) The National Science Foundation's focus to support research in artificial intelligence through computer and information science and engineering, cognitive science and psychology, economics and game theory, control theory, linguistics, mathematics, and philosophy, is building a better understanding of how new technologies are shaping the society and economy of the United States.

(3) The National Science Foundation has identified the "10 Big Ideas for NSF Future Investment" including "Harnessing the Data Revolution" and the "Future of Work at the Human-Technology Frontier", in with artificial intelligence is a critical component.

(4) The outputs generated by generative adversarial networks should be included under the umbrella of research described in paragraph (3) given the grave national security and societal impact potential of such networks.

1   (5) Generative adversarial networks are not
2   likely to be utilized as the sole technique of artificial
3   intelligence or machine learning capable of creating
4   credible deepfakes. Other comparable techniques
5   may be developed in the future to produce similar
6   outputs.

7 **SEC. 3. NSF SUPPORT OF RESEARCH ON MANIPULATED OR**
8   **SYNTHESIZED CONTENT AND INFORMATION**
9   **SECURITY.**

10   The Director of the National Science Foundation, in
11 consultation with other relevant Federal agencies, shall
12 support merit-reviewed and competitively awarded re-
13 search on manipulated or synthesized content and infor-
14 mation authenticity, which may include—

15   (1) fundamental research on digital forensic
16   tools or other technologies for verifying the authen-
17   ticity of information and detection of manipulated or
18   synthesized content, including content generated by
19   generative adversarial networks;

20   (2) fundamental research on technical tools for
21   identifying manipulated or synthesized content, such
22   as watermarking systems for generated media;

23   (3) social and behavioral research related to
24   manipulated or synthesized content, including the

1 ethics of the technology and human engagement
2 with the content;

3   (4) research on public understanding and
4 awareness of manipulated and synthesized content,
5 including research on best practices for educating
6 the public to discern authenticity of digital content;
7 and

8   (5) research awards coordinated with other
9 Federal agencies and programs, including the Net-
10 working and Information Technology Research and
11 Development Program, the Defense Advanced Re-
12 search Projects Agency, and the Intelligence Ad-
13 vanced Research Projects Agency.

SEC. 4. NIST SUPPORT FOR RESEARCH AND STANDARDS ON
14
GENERATIVE ADVERSARIAL NETWORKS.
15

16 (a) IN GENERAL.—The Director of the National In-
17 stitute of Standards and Technology shall support re-
18 search for the development of measurements and stand-
19 ards necessary to accelerate the development of the tech-
20 nological tools to examine the function and outputs of gen-
21 erative adversarial networks or other technologies that
22 synthesize or manipulate content.

23 (b) OUTREACH.—The Director of the National Insti-
24 tute of Standards and Technology shall conduct out-
25 reach—

1   (1) to receive input from private, public, and
2 academic stakeholders on fundamental measure-
3 ments and standards research necessary to examine
4 the function and outputs of generative adversarial
5 networks; and

6   (2) to consider the feasibility of an ongoing
7 public and private sector engagement to develop vol-
8 untary standards for the function and outputs of
9 generative adversarial networks or other technologies
10 that synthesize or manipulate content.

11 **SEC. 5. REPORT ON FEASIBILITY OF PUBLIC-PRIVATE**
12   **PARTNERSHIP TO DETECT MANIPULATED OR**
13   **SYNTHESIZED CONTENT.**

14   Not later than 1 year after the date of enactment
15 of this Act, the Director of the National Science Founda-
16 tion and the Director of the National Institute of Stand-
17 ards and Technology shall jointly submit to the Committee
18 on Science, Space, and Technology of the House of Rep-
19 resentatives, the Subcommittee on Commerce, Justice,
20 Science, and Related Agencies of the Committee on Appro-
21 priations of the House of Representatives, the Committee
22 on Commerce, Science, and Transportation of the Senate,
23 and the Subcommittee on Commerce, Justice, Science,
24 and Related Agencies of the Committee on Appropriations
25 of the Senate a report containing—

1   (1) the Directors' findings with respect to the

2   feasibility for research opportunities with the private

3   sector, including digital media companies to detect

4   the function and outputs of generative adversarial

5   networks or other technologies that synthesize or

6   manipulate content; and

7   (2) any policy recommendations of the Direc-

8   tors that could facilitate and improve communication

9   and coordination between the private sector, the Na-

10 tional Science Foundation, and relevant Federal

11 agencies through the implementation of innovative

12 approaches to detect digital content produced by

13 generative adversarial networks or other technologies

14 that synthesize or manipulate content.

15 **SEC. 6. GENERATIVE ADVERSARIAL NETWORK DEFINED.**

16   In this Act, the term "generative adversarial net-

17 work" means, with respect to artificial intelligence, the

18 machine learning process of attempting to cause a gener-

19 ator artificial neural network (referred to in this para-

20 graph as the "generator") and a discriminator artificial

21 neural network (referred to in this paragraph as a "dis-

22 criminator") to compete against each other to become

23 more accurate in their function and outputs, through

24 which the generator and discriminator create a feedback

25 loop, causing the generator to produce increasingly higher-

1 quality artificial outputs and the discriminator to increas-

2 ingly improve in detecting such artificial outputs.

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