116TH CONGRESS
1ST SESSION

H. R. 4355

IN THE SENATE OF THE UNITED STATES

DECEMBER 10, 2019

Received; read twice and referred to the Committee on Commerce, Science, and Transportation

AN ACT

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".

7 **SEC. 2. FINDINGS.**

8 Congress finds the following:

9 (1) Research gaps currently exist on the under-

10 lying technology needed to develop tools to identify

11 authentic videos, voice reproduction, or photos from

12 manipulated or synthesized content, including those

13 generated by generative adversarial networks.

14 (2) The National Science Foundation's focus to

15 support research in artificial intelligence through

16 computer and information science and engineering,

17 cognitive science and psychology, economics and

18 game theory, control theory, linguistics, mathe-

19 matics, and philosophy, is building a better under-

20 standing of how new technologies are shaping the

21 society and economy of the United States.

22 (3) The National Science Foundation has iden-

23 tified the "10 Big Ideas for NSF Future Invest-

24 ment" including "Harnessing the Data Revolution"

25 and the "Future of Work at the Human-Technology

1 Frontier'', in with artificial intelligence is a critical
2 component.

3   (4) The outputs generated by generative adver-
4   sarial networks should be included under the um-
5   brella of research described in paragraph (3) given
6   the grave national security and societal impact po-
7   tential of such networks.

8   (5) Generative adversarial networks are not
9   likely to be utilized as the sole technique of artificial
10   intelligence or machine learning capable of creating
11   credible deepfakes and other comparable techniques
12   may be developed in the future to produce similar
13   outputs.

SEC. 3. NSF SUPPORT OF RESEARCH ON MANIPULATED OR
SYNTHESIZED CONTENT AND INFORMATION
SECURITY.

17   The Director of the National Science Foundation, in
18 consultation with other relevant Federal agencies, shall
19 support merit-reviewed and competitively awarded re-
20 search on manipulated or synthesized content and infor-
21 mation authenticity, which may include—

22   (1) fundamental research on digital forensic
23   tools or other technologies for verifying the authen-
24   ticity of information and detection of manipulated or

1 synthesized content, including content generated by

2 generative adversarial networks;

3   (2) fundamental research on technical tools for

4 identifying manipulated or synthesized content, such

5 as watermarking systems for generated media;

6   (3) social and behavioral research related to

7 manipulated or synthesized content, including the

8 ethics of the technology and human engagement

9 with the content;

10   (4) research on public understanding and

11 awareness of manipulated and synthesized content,

12 including research on best practices for educating

13 the public to discern authenticity of digital content;

14 and

15   (5) research awards coordinated with other fed-

16 eral agencies and programs including the Net-

17 working and Information Technology Research and

18 Development Program, the Defense Advanced Re-

19 search Projects Agency and the Intelligence Ad-

20 vanced Research Projects Agency.

21 **SEC. 4. NIST SUPPORT FOR RESEARCH AND STANDARDS ON**

22   **GENERATIVE ADVERSARIAL NETWORKS.**

23   (a) IN GENERAL.—The Director of the National In-

24 stitute of Standards and Technology shall support re-

25 search for the development of measurements and stand-

1 ards necessary to accelerate the development of the tech-

2 nological tools to examine the function and outputs of gen-

3 erative adversarial networks or other technologies that

4 synthesize or manipulate content.

5 (b) OUTREACH.—The Director of the National Insti-

6 tute of Standards and Technology shall conduct out-

7 reach—

8 (1) to receive input from private, public, and

9 academic stakeholders on fundamental measure-

10 ments and standards research necessary to examine

11 the function and outputs of generative adversarial

12 networks; and

13 (2) to consider the feasibility of an ongoing

14 public and private sector engagement to develop vol-

15 untary standards for the function and outputs of

16 generative adversarial networks or other technologies

17 that synthesize or manipulate content.

18 **SEC. 5. REPORT ON FEASIBILITY OF PUBLIC-PRIVATE**

19 **PARTNERSHIP TO DETECT MANIPULATED OR**

20 **SYNTHESIZED CONTENT.**

21 Not later than 1 year after the date of the enactment

22 of this Act, the Director of the National Science Founda-

23 tion and the Director of the National Institute of Stand-

24 ards and Technology shall jointly submit to the Committee

25 on Space, Science, and Technology of the House of Rep-

1 resentatives and the Committee on Commerce, Science,

2 and Transportation a report containing—

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

4   feasibility for research opportunities with the private

5   sector, including digital media companies to detect

6   the function and outputs of generative adversarial

7   networks or other technologies that synthesize or

8   manipulate content; and

9   (2) any policy recommendations of the Direc-

10   tors that could facilitate and improve communication

11   and coordination between the private sector, the Na-

12   tional Science Foundation, and relevant Federal

13   agencies through the implementation of innovative

14   approaches to detect digital content produced by

15   generative adversarial networks or other technologies

16   that synthesize or manipulate content.

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

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

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

20 machine learning process of attempting to cause a gener-

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

22 graph as the "generator" and a discriminator artificial

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

24 criminator") to compete against each other to become

25 more accurate in their function and outputs, through

1 which the generator and discriminator create a feedback

2 loop, causing the generator to produce increasingly higher-

3 quality artificial outputs and the discriminator to increas-

4 ingly improve in detecting such artificial outputs.

Passed the House of Representatives December 9, 2019.

Attest: CHERYL L. JOHNSON,

Clerk.